Pontifícia Universidade Católica
do Rio de Janeiro

Luisa Cruz Lobato

A world made of apps?

Algorithms and (in)security governance in the Global South

Tese de Doutorado

Thesis presented to the Programa de Pós–graduação em Pós-Graduação em Relações Internacionais, do Instituto de Relações InternacionaisRelações Internacionais da PUC-Rio in partial fulfillment of the requirements for the degree of Doutor em Pós-Graduação em Relações Internacionais.

Advisor: Prof. Anna Leander

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To my parents, for their support
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Miguel, I do not think what I have to say can be expressed in words. Thank you. A zillion.

Abstract

Lobato, Luisa Cruz; Leander, Anna (Advisor). **A world made of apps?Algorithms and (in)security governance in the Global South**. Rio de Janeiro, 2021. 271p. Tese de Doutorado – Instituto de Relações Internacionais, Pontifícia Universidade Católica do Rio de Janeiro.

This work looks at how apps enact insecurity in/of the Global South in order to understand the algorithmic mediation of security governance. Apps are manifestations of computation whose power resides in their proximity with end-users and alleged democratizing and empowering roles. At the same time, however, apps are embedded into and replicate 'complicated' geopolitics of knowledge that cannot be understood by what I characterize as 'non-monstrous' forms of IR theorizing, which, wittingly or not, re-enact the containment of authority within the categories of the individual, the state and the international system. In contrast, monstrous forms of theorizing, such as those which attempt to account for the politics of (digital) artifacts and sociomateriality, disturb disciplinary boundaries, assumptions and representations of politics in order to expand and extend what is encompassed as the 'political' and the 'authoritative'. While engaging with efforts to account for the politics of both in security governance, this thesis argues that apps add layers of complication to our understanding of governance, of which I will be dealing with three: simplification, formalism and objectivity. In a second argumentative thrust, the thesis argues that these three layers are also logics of computation that give form to an app's authority, but not without being significantly transformed and repurposed in practice. To the extent that apps decisively embody both stories of democratic politics and unequal geopolitics of knowledge, we must acknowledge that practical questions pertaining to their governance work traverse the Global South, understood both as a category of thought about postcolonial entanglements and interactions traversed by digital technologies and a marker of knowledge hierarchies. This thesis, therefore, provides an alternative account of the interplays of power and authority in global (South) security politics. With this, the work moves away from abstract theorizing to look at computational governance 'on the ground', that is to say, in the sociopolitical contexts in which they operate, are designed, created and adapted. While doing so, it engages in empirical philosophy grounded on the use of ethnographic methods

and an 'anthropophagic' use of concepts developed by IR scholars, philosophers of technology, STS and digital politics scholars and philosophers and sociologists writing about power and inequality. Fieldwork was conducted between 2018 and 2021 with three security apps: Fogo Cruzado, EagleView 2.0, and UN SanctionsApp, and involves a collage of methods, ranging from participant observations, interviews, app 'walkthroughs' and bibliographical research. This messy combination of methods, objects and places cannot be seen as untangled from the broader conceptual thrust of the thesis, namely, that it is in and through the work of apps as authoritative components of governance in/of the Global South, that we can start to embrace the monsters that have been terrifying security politics for so long. And if we do so, we might finally be able to open authority to its processual, transversal, and manifold enactments through computation, itself understood as a situated, adaptable and contextual set of practices, which both reproduce and complicate knowledge hierarchies.

Keywords

Apps; Security governance; Global South.

Resumo

Lobato, Luisa Cruz; Leander, Anna. **Um mundo de aplicativos? Algoritmos e a governança da (in)segurança no Sul Global** Rio de Janeiro, 2021. 271p. Tese de Doutorado – Instituto de Relações Internacionais, Pontifícia Universidade Católica do Rio de Janeiro.

Resumo: Esse trabalho olha para como os aplicativos enactam a insegurança no/do Sul Global, de modo a compreender a mediação algorítmica da governança da segurança. Aplicativos são manifestações computacionais cujo poder reside em sua proximidade com o usuário final e em seu suposto papel democratizante e empoderante. Ao mesmo tempo, no entanto, esses apps estão embutidos e replicam uma geopolítica do conhecimento 'complicada' que não pode ser entendida pelo que caracterizo como formas 'não monstruosas' de teorização de RI, que, intencionalmente ou não, re-enactam a contenção da autoridade dentro das categorias do indivíduo, do estado e do sistema internacional. Em contraste, formas monstruosas de teorização, como aquelas que tentam explicar a política dos artefatos (digitais) e da sociomaterialidade, perturbam as fronteiras disciplinares, suas suposições e representações da política, a fim de expandir e estender o que é compreendido como "política" e "autoridade". Ao engajar-se com uma compreensão da política de ambas na governança de segurança, esta tese argumenta que os aplicativos adicionam camadas de complicação ao nosso entendimento de governança, das quais lidarei com três: simplificação, formalismo e objetividade. Em um segundo impulso argumentativo, a tese sustenta que essas três camadas também são lógicas de computação que dão forma à autoridade de um aplicativo, mas não sem serem significativamente transformadas e reaproveitadas na prática. Na medida em que os aplicativos incorporam de forma decisiva contos sobre políticas democráticas e geopolíticas desiguais do conhecimento, cabe reconhecer que as questões práticas relativas ao seu trabalho de governança atravessam o Sul Global, entendido tanto como uma categoria de pensamento sobre os emaranhados pós-coloniais e as interações atravessadas pelas tecnologias digitais, como um marcador de hierarquias de conhecimento. Esta tese, portanto, fornece uma explicação alternativa para as interações de poder e autoridade que compõem a política de segurança (do Sul) global. Com isso, afasta-se da teorização abstrata para olhar para a governança computacional 'no chão', ou

seja, nos contextos sociopolíticos em que opera, é concebida, criada e adaptada. Ao fazer isso, engaja-se em uma filosofia empírica baseada no uso de métodos etnográficos e no uso 'antropofágico' de conceitos desenvolvidos por estudiosos de RI, filósofos da tecnologia, estudiosos de política digital e STS, e filósofos e sociólogos que pensando poder e desigualdade. O trabalho de campo foi realizado entre 2018 e 2021 com três aplicativos de segurança: Fogo Cruzado, EagleView 2.0, e UN SanctionsApp, e se compõe de uma colagem de métodos, que vão desde observações participantes, entrevistas, 'walkthroughs' em aplicativos e pesquisa bibliográfica. Essa combinação confusa de métodos, objetos e lugares não pode ser vista como desvinculada do impulso conceitual mais amplo da tese, ou seja, mostrar que é na e por meio da autoridade dos aplicativos na governança no/do Sul Global, que podemos começar a abraçar os monstros que têm assustado a política de segurança por tanto tempo. E, ao o fazermos, seremos finalmente capazes de abrir o estudo da autoridade para suas manifestações processuais, transversais e múltiplas, por meio da computação, esta mesma entendida como um conjunto de práticas situadas, adaptáveis e contextuais, que tanto reproduzem como complicam hierarquias de poder e conhecimento.

Palavras-chave

Apps; Governança da seguranca; Sul Global.

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List of Abreviations

API – Application Programming Interface

AWS – Amazon Web Services

CCTV – Closed Circuit Television

FATML – Fairness, Accountability, Transparency in Machine Learning

F-P – Formal procedural authority

GPS – Global Positioning System

IHEID – Institut de Hautes Études Internationales et du Développement

ICG – International Crisis Group

IR – International Relations

ML – Machine Learning

OTT – Onde Tem Tiroteio

NGO – Non-Governmental Organization

S-P – Substantial-purposive authority

STS – Science and Technology Studies

UN – United Nations

UNDP – United Nations Development Programme

UNSC – United Nations Security Council

Single vision produces worse illusions than
double vision or many-headed monsters.

Donna Haraway, *Cyborg Manifesto.*

Part I

Apps, security governance, Global South

1
Introduction

This is a thesis about different enactments of (in)security in/of the Global South. The stories it tells are about crime, violence, colonialism and their management via apps. At the same time, this thesis is only tangentially about crime, violence and colonialism, not because these topics are not urgent and relevant, but because here I address them only partially, through how they unfold via computation. Thus, the thesis looks more attentively at the governance work performed by computation in Global South security politics, and how computation, in turn, is mobilized to represent crime, conflict and violence in specific ways. Another way of saying this is to say that this thesis is about how computation helps produce what is taken to be insecurity in/of the Global South. In this regard, it can be situated within a long established effort of Critical Security Studies to look at the inscription of (in)security into devices, algorithms, databases. Beyond inscriptions, however, it looks at emergences: What takes part in attempts to compute particular security phenomena into zeros and ones, in excel tables or in code, efforts to dispute official statistics or improve efficiency in security decision-making?

The journey leading to this text started as an inquiry into the authority of algorithms – which, in this work, are treated as close synonyms of computation. It has not departed from that, but in the process it became something else. It became about apps, but not only. It became about how these apps get entangled with/in in/security practices. Entanglement. This is an expression mobilized in Karen Barad's 2007 book, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, to refer to an entity's lack of independent existence from the relations it establishes with other entities. In the context of this work, to speak of the entanglements of apps and security practices is to speak of the ways in which both intra-act to mutually constitute each other, in ways that we can speak of the becomings of security through the work of apps and of the becomings of apps through particular articulations of insecurity. It is also to speak of the traces of violences left even in the most abstract of computation's logics, of which I will be dealing with three: simplification, formalism and objectivity. It is, finally, a reminder of the *situatedness* of these logics to such a 'vestigial' violence and to the differences that feed into how we articulate international norms, plan and effectuate policing patrols and count bodies.

This thesis is also a form of ethnography in IR, one that experiments

with empirical philosophy. I borrow the expression from Annemarie Mol's 2002 *Body Multiple: ontology in medical practice*, as I also do with this thesis's structure. Let's begin with the empirical and ethnography parts. In the course of two and a half years – some time between late 2018 and early 2021 – , I have conducted research on three apps, each one designed to govern a different aspect of insecurity politics in/of the Global South: Fogo Cruzado (translatable as 'Crossfire'), EagleView 2.0, and UN SanctionsApp. These aspects are violence, crime and conflict, respectively.

The three apps in question have seemingly more differences than similarities, either aesthetically, politically or technologically. Fogo Cruzado is a web platform and app that crowdsources real-time data on shootouts and gunshots in the cities of Rio de Janeiro and Recife, respectively in the southeast and northeast Brazil. EagleView 2.0 is a police-facing platform that provides crime forecasts while seeking to predict where to best allocate police resources (in addition to offering criminal data analysis features) and was piloted in two global South cities during the year of 2020. Lastly, UN SanctionsApp is the newest version of SanctionsApp, (formerly an Android and iOS-based app) that provides up-to-date data on the United Nations sanctions regimes, as well as evaluations of their effectiveness, to diplomats in charge of designing, implementing, maintaining and lifting United Nations (UN) sanctions at the UN Security Council.

Because of these differences, approaching each app required having distinct methodological strategies. Two apps were already "finished" by the time I started the research: Fogo Cruzado and UN SanctionsApp. I use quotation marks because, as my interlocutors kept constantly reminding me, an app is never actually finished: it requires constant updates, upgrades and modifications in order to continue to exist and to retain its relevance. In the course of the research, both apps have changed significantly, underwent reformulations and reprogrammings and, in the case of Fogo Cruzado, gained a more robust institutional face (considering that this is a fairly recent change that took place in the first semester 2021).

In these cases, I asked people to reconstruct the development process and discussed with them the challenges of keeping each app operational, how users seemed to use it, the intended purposes, as well as programming and design choices. I did this with the help of semi-structured and narrative interviews and participation in meetings, in addition to a number of informal chats and e-mail exchanges. More importantly: both apps were available in app stores or on the Web, therefore remaining 'publicly' available. This allowed me to navigate through their layers several times and thus complement personal stories of app

developers and data analysts with my exploration of each app interface. In one case, Fogo Cruzado, social media also played a role, working as a channel through which people engaged with the production of data about gunshots.

Unlike Fogo Cruzado and UN SanctionsApp, EagleView 2.0 was still a prototype, yet to be piloted at the time I started this research. Thanks to a research internship I was offered at TechLab, the research laboratory where it was being designed, I could attend meetings, exchange ideas during coffee breaks and establish meaningful personal relations with my interlocutors involved in the project. I had the privilege of accompanying part of its development, the very technical debates about setting parameters, developing algorithms and balancing partners' demands with contractual obligations and commitments. I was able to witness 'technology in the making', as Actor-Network theorists would call it, and not always needed to ask interlocutors to retell their stories: I was there to see and hear them, and to witness some of the conflicts and negotiations involved in the process.

The stories I retell here were communicated to me through interviews and participation in internal meetings, both authorized via consent forms. Most of the time, I sat quietly in the meeting room, aggressively taking notes on what was being said, on how people reacted, reminding myself to ask later about this or that thing I did not understood. Not rarely, I was asked to express my point of view on the discussions and decisions they were making, specially regarding the ethics of this or that aspect of the tool. I could see different prototypes being created and perfected, old ones being abandoned. I could follow the different interpretations that each interlocutor gave to the work they were collectively constructing. The list goes. But here, I have also resorted to narrative and semi-structured interviews, since they helped me to retrace the story from the first version of the platform to the one I was now studying and to learn about my interlocutors' expectations about the newer iteration.

The stories in the thesis take the form of short anecdotes, each describing or extrapolating episodes from my notes, interviews and informal exchanges. These anecdotes do not follow a chronological order, rather, they are practical moments that help me recount how computational forms get instantiated. This makes such stories not mere reports from field experiences, but accounts of reality/ies-in-the-making. This is the philosophy part. What I was following was not simply the process of making technology, but the processes by which technology (and surely, the humans they work with) gets to enact (in)security by making insecurity phenomena, such as bullets, policing management and the evaluation of sanctions effectiveness, algorithmically readable, interpretable and instantiated. In creating computer representations of these phenomena, the

assemblages we call apps are at the same time crystallizing in/security in terms of crime, gunshots or international norms enforcement, getting intermingled or even conflicting with emerging manifestations of colonizing practices – colonizing, here, understood as having to do with the ways in which we are governed, such as racism, patriarchy, and the capacity to turn acts, events, behaviors or practices into data.

This chapter offers the reader a framing for the rest of the thesis and is split into three sections. The initial section comprises the thesis' conceptual framework. In that order, its sub-sections are structured so as to situate the contribution of my work to security studies ("Citizen, police, diplomat"), discuss the role of mobile technologies in Global South security governance ("Engaging the local: algorithms, smartphones and security governance"), alongside the unique power hierarchies they entail ("Makers and takers" and "Beyond imported magic"). In these subsections, I introduce the main theoretical contribution of this thesis, consisting of a processual understanding of authority based on the work of three computational logics: objectivity, formalism and simplification. In the second section, I discuss these logics and situate them within the thesis' framework in the section "Three logics of computation". Alongside the two first sections, I will introduce the reader to the three apps on which this research is based.

The third section will introduce the reader to this research's methods. This part is divided into 4 additional sections. In "Mess and methods" I present the ethnographic methods that ground this research, as well as discuss the contributions of these methods in the context of this research. In "Making the familiar strange", I show that one such contribution is to complicate and create a sense of estrangement around categories and practices we are typically familiar with, including research practices and longstanding fictions that preach the separation between fieldwork and writing, field and home, or that still adhere to some sort of disembodied academic objectivity, a virtue that Haraway calls modesty and that is performed by a witness who himself pretends to be the world's most legitimate ventriloquist (HARAWAY, 1988, 1997). The section "Starting in the middle" is a timid exercise of departure from these practices and fictions. It is or intends to be an acknowledgement of our – my – own situatedness as researchers, a call for a sort of 'strong objectivity' (HARDING, 1995; LEANDER, 2016), strong because it is explicit about its biases, embodiments and, thus, impurity and because its narrative does not intend to exist as magical mirrors of facts (HARAWAY, 1997). The last section in this methodological movement presents the reader with the organization and style of writing of the thesis.

The contribution of this thesis to the study of international politics lies beyond an effort of bringing into consideration the role of apps in security decision-making. It is, moreover, in its inquiry into the very ontology of security governance as it gets enacted through computation. But there is more. In proposing to look at the work of apps in the governance in/of the Global South, I side with many other scholars who, before me, have already addressed the ambivalences of computing beyond industrialized centers of power (AMRUTE; MURILLO, 2020; SILVA, 2020; MILAN; TRERé, 2019; FIRMINO; CARDOSO; EVANGELISTA, 2019; MEDINA; MARQUES; HOLMES, 2014), especially considering the unique colonial (re)configurations around global tech markets of our times. More pointedly, I highlight that computation, far from being a magical, a-historical process that, disembodied, floats above our power ridden, capitalist world, is continuously reinvented, re-used and adapted, sometimes to challenge, other times to perpetuate sticky (in)security practices, which themselves seem to feed from a variegated set of structural, racial and other forms of inequalities among nations and peoples.

Furthermore, in asking questions about the spatiotemporal reorganizations of authority via computation, I show that these reorganizations become necessary to producing what is deemed in/security and also to framing what kinds of interventions do different forms of in/security require. With this, I mobilize and intermingle reflections inspired from fields as diverse as Critical Security Studies, Science and Technology Studies, Philosophy, Science Fiction, Anthropology and Computation. But more than invoking bodies of literatures to reflect upon apps participation in security governance and how in/security gets instantiated, this mobilization speaks to an effort to call into question the assumed universality and abstractness of computation, showing that computational abstractions require situated practices in order to be/come.

1.1
Citizen, police, diplomat

Waltz (1979) famously wrote about the three images that, at his time, would help account for the question of what caused war. Individual behavior, the internal structure of states and the structure of the international system, in sum, Man, State and War, provided a typology of the three kinds of answers to it. Waltz, himself a 'third image' theorist, believed that the causes of war were to be found in the structure of the international system – anarchy – instead of the other two (which could not explain neither the recurrence and persistence of war over time, nor how being authoritarian or democratic would help foster/prevent it).

Waltz tripartite account foregrounds the proliferation of diagrams of in-/security structured around the opposition between authority and anarchy and the circumscription of politics to bounded spaces and/or political entities. The blindness of this opposition was disputed by social constructivists and postructuralists alike (GUZZINI, 1993; GUZZINI, 2005; GUZZINI, 2013; COPELAND, 2006; WALKER, 1992; ONUF; KLINK, 1989) and somehow 'smoothed out' by liberal institutionalists and scholars advocating for a global governance approach to international politics. The latter introduced to the field the idea that governance could very well dispense with the unshaken centrality of states and be exercised by actors of a different nature, mainly companies, IOs, NGOs and individuals, emphasizing the many possible cooperative arrangements between them (ROSENAU, 1992; ROSENAU; CZEMPIEL, 1992; LAKE, 2010; WEISS; WILKINSON, 2014a; WEISS; WILKINSON, 2014b; WEISS; SEYLE; COOLIDGE, 2013; ZüRN, 2018a). Under such an account, different diagrams of governance could now coexist: from the more traditional balance of power and great power politics approaches to (international) hierarchy and 'flat' networks (BIERSTEKER, 2017).

But, even if smoothed out, Waltz's heritage remains very sticky. The tripartite imagery of Man, State and War very much colonizes our attempts of conceiving something such as the 'international' and its politics. This is the case even in some of our attempts to overcome its limitations through ideas such as the 'global' and the 'local', when those dangerously veer towards a reenactment of Waltz's segmentation of politics in terms of bounded scales or 'levels of analysis.' It is as if the opposition between anarchy and authority was simply reworked, reconfigured perhaps, but unlikely overcome.

In a 1973 letter, partially reproduced in the English version of Le Bergsonisme, Deleuze describes "the history of philosophy as a kind of buggery":

> I imagine myself getting onto the back of an author, and giving him a child, which would be his and which would at the same time be a monster. It is very important that it should be his child, because the author actually had to say everything that I made him say. But it also had to be a monster because it was necessary to go through all kinds of decenterings, slips, break ins, secret emissions, which I really enjoyed (DELEUZE, 1988)

A monster is a figure that sits uneasily and causes discomfort, fear and, sometimes, repugnance, whenever it passes. Because of its horrendous nature, rarely ever it has its paternity (or maternity) acknowledged. For Deleuze, however, the point is precisely to make Philosophy slightly more monstrous

and this is only possible when tweaking through other philosophers' ideas. The point, for both Philosophy and IR, which concerns me here, is not to do away with what has been inherited, however inconvenient this inheritance may be, and most certainly not to fall prey to the sticky threads of this inheritance. It is, rather, to use it in a way that both acknowledges its inconveniences but also the possibilities of doing otherwise, taking different directions, exposing the cracks and filling them with other modes of thinking and doing so that we turn it into a chimera, a chimera made from many strange parts, such as Waltz, but also Mignolo, Barad, Haraway, Fogo Cruzado, EagleView 2.0 and UN SanctionsApp.

I would like to do with the study of security governance in IR something along the lines of Deleuze's 'buggery', to use it to give it back a child that is not exactly what it expected to produce. This is partially the reason why I mimic Waltz's three ideal types in the title of this section through the figures of the citizen, the police and the diplomat, the three ideal types that permeate the three security apps which stories this manuscript unfolds.

Citizen, police, diplomat: each of these ideal types provides us with a different fragment of user subjectivity as imagined and (re)produced by the work of Fogo Cruzado, EagleView 2.0, and UN SanctionsApp, respectively. The three apps in question share a similar governance purpose: to democratize the production of security by empowering their target-users with real-time access to data and information. Ready access to information afforded by digital technologies is said to leverage the capacity for action of users: by hearing the reports of local dwellers and offering them information so they can decide how to displace in the city, which route to take or not to take, etc., and feeding public authorities with data about gun violence, an issue that is said to be poorly accounted for by official statistics; by providing police authorities with 'smart' management tools [1] and, in the words of an informant, an 'eagle eye' view of available resources, policing patterns and efficiency in response to crime; and by providing up-to-date information on the status and history of active UN sanctions regimes and expert evaluations of their effectiveness.

[1]The expression 'smart' is employed by TechLab's director in interviews and publications to present the problems and opportunities raised by the integration of a particular set of digital technologies (surveillance/monitoring tech, digital cameras, algorithms, integrated systems, etc) to the management of urban routine. While the vocabulary of 'smartness' was, most of the time, not openly present in the routine of the laboratory and of the development of EagleView 2.0, some assumptions core to it – that it is sought to facilitate the managerial work of public authorities, provide integrated data points to aid with data analysis for public policy, provide a network of sensors (surveillance cameras, body cameras, GPS, smartphones, tablets, sometimes automated gunshot detectors) to produce such data, etc. – were nevertheless part of how my interlocutors used to describe and understand the work of the app

Unlike what is usually the case with multi-case studies, these apps are not weaved together by some common history, timeline, overarching logic (e.g., 'policing', citizen participation), or governance area (e.g., international conflict, peacebuilding), but rather by two unusual, perhaps non-intuitive threads. First, the aforementioned user-subjectivities. The images of the citizen, the police, and the diplomat seem to cohere, almost flawlessly with Waltz's ideal types and their outlining of political authority and political action, and are sought to represent the target-audiences of each app: for Fogo Cruzado, it is local inhabitants of the city of Rio de Janeiro (especially those in favelas who more often find themselves in the crossfire), for EagleView 2.0, it is police departments in Global South cities, and for UN SanctionsApp it is diplomats at the UN Security Council (especially those representing non-permanent members).

And yet, while these three figures indeed resemble the Waltzian imagery, they do not perfectly reflect it. Because, according to these types, authority can only be attributed to some individual, institution or abstract entity personified by mainstream political theory. This is the second thread weaving my apps together: the authority they proclaim suffers from – to borrow from the vocabulary of cyber security scholars – an 'attribution problem' (EGLOFF, 2020; EGLOFF; CAVELTY, 2021). In cyber security, the problem of attribution refers to the difficulty of identifying the source of a cyber attack or crime due to the difficulty of tracking its perpetrators. The problem that I am identifying is even worse, to the extent that it is impossible *in principle* to even attribute the kind of authority I have in mind to someone, whether they are citizen, police, diplomat, an expert or the creator of the app. And this difficulty is not because someone willfully hides their tracks, but simply because it is in the "essence" of technical objects to exist, adapt, change, mimic other objects, and become more or less authoritative, by negotiating the several tensions, conflicts, and whims of humans and nonhumans (LATOUR, 1995). In other words, it is a processual kind of authority, the nature of which is missed when it is attributed to a discrete entity.

Still, the Waltzian ideal types profoundly colonize disciplinary accounts of power relations and inequality. Take the more specific framing of this manuscript: what apps do to security governance in/of the Global South. In the study of global politics, the term Global South has almost entirely replaced the Cold War's Third World, which characterized the part of the world that neither belonged to the wealthy capitalist nations of the West, not to the communist bloc. Most of the Third World and, consequentially, of the Global South, also shared a common history with the two major waves

of European colonial expansion in the 16th and 18th centuries (MIGNOLO, 2012; GROVOGUI, 2011).

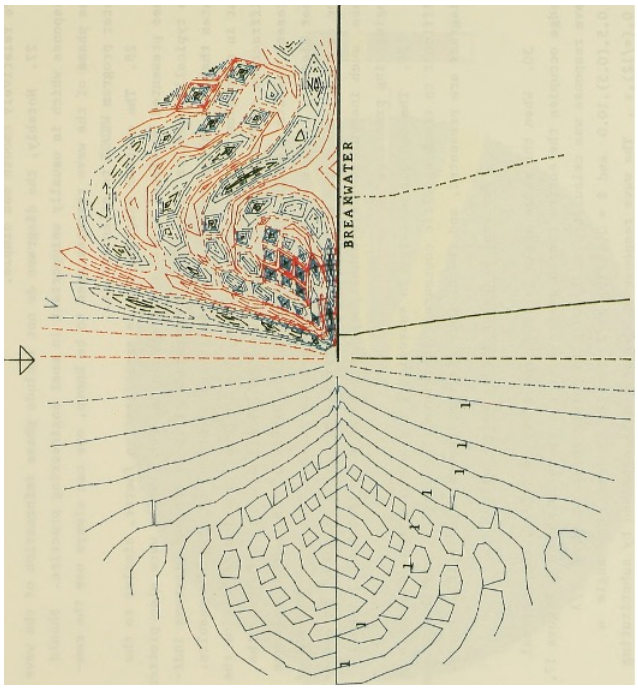
The term itself is troubled by its multiple, sometimes hazy definitions and usages. Sometimes, it works as a marker of cultural, social and political difference, while other times it seems to become synonymous with development. But perhaps the most widespread use of the jargon has to do with its emphasis on geopolitical power relations marked by patterns of exclusion, where Global South "name[s] patterns of wealth, privilege, and development across broad regions" mostly "outside Europe and North America, mostly (though not all) low-income and often politically or culturally marginalized" (DADOS; CONNELL, 2012, p.12-13).

One could easily fall onto the 'level of analysis trap', namely, reinforce the tripartite division of the political, when resorting to analyses of unequal power relations, especially with regards to security politics. But one could equally use the category of the Global South to diffract, rather than reflect, this division and the power relations it assumes. Borrowed from feminist scholarship, this concept of diffraction works as a strategy to step out of the cyclic (re)production of sameness and pay attention to differences, in other words, to account for 'differences that make a difference' (BARAD 2007, HARAWAY, 1992, 1997) in security politics. In more practical terms, and in the interpretation I offer, this would imply an attentiveness to the power hierarchies – alongside the spaces for political action that they enable and constrain – implicated in making computation into an authoritative infrastructure of governance, as well as to the parts that compose each situated enactments of authority in a way that does not constrain the analysis to an *a priori* established political ideal space(s).

Let us look at figure 1. According to the argument I have sewed so far, we should already find ourselves wandering in the colorful patterns of the second quadrant. If, however, what I am proposing was to reinstate the idea that political authority can be understood as a property either of the individual, the state or the (anarchic) international system, then, as we can see in quadrants 1 and 3, I would be merely reflecting the Waltzian argument, nothing more. Under this reflective logic, authority would be easy to locate, even within our current digitally-mediated state of affairs. We would somehow be able to find it in a government, a company, a hacker, a citizen, a collective of governments, companies, hackers or citizens. But if we stick with this idea of diffraction, then the picture we are left with is quite different.

Digital technologies entail a complicated account of politics and political relations. Strum and Latour (1987) believe that this complication has to do

Figure 1.1: Combined reflection and diffraction by a vertical wedge



Source: Chen (1987, p.28).

with the question of what holds social practices together beyond what they call 'social skills', or our capacities to influence, set agendas, coerce, convince, etc. They argue that it is technology, materials, artifacts, in sum, sociotechnical systems, however sophisticated or simple they may be, that do most of this gluing job. More than hanging things together, these objects play the role of magicians: full of tricks, they leave us under the impression that the epistemic, material and political hierarchies that make these technologies authoritative are nowhere to be seen.

Once authority becomes enmeshed in processes rather than bounded to some imagined political container (or, if we consider anarchy, to the apparent absence of thereof), a monstrous version of IR is born. In this monstrous version, authority, as taught in Gramsci's "The Southern Question," is also a question of power hierarchies established not between geographical regions, urban and rural settlements, or by bounded entities occupying their positions on the imagined theater of the international, but 'transversally' and 'within' through the 'flat' networks that were supposed to empower individuals. It is a transversality and embededness that crosscut the global, the local, the international, the domestic, security, insecurity, in sum, all these jargons that shape the boundaries of IR as field and practice, almost like a 'planetary hegemony', a soft, almost imperceptible enframing of the lifeworld, in the molds of Heidegger's concerns with technical domination in his "The Question

Concerning Technology" (HEIDEGGER, 1977; LYRA, 2014).

Thus, rather than reflecting the categories of the individual, the state and the international system as the containers of authority, a diffracted view on digital security politics would enable us to grasp the unique dynamics of domination of global technology markets, how they infrastructure a particular mode of extraction, that is, of data (COULDRY; MEJIAS, 2019; ZUBOFF, 2015), and favor racial, gendered, and military hierarchies (KAUFMANN; LEANDER; THYLSTRUP, 2020; BENJAMIN, 2019; NOBLE, 2018; BUOLAMWINI; GEBRU, 2018; GROVE, 2015; NAKAMURA, 2009), as well as the ways in which this extractive and surprisingly hierarchical model is enhanced, improvised, challenged, or circumvented. It would afford us an understanding of authority that is processual, transversal and enacted manifold through computation, itself understood not as an abstract universal, but rather as a situated, adaptable and contextual set of practices, which both reproduce and complicate power relations.

This just reinforces the fact that there is hardly any clear-cut 'level of analysis' when it comes to the study of digital technologies and their underlying infrastructures. Apps sit between different modes of existence of the digital, and are not unique, nor necessary. As Shah (2017) notes, theses modes have shifted throughout history. From the mainframe towards personal devices – which brought along the model of human-computer interaction on which my apps mostly hinge –, and then towards the Internet of Things and its modes of interaction based on mapping informational meanings on individual and collective bodies, they were produced by "certain intersections of cultural, economic and subjective powers" (SHAH, 2017, p.191), intersections that remind us of the transversal nature of postcolonial security governance (HöNKE; MüLLER, 2012). It is not possible to establish any automatic fungibility between what companies at the Silicon Valley – who happen to own an expressive part of the infrastructure underlying the 'digital' – do and the 'interests' of the government of United States, yet the former still seem to enable an expansion and extension of the latter's power, epistemically, by setting the boundaries of an imagined makerspace of technology, materially, by owning the infrastructures on which many systems, apps and online services depend, and politically, by modulating the terms of political action within these infrastructures. This situation makes it particularly difficult to grasp, let alone research rigorously, the scope of digitality in international politics, if we choose to remain wedded to a non-monstrous version of IR.

In a way, the governance work proposed by apps resembles that of crutches, designed and imagined to aid in security decision-making: they work

not as final responses to the issues they are conceived to govern, but as tricks that make them governable (and increasingly better so, according to app-makers). Here, what is central is not so much the problem of inherent uncertainty that has long haunted neorealists (COPELAND, 2006), but the longstanding problem of legibility, incidentally also a colonial question of the past and present (ANSORGE, 2016).

To different degrees, apps like Fogo Cruzado, EagleView 2.0 and UN SanctionsApp recombine computational infrastructures, processes and features, getting inspiration and even mimicking governance strategies, and ideas devised elsewhere, in the 'North'. At the same time, this is not simply automatic reproduction: independently of whether it is predictive policing, collaborative participatory politics, or analogical reasoning that is being mimicked, because they are constantly being adapted, used and recombining different features, seeking to build specific connections with their target audiences, and adapt to the variations in the contexts in which they operate, these apps introduce their own unique twists to these strategies and ideas. In doing so, they end up complicating the colonial infrastructures on which they hinge, some because they engage 'pragmatically' with and within these infrastructures (KAUFMANN; LEANDER; THYLSTRUP, 2020), others because, in these re-combinations, still perpetuate them. The unique relevance of this to the study of digital security politics is to acknowledge its profound ambivalence, alongside with the difficulty, if not impossibility, of operating entirely outside these infrastructures.

1.1.1 Engaging the local: algorithms, smartphones and security governance

The choice of apps as objects of this research is purely circumstantial. My original intent was to talk about how computation becomes so embedded in security practices that it ends up constituting them. Apps seemed a nice way of doing it, not only because of their ridiculous popularity in developing economies, but also because it is increasingly via apps that communities, activists, lobby organizations, government officials, and corporations, organize themselves, engage with and make sense of insecurity. But also because apps offer us a very unique and contemporary (and, for sure, not definitive) manifestation of computation and algorithmic work. This manuscript mobilizes both conceptualizations – computation and algorithms – interchangeably. Both refer to the execution of a pre-defined set of steps, in other words, to a particular kind of calculation. "To say that a device or organ computes is to say that there exists a modelling relationship of a certain kind between

it and a formal specification of an algorithm and supporting architecture" (COPELAND, 1996, p.335). Apps provide us with unique, contemporary manifestations of computational work.

Having made such a disclaimer, another is to follow. This manuscript starts from the premise that apps are artifacts of governance. This premise is not mine, for a start: as we shall see, it is UN's, tech companies', app-makers' and even users' themselves, whenever they enunciate that apps help with decision-making, situational awareness, development, security, and in rendering security affairs more democratic, transparent and accountable. The relative success of apps as artifacts of governance is in part owed to the success of mobile technologies in the decade following their worldwide expansion: according to a UNDP report launched in 2012, "no other technology has been in the hands of so many people in so many countries in such a short period of time" (UNDP, 2012, p.8).

The decreasing costs for purchasing smartphones in several developing societies coupled with zero-rating plans afforded cheaper and widespread access to the Internet in these societies, which translated into more and more people using the Web, relying on online services to communicate, work, sell, shop, study and live their lives. This also took over the way in which conflict, violence, and community safety were approached, with 'civic tech' and citizen security' apps popping up here and there to help local populations to cope with everyday violences.These apps include services as diverse as the use of WhatsApp to denounce police violence and abuse (Defezap)[2], local transport apps allowing users to denounce violence, misconduct and assault in public transportation (VouD)[3], apps that mediate the contact with emergency services and community based crime-fighting organizations (Namola)[4], humanitarian apps used to map conflicts and crises (Ushahidi)[5], collaborative platforms providing maps and unofficial statistics on robberies (Onde Fui Roubado)[6], among many others.

An 'app', a shortening for 'application', technically refers to any computer program with a user interface. To put it more simply, any piece of software with a user interface can be described as an app. In practice, apps are put to many different uses: in harnessing the possibilities offered by our smartphone, as well as other types of sensors, they work as 'points' for data collection; They are said to mediate and democratize our contact with complicated

[2]https://www.defezap.org.br, (Accessed 24 September 2021)
[3]https://www.voud.com.br, (Accessed 24 September 2021)
[4]https://www.namola.com, (Accessed 24 September 2021)
[5]http://www.ushahidi.com, (Accessed 24 September 2021
[6]https://www.ondefuiroubado.com.br, (Accessed 24 September 2021)

computer systems, using this data as input to provide us with useful outputs, and are also said to facilitate our access to a wide range of services; And, aesthetically speaking, they are relatively easy to get along with, can be packed and carried around in our smartphones, or stay at our computer desktops, and quite easily and subtly entice us with their simplicity and user friendliness.

The term 'app' gained notoriety when tech companies begun to harness the potential of mobile computation with smartphones. This potential, it was and keeps being argued, may be empowering, especially to marginalized parcels of the world population, because mobile technologies allow both for opening new channels between governments and their people and for offering greater access to information and public services. When used by governments, apps branch into multi-layered computer systems but maintain their friendly user interfaces. These systems more often than not promise an 'eagle eye' view of everyday urban routine alongside more efficiency in the response to governance issues such as violence, crime and urban traffic. And with regards to international conflicts and security governance, they have increasingly come to serve as tools to inform and substantiate policy decision-making, map conflicts and humanitarian disasters, track refugee flows, liaise local communities and humanitarian actors, among other uses.

Today, apps are synonyms with pieces of software distributed by corporate app stores. It has been some good 13 years since the first app store was created and, with it, a precedent that keeps haunting us, namely, the commercial mediation of the distribution and circulation of software. In fact, commercial does not even seem to be the appropriate wording, if we consider that it is roughly two companies – Apple and Google – who each own the two major app stores in the market. Whatever the appropriate wording, the reader must not to get fooled: we barely notice this mediation and, when we do, there seem to be few reasons for concern. On the contrary, it appears to be almost benevolent. But the apparent benevolence has less to do with the companies themselves than with what their infrastructures afford, that is to say, with the many possibilities of expanding the reach, form and means of computation with these distinguished pieces of software-plus-hardware, a magic that is indeed left to app-makers to perform. This manuscript offers the reader a partial and situated account of how this magic takes place.

This account is supported by the study of EagleView 2.0, Fogo Cruzado and UN SanctionsApp. Some explanation about how I have come across these apps may be useful. Starting by their origins: the first two apps, EagleView 2.0 and Fogo Cruzado[7] were both born proposing to fuel the debate around

[7]Available at: http://fogocruzado.org.br

public security in their Global South cities – in the case of Fogo Cruzado, it was Rio de Janeiro at a time when it was under the international spotlight (COUTO; OLLIVEIRA, 2019, personal interview). The way in which they would do so, however, differed. Fogo Cruzado and its crowdsourced reports on gunshots highlighted the widespread and routine dimension of gun violence and how it affects the lives of local inhabitants. The app collects reports from social media users or directly in their platform and returns them in the form of notifications about ongoing or recent events, published simultaneously on its social media pages and as real-time, geolocated push notifications sent to your phone, if you have the app downloaded. Aggregated data is compiled into weekly and monthly reports and used to create narratives about gun violence, push for public policies and orient the debate news media articles on the topic of urban violence.

In its turn, TechLab wanted to experiment with crime predictions. The experimental character of early versions of the software was thoroughly emphasized by their director in an interview. The idea of EagleView's 1.0, for example, was to "both empower citizens and inform them and help them have better information" and to "close the information asymmetry gap around crime, so they [citizens] could make better decisions about their safety and security" (TechLab director, 2019, personal interview). But from the moment the 2.0 version of the app turned to the police, this objective could no longer be sustained and a different account of democracy and empowerment, one oriented towards making the police more accountable and better managed, would emerge.

As one could expect EagleView's interface would also change. The current version can only be accessed by the police departments that are testing the tool and by some people at TechLab. During my research, I was given a glimpse onto many of its interface iterations. Throughout the thesis the reader will be able to wonder about how it looks like and works with the help of my fieldnotes and interviews. For now, I will sum it up as following: a crime and situational analysis system with customizable layers ranging from crime prediction, to crime statistics, to real-time data, such as, e.g., indication of the position of police cars and garrisons, surveillance cameras and whatever other sensors are available to the police department in question. The overarching goal – to improve citizen safety and security – remained unchanged, according to TechLab's director (TechLab director, 2019, personal interview). It just happens that this improvement is once again back to the police's discretion.

In contrast with the previous two apps, UN SanctionsApp's is an origin story that threads together some very different places. First, the area surround-

ing Geneva, where lie its founders' main headquarters: institutionally, the Institut de Hautes Études Internationales et du Développement (IHEID) and, informally, a cozy chalet in the Swiss Alps where the current team meets annually to update the app. Second, New York, where its initial concept was brainstormed and discussed, first, with diplomats from non-permanent country-members of the UN Security Council, and, then, among the early members of the team – Thomas Biersteker, Marcos Tourinho and Sue Eckert. Yet, a third moment, consisting of much of its translation from a concept to an app properly, would take place on board of a trans-Siberian express train travelling from Beijing to Moscow – the former being where its first programmer, a young Portuguese national, used to work at the time (BIERSTEKER, 2019, personal interview). According to Biersteker, who is also professor at the IHEID, the idea of the app was born between the years of 2012 and 2013, as a suggestion of a Swiss diplomat to disseminate the results of a multi-year research project called "Targeted Sanctions Consortium" (TSC),[8] of which he, Tourinho and Eckert took part. Of these three early members, I would come to meet Biersteker and Tourinho, but not Eckert, who had not been part of the team for a long while in the moment I started the research. I would, however, come to meet Zuzana Hudáková, who joined the team after Eckert left.

In contrast with Fogo Cruzado or EagleView 2.0, UN SanctionsApp's focus is on 'international' security; more specifically, on helping with the design and management of UN targeted sanctions regimes.[9] The way in which it works is quite simple: drawing from two databases, one quantitative and one qualitative, it gives users a detailed and fairly up-to-date account of existing UN targeted sanctions, their overall effectiveness and an easily accessible section of 'quick facts' with statistical accounts about these sanctions. The form of hypertext or hyperlink affords the app's interactive component by interconnecting the content of the app and making it possible for users to filter through the quantitative database so as to find analogies and common topics between different sanctions regimes.

Despite of these evident distinctions, these three apps very much resemble each other in their overarching and overlapping purposes: to empower end-

[8]Available at: https://www.graduateinstitute.ch/research-centres/global-governance-centre/targeted-sanctions-initiative

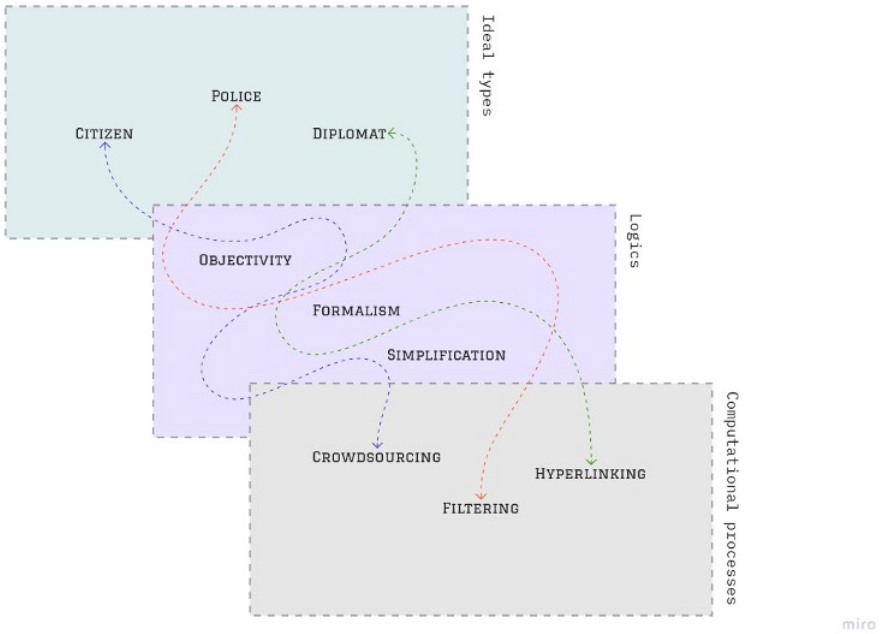
[9]On a spectrum of sanction discrimination, targeted sanctions, in contrast to their comprehensive counterparts, "allow senders to target a specific individual, corporate entity, region, or sector" and thus are intended "to minimize the negative effects of sanctions on wider populations" (BIERSTEKER et al., 2018, p.404). The focus of the SanctionsApp, which was renamed UN SanctionsApp, is precisely on UN targeted Sanctions. These sanctions are legally binding and applied by the UN Security Council to coerce targets to change their behavior, constrain them from engaging in proscribed activity, and/or signal a violation of international norms (BIERSTEKER et al., op. cit., p.407).

users, to improve the transparency of the institutions responsible for managing security politics and to make them more accountable, either through increased access to information and actionable data or by making data readily accessible and scrutinizible. Each intends to leverage the resources available to their users when passing judgements with regards to security politics. 'To aid', 'to help' and 'to assist' hence become part of the justification for why they are needed or relevant to address apparently 'intractable' issues, to borrow from an expression I have heard in an interview. Notably, none of these apps are there to replace human reasoning and decision-making, but to assist them, making both more efficient and timely. Possibly, also, it is these apps' goal to make security politics more democratic – even if, in practice, what is meant by democratic is not always self-evident.

This manuscript looks also at how, in practice, these three apps branch 'democracy', 'empowerment', 'accountability' and others towards multiple directions and throughout different computational processes while attempting to engage the local (LEANDER; WAEVER, 2018). By engaging the local, I specifically mean the way in which particular contexts, issues and people (including users) are translated into policy relevant knowledge by, in and through the app. Notably, this translation requires turning intractable issues into issues that can be 'tractable', at least within the parameters set by the apps themselves. These may include questions of how the app gathers and delivers information in real-time, how it is designed to engage the user and how it assembles security knowledge (e.g., hyperlinked menus, crowdsourcing, sensors, historical and statistical data, etc.) When apps engage the local through computation, they seem to do so by making the local a part of the app itself, rendering it knowable specifically through its features and parameters.

A quick example that will be developed later in the manuscript: in collecting reports from Twitter, Facebook and, sometimes, WhatsApp groups, Fogo Cruzado performs a sort of crowdsourcing. As introduced above, the app was first developed in Rio de Janeiro, and this happened in response to something peculiarly carioca: 'public' gunshots and shootouts. The particularity of Rio vis-à-vis other Brazilian capitals is that, be it in the favelas or in the 'asphalt', gunshots are an enormous source of urban insecurity, not restricted to the realities of drug dealers, gangs, and police officers, and leading to the interruption of the daily routine of thousands of its inhabitants (or to the interruption of a person's life altogether), to suspended school activities, and to interruption of the traffic in some of the city's busiest highways and roads. The premise on which Fogo Cruzado's crowdsourcing rests is this: because they affect so many and in so many different corners of the city, people will get to their smart-

Figure 1.2: Conceptual framework



Source: Elaborated by the author

phones to talk about shootouts and gunshots on social media and, from this, a significant bulk of reports can be collected. The local is therefore engaged in order to produce data about gun violence. The opposite of this would be that, if gun violence does not particularly suits the same dynamics and people are either afraid or not very interested in tweeting about it, the app would become unable to engage its users. We could hence guess that there is one particular enactment of crowdsourcing at play in the work of Fogo Cruzado in Rio de Janeiro.

Overall, my intention is, analytically, to show that the 'local' is mimicked by the three apps according to different computational processes and logics. Having as starting points the images of the citizen, the police and the diplomat, each app's imagined user types, I will look into how three core computational logics – simplification, formalism and objectivity – are enacted through Fogo Cruzado's crowdsourcing of social media reports about gunshots, EagleView's filtering among layers as distinct as crime analysis, prediction and optimization, and UN SanctionsApp's hyperlinking of sanctions cases and evaluations. These ideal types, processes and logics will be furthered in the following sections of this chapter. Note that figure 1.2 schematizes these threads.

The three apps on which this manuscript builds each propose to leverage a particular power asymmetry, be it by democratizing access to information

in the UN Security Council (TOURINHO, 2019, personal interview), by improving the accountability, transparency, efficiency and effectiveness of the police (TechLab director, 2019, personal interview) or by creating new data entities (e.g., gunshots, data related to the qualities of the victims of gun violence, etc.) that will allow users to decide how to displace around their own cities (and possibly take part into public authorities' decision-making). However, this intended leveraging, if and when it occurs, does so at the cost of the thriving of a completely different set of hierarchies. It must happen within the parameters of each app: empowerment becomes synonymous with crowdsourcing; transparency and accountability become a matter of multiple layers weaving through multiple data collecting points (cameras, GPS sensors, historical data, crime reports, nature and quantity of available resources, etc.) so that the computer can assist with police planning; and democratization is achieved via 'at-hand' hyperlinked narratives. These parameters, however, may go beyond the app proper, intertwining with the broader infrastructures on which each app hinges.

1.1.2 Makers and takers

Another common thread tying together Fogo Cruzado, EagleView 2.0 and UN SanctionsApp is that these apps are not created and developed by specialized technology companies, nor governments. A fundamental aspect of app culture is that it (supposedly) democratizes and decentralizes the production and distribution of software, making it available to most people with at least some familiarity of software development (or with the resources to hire of of these people). As noted by Goggin:

> (...) apps have evidently represented the efflorescence of small, micro-enterprises and individuals associated with software development industries, for whom the platform has allowed distribution of their wares where otherwise the political economy of software and computing industries (. . .) has made this difficult. (GOGGIN, 2011, p.154-155).

You do not need to own Facebook or to work for them to develop your own app. 'Non-tech' persons can very well do it, sufficing for them to have the necessary programming skills or financial support to hire such people to do it. Fogo Cruzado, for example, was created by Cecilia Olliveira, a journalist specialized in the topics of public security and safety in Rio de Janeiro, and funded by Amnesty International as part of a campaign to raise

awareness on police violence in Rio de Janeiro at the outset of the 2016 Olympic games in the city. Cecilia then hired a programmer based in São Paulo and who was also familiar with other Amnesty International projects. In its turn, UN SanctionsApp was conceived by a group of academics specialized in international sanctions and funded by the Swiss government to further the outreach of the Targeted Sanctions Consortium research. After coming up with the initial concept and architecture of the app, the team would then hire a programmer to do the coding.

The third app, EagleView 2.0, can hardly be considered a product of 'individual' innovation, but it is still somehow attached to this culture of 'ubiquitous development', particularly if we consider its development by a research lab specialized in public security and their apparently ludic disposition to "experiment" with predictive technologies (TechLab director, 2019, personal interview). EagleView's 1.0 was the product of an 'ad hoc coalition', in the terms used by TechLab's director, formed by TechLab, public security authorities, a startup incubator, and a software engineering company, who would develop the app's predictive model. Things change in EagleView 2.0, starting with the fact that it is based on two different algorithms: one to predict occurrences and the other, a 'logistics' algorithm, to provide recommendations to the police about where to allocate police resources, based on the data provided by the first algorithm, as well as on more 'traditional' crime statistics and operational information about the police's routine and available resources. Most of the development work of the predictive model sat at the hands of TechLab, who initially wanted to develop it fully in-house and have it open-source. Later on, specialized consultancies were hired to do part of the process, including to develop the 'optimization algorithm.'

App culture's focus is on the relation between app-makers and users. As Morris and Morris (2019, n/p) note, "[a]pps have now become one of the primary ways contemporary consumers and citizens engage with software." To many commercial apps, engaging the user means producing more data, which can be commodified and sold in the market as insights into consumers' behaviors and habits. While apps may resort to different strategies to generate revenue (for example, asking the user to pay to download them, by allowing within-app purchases or by commodifying the data they collect from usage and users–or by the three of them at the same time), keeping the user engaged is also necessary for the sustainability of many of them, in the long run. But the three apps in the manuscript steer away from this model, seemingly skewing the more immediate commoditization need. In the moment when I was conducting this research, most of their development and operational funding

came from philanthropic organizations, rather than from users or from selling advertisements. With the exception of EagleView 2.0, which intended to create a sustainable business model (TechLab director, 2019, personal interview), there was no indication of attempting to shift this model.[10]

For many media theorists and philosophers of technology the democratizing promise of apps stumbles across a fundamental problem: the very political economy of digital media (STIEGLER, 2016; HAN, 2017; ZUBOFF, 2015; MOROZOV, 2011). We all know, by this point, that our online experiences are shaped by the decisions of a handful of technology companies. A handful may even be too much. Let us say that the number may not exceed five. The terms "Big tech" and "GAFAM" speak of the 'big five' of the tech market: Google, Apple, Facebook (now: "Meta"), Amazon and Microsoft, all US companies who basically 'own' most of what comes to be seen as the Internet (outside of China, that is). In some cases, this ownership is further favored by agreements with telecommunications providers to offer 'zero-rating' plans, that is to say, free-of-charge browsing on their apps and services. In addition to the GAFAM group, a number of other companies and startups (the most expressive of them being also US companies) also compete for their own share of this market – think of IBM, PayPal, Intel, Cisco, Siemens, Twitter, alongside a number of other companies and startups operating globally under the digital liberalism promoted by the Silicon Valley (SADIN, 2016).

Posing themselves as mere intermediaries, these companies extend their tentacles further and further, meddling into an ever-increasing set of relations and setting the guidelines, standards, expectations and parameters around which apps must be developed. This is evident from both the fact that most apps borrow these companies' infrastructures to operate and the fact that corporate infrastructures centralize their circulation and distribution. App stores, for example, define the conditions for access, download, purchase and review of apps, while affording their monetization, promotion and distribution (MORRIS; MORRIS, 2019). In re-configuring power relations between users, app-makers and the underlying structure of digital technologies, this political

[10]When philanthropic funding is concerned, justifying the app's impact and creating a compelling narrative around it has a heavier weight than the absolute size of the user base (however, user-base may become a relevant indicator depending on how the app defines its target-users). This is even more the case when the user base is limited geographically, as in the case of Fogo Cruzado, whose operations are limited to Rio de Janeiro and Recife, or institutionally, as is the case of both EagleView's and UN SanctionsApp's targeted users – respectively, police departments in middle-income countries and diplomats from non-permanent country-members of the UN Security Council. In these three cases, quantity gives away to quality, namely, how user's engagement is mobilized to justify the fulfillment of the app's normative purposes of empowerment, accountability and democratization. The 'burden' lies more heavily in establishing how the app relevantly changes security politics.

economy inevitably troubles the imaginaries established throughout the 1990s and 2000s of mobiles and the Internet as decentralized, user-driven and participatory technologies (CASTELLS, 2010) and who passes as maker and taker of technology.

Gerlitz et al. (2019, n/p) highlight the fact that apps are not standalone objects but "inherently entangled in multiple socio-technical assemblages." In practice, this situates our apps within a web of relations that spread across different environments, commercial infrastructures, as well as activist and policy networks. App-developers may, for example, employ a variety of third-party developer tools and data, including (from) application programming interfaces (APIs), software development kits, and integrated development environments, which enable them access to mobile operating systems' functions and functionalities, including sensors. Fogo Cruzado and EagleView 1.0, for example, resort to Google Maps API to produce their maps and visualizations, while UN SanctionsApp was initially programmed in Flash. The first also makes use of your smartphone GPS to send push notifications for shootouts based on your locations (NINO, 2019, personal interview).

Democratization, which is a normative ambition of these three apps, is equally equally a promise of the app culture that took shape around the 2010s, when innovation would be further decentralized, alongside software development and distribution. The trouble, however, is that this promise does not preclude the operation of what Byung Chul Han (2017) calls 'smart power', which finds resemblance in Foucault's (1979) concept of "governmentality," but also potentially in Bourdieu's (1992, 1993) "symbolic power". The smartness that Han foresees has to do with how efficiently power happens without drawing attention to itself, indeed, something which he defines in terms of its friendliness and ability to present itself as freedom (HAN, 2017, p.17).

Han's emphasis on voluntary submission to power shows a strategy of legitimization based on voluntary acceptance and internalization of its mechanisms. 'Voluntary', however, might not be always the better wording for what happens in these authoritative relations beyond our psyche. If we turn to the Bourdieusian account, symbolic power, we see that power sustains itself through the (smooth) imposition of categories of thought and perception upon subjects, who then get to understand and apprehend the world in terms of these categories. This also comprises materials and infrastructures, of course. These categories, in the case of digital technologies, provide both the conditions and limits for action under digital security politics – the 'parameters' under which one could act, dispute, contest. In other words, each app's normative promises can be (re)configured within the parameters set not by the standalone object

app, but by the more complicated entanglements in which they take part.

These entanglements significantly shape how far the categories with which apps work can go, be they normative or of other nature. The gap between this form of domination and voluntary submission is significant and has implications that may go beyond thinking the Global South as a geopolitical category indebted to the former Cold War 'Third World' or the developed/developing/underdeveloped cutout.

1.1.3 Beyond imported magic

> In the 1970s, students in the engineering school of the Universidade Federal do Rio de Janeiro, Brazil, referred to computers as a form of "imported magic." This phrase, which came to be used even among members of the Brazilian technical elite, cast computer technology as highly effective, universal, sometimes mysterious, and always as coming from somewhere else (...). Indeed, there is a widely held perception that science and technology necessarily come to Latin America from elsewhere, a notion fostered by ideas of modernization and development that originated outside Latin America and encouraged the transfer and diffusion of machinery and knowledge from more industrialized nations to less industrialized ones. (MEDINA; MARQUES; HOLMES, 2014, p.1-2)

The assumption that technological innovation occurs predominantly in the Global North (especially the United States) remains pervasive. The persistence of the idea of 'catching up' and of comparisons and expressions like first world-like service/infrastructure (especially among the Brazilian elite) serve as grim reminders of this, with scientific and technological creation being disproportionately credited to the most industrialized regions of the world. This is part of the story that Mavhunga (2018) recounts in his retracing of Tse Tse fly control policies in colonial Zimbabwe, to which local, indigenous work and knowledge, dismissed as unscientific by local elites and European colonizers alike, were in fact fundamental. Termed "black knowledge" and "knowledge of tsetse", these indigenous management techniques consisted of night travels (when the fly was less active), forest clearance and strategic settlement of the cattle, in addition to using tsetse infested environments strategically to avoid invaders or attackers or define safer travel routes (MAVHUNGA, 2018, p.31).

The story of digital technologies is no different, with competing narratives still crediting most relevant innovation either to the US or European – sometimes both – intellectuals, entrepreneurs and corporations (in most cases,

white and male), while diminishing and even erasing contributions from women, people of color, or other participants in this process in other parts of the world (ABBATE, 2012; HOOKS, 2003; KOTHARI et al., 2021). Following these traditional roles, which are also reproduced in academia (CUSICANQUI, 2012), the North becomes synonym with true digital innovation, while the South becomes its raw material, a mere recipient of technology at best.

This imaginary is a pervasive and blinding ideology at best, somehow contradicting the actual practice of making technology. In this regard, apps – both in their embeddedness in complicated capitalist infrastructures and assumptions that in principle anyone can make them – leave us with a much welcomed complication. On the one hand, we have seen, they are entangled with commercial infrastructures imbued with commercial, military, gendered, racial, and other power hierarchies, staying with and working from within them (KAUFMANN; LEANDER; THYLSTRUP, 2020). On the other hand, like mimickers, they reproduce and replicate practices from one context to another, leading us to believe they resemble each other only to mockingly prove us wrong. Apps make technological innovation less a matter of owning infrastructures and more a matter of creatively reassembling them, troubling established assumptions about who gets to make and who gets to take technology. But how and what do apps mimic? What kinds of infrastructures and practices they (re)combine together? How are these infrastructures and their affordances re-used? How do apps create their own versions of pervasive computational ideas and imaginaries?

The idea of going beyond imported magic proposed by Medina, Marques and Holmes suggests overcoming the assumption that technology travels in a single direction to explore alternative views of how it is created, travel (from North to South, within the global South and among regions, nations, communities...), change and adapt. Even when these technologies are used to perpetuate power hierarchies and structural inequalities or when they reproduce US and European ideas of modernity, re-use can lead these ideas to mutate.

Fogo Cruzado, for example, was originally conceived as a "Waze of bullets" (NINO, 2019, personal interview). But its version of the collaborative economy is unique. On Waze, information about traffic conditions is actively provided by users, who feed it directly into the app. Fogo Cruzado, given the limitations of their own user base, requires both 'active' and 'passive' data collection. Data collection is active when the app's analysts actively seek for keywords related to gun violence events in social media, and passive when they receive this information in their platform or directly at their social media

profiles. The appeal to the collaborative economy via user reports meets the purpose of raising awareness and making accessible a lived reality of gun violence that is generally overlooked in public statistics. Incidentally, having this information at-hand and in-real time would be empowering to users, who could then make their own decisions about where to go, not to go, what to avoid, etc., and it would also enable the bottom-up production of new categories of violence, which app-makers and their community partners use to press public authorities to take into consideration.

Similarly, TechLab had to come up with its own enactment of predictive policing. The purpose of EagleView 2.0 is to explore a market niche – Global South cities – that remains somehow secondary to US and European vendors. The heterogeneity of this niche, however, would be quite challenging. It required TechLab to adapt its plans in order to account for the institutional and regulatory variations between countries, state governments and cities, and rendered impossible the intended 'plug-and-play set-up' that they had originally imagined for the app. Furthermore, for prediction to be feasible, they would need good enough data, something which they knew they would not find evenly in their potential customer's list (TechLab director, 2019, personal interview).

> It all comes down to the nature of having collected the administrative zone that you're covering, the nature, quality and coverage of the data. The system falls down when you have a situation that is incredibly data scarce, let's call it data uneven. I mean, Rio is a relatively specific place in a sense that it has got reasonably big data, although one could argue that there are big gaps. But once you get a situation like Nairobi or Kinshasa or, you know, more underdeveloped areas that don't even have a remote level of sophistication, this becomes impossible. But for more advanced and middle income places, the EagleView 2.0 model is feasible. (TechLab director, 2019, personal interview).

The iteration I was following, while trying to avoid the plug-and-play set-up, would still have to find a way to adapt its infrastructure to these heterogeneous institutional and regulatory settings. From a technical standpoint, this adaptation would come in the form of filtering. This basically meant that the system would come with multiple layers that could be accessed through an API. If the police department in question already had a crime analysis software in place and only needed the predictive component, no problem: they could request access only to the predictive layer of EagleView 2.0. If they

required any additional layers: no problem, they could request access to the layers they would need via EagleView 2.0 API. If there was no system in place, no problem: they could implement EagleView 2.0 from the scratch... I hope this gives you the idea. The main advantage of the model was to adapt to the local technological and data environment, restricting prediction only to those cases that met their data quality standards, and to decenter prediction from the platform's spotlight, refocusing it, instead, on the ideals of smartness and efficiency through the real-time management of information.

However, the work of reassembling that apps do is not always triggered by the need to adapt to one context or another. It may as well be the case that it is intended to ground or even resemble a particular practice. This seems to be the case of the UN SanctionsApp. This app was inspired after another app, designed to disseminate the contents of a report on the UN resolution on Women, Peace and Security. The source of UN SanctionsApp's inspiration, however, was very simply a report on a handheld device. Biersteker and the team wanted their app to go beyond that, they wanted a truly interactive thing. And here is the twist introduced by UN SanctionsApp: to make things interactive, to allow users to explore its content in non linear ways; copy and paste; and navigate through different menus and visual resources.

More profoundly, the app's hyperlinked architecture was sought to mimic policy-making reasoning on international security, which Biersteker once explained to me, is based on precedents (on having past similar cases from which to draw analogies). The content of the app was mostly a reassembling of many UN reports, especially those coming 'from the field', and their very specific (and I add: sometimes, reductive) narratives about the places targeted by UN sanctions regimes (NIEDERBERGER, 2020). Hyperlinking would facilitate the connections between these reports, the various other sources used and the evaluations provided by the UN SanctionsApp team, but also make it hard to discern between what is what.

Looking at these three examples, we see that apps expose us to the ambivalences of digital politics: on the one hand, as I have discussed in the previous section, their mimicry goes hand-in-hand with their reliance on the commercial infrastructure provided by tech platforms, which raises the problem of complicity, in other words, of perpetuating the power hierarchies that both enable and constrain them. On the other hand, it is hard to speak of a transfer or blind replication of technologies imported from elsewhere: reinvention, adaptation and use entail innovation through reassembling, namely, the way in which apps re-combine these infrastructures, ideas and technical features with the unique objectives of their creators.

That mobile technologies are popular everywhere but, either due to their cost, simplicity or reach, remain the most important form of entangling with the digital across the South should open our eyes to the many forms of engaging with technology that remain buried by assumptions that what counts as innovation lies elsewhere. And I mean engaging not simply in terms of using online services and platforms, but also in doing so to create, adapt and/or use software to challenge, reconfigure or even reinforce some hierarchies pervasive in security practices. In this sense, the idea of going beyond imported magic is also a call for embracing ambivalence and modes of action that go with creating and using these apps and perhaps a reminder that their variegated re-combinations further complicate the state of security politics.

1.2 Three logics of computation

Take another look at figure 1.2, the framework I propose to account for how the 'local' is computationally enrolled and engaged by our three apps. The ideal types of the citizen, the police and the diplomat more or less speak to the question of how each app imagines its users and justifies its relevance and impact vis-à-vis them. Next, the tropes of crowdsourcing, hyperlinking and filtering allow us to navigate throughout some of the computational processes and concepts on which the apps operate. But what about the third layer?

Most computation is premised on a set of common and apparently universal principles: computation represents facts and events through mechanical calculations, therefore, it is objective. Two, these calculations are effected through formal logic, being based on a finite number of steps or commands, and three, require an operation of simplification whereby complex events are rendered legible to a computer in order for these operations to take place. In other words, algorithmic calculations necessarily involve a claim to objectivity and a simplification of world events according to formal commands. What I call logics are actually the three operations just described that take part in the practice of computation.

Surely, these are not the only operations on which such practice hinges but they are perhaps the most pervasive and sticky. Operations of simplification were studied by scholars like Finn (2017), Chun (2008) and Galloway (2011), among others, who have pointed to their ability of concealing complex computational processes under apparently seamless interfaces while concurrently making it appear that it is the user who is in charge of all action. Simplifications are the products of a translation of the world into a form and language that can be apprehended by computers and, thus, also the effect of

joining together different kinds of data, computational affordances, processes and their aesthetics.

Computational representations are simplifications of worldly phenomena. For example, when a prediction is produced, it triggers a process whereby an event (a robbery, burglary or car accident) is translated into computational forms (binary data, circles, heat maps, hexagons, etc.), which transmit a message (the probability of having a particular occurrence in the near-future in a given place). For this process to occur, some elements of the event are or must be abstracted out – for example, the fear and possible reaction of the victim, the structural conditions that contribute to increasing the rate of detentions and that sustain certain criminal statistics (e.g., social and economic inequality and exclusion, racism, etc.), and, in the case of EagleView 2.0, personal, identifiable information about the perpetrator and victim. Here, to simplify is to filter what parts of our messy affairs deserve consideration (and how). All of this is then represented in a user-interface, itself supposed to be simple, that is, graspable by those it intends to have as users, a step that involves concealing these manifold processes and parameters.

The operations which simplification conceals are enabled by computation's dependence on pre-determining formalisms. These formalisms are taught in Computer Sciences classes across the globe, as parts of the canons of computation, and comprise sets of rules and grammars instantiated by algorithms through a programming language. In other words, formalisms define the parameters through which computation will occur.

Abiding to formalisms is a condition for the production of singular images by computers (GALLOWAY, 2011). As the science of the formal (FILHO, 2007), computation obeys blindly the commands of code and, unlike humans, admit no exceptions (under the risk of incurring in errors). At the same time, the fact that computers recursively go back to themselves – a move which the philosopher Yuk Hui (2019) refers as recursivity – may pave the way for subtle but important differences in the simplifications they produce. Recursive behavior, far from indicating a 'no way out', invite us to imagine and practice counter-moves with and through computation itself. It is this that gives computation both its form and authority, making formalisms both a constraint and condition of possibility for navigating and disputing powerful infrastructures of domination.

The operation of such formalisms, coupled with the feeling of simplification that comes with interacting with these machines, help compose the sense of objectivity that stems from acts of calculation based on computer operations. Computational objectivity involve both the computational construct of

(in)security objects and negotiating the amount of judgement left to humans, the amount left to machines, as well as the parameters of the translations required to pass these judgements. It is not always the case that app-makers will openly claim their creations to be more objective or to pass a more objective reading of the world. These negotiations are far more subtle and may be hinted at, for example, whenever a claim to neutrality spurs from the quantification of crime or violence, whenever app-makers invoke field expertise or evidence-based decisions to build confidence in their apps, or when, to do so, they find it necessary to weight human or machinic decisions against each other.

The framework of these three logics is one of the theoretical contributions I offer in the thesis. They are part of my own, personal interpretations and extrapolations from fieldwork. However, in the actual making of computation, these logics overlap. Any attempt to separate them is in itself already a reductive operation, which I am guilty of effecting for the sake of textual and analytical clarity.

These three logics are not simply politically relevant analytical categories, they also play a structuring role in this manuscript: they give the names of the three empirical chapters, where I will discuss how each logic is enacted in the processes put forward by our three apps. It is a contention of this thesis that the computational work performed by apps branches the meanings of 'democracy', 'empowerment' and 'accountability' towards multiple directions and throughout many different algorithmic processes in their attempts to engage the local. Democratization may be enacted through crowds, empowerment may take place through real-time access afforded through hyperlinking, and accountability may be made equivalent to having a system against which to measure and compare judgement. The possibilities are manifold. These empirical chapters are intended to dissect how this branching takes place.

Lastly, these logics are also conceptually central to my analysis of political authority. As I claim in the previous section, diffracting the Man, State and War trope seeks to produce a version of political authority that is very much the outcome of processes rather than a mere property of bounded subjectivities. As logics informing a varied set of computational processes, simplification, formalisms and objectivity are fundamental to our understanding of political authority in its mediation by digital technologies. These three logics complicate our account of politics by both informing and concealing the parameters under which security is produced, disputed and reproduced, that is to say, by 'setting-up' how local conditions, particularities and situations are to be enrolled. These logics also render apps authoritative, to the extent that they feed into an app's justifications for acting in the world through users' judgements and decisions.

Perhaps somewhat boldly, I also claim that one of their roles is to function as the terms of the game under which security politics is imagined and enacted.

1.3 Mess and methods

This work is more or less ethnographic. Maybe a sort of a 'multi-sited' ethnography of apps, as I have heard from one ethnographer once. Multi-sited investigations define for themselves "an object of study that cannot be accounted for ethnographically by remaining focused on a single site of intensive investigation" (MARCUS, 1995, p.96), coming against a tradition that defines ethnography by the time spent in 'the field' and by an ideal of field as a particular site, ideally faraway from the ethnographer's homeplace (the concept of homeplace does not need to be geographic; it could be as well cultural). When we research apps, measuring how long we have spent in the field may be tricky, for there may be no evident field to start with. When there is, it may be a challenge to keep the research focused on a particular site.

Most of my fieldwork was conducted 'onsite': in and/or from Rio de Janeiro, from where most of those responsible for Fogo Cruzado operate, in and/or from TechLab's headquarters, in and/or from São Paulo, Geneva and – after months of negotiation with TechLab's board – in and/or from one of the cities where they were conducting pilots. Data collected onsite, both through interviews and observations, would be combined with data made public online about UN SanctionsApp Fogo Cruzado and EagleView 2.0. Such may be the nature of researching apps. They are both everywhere and nowhere to be seen, right there in our pockets and scattered through the many 'intermediaries' that afford their existence. To account for this multi-situatedness, one needs to resort to a variety of tricks.

The most straightforward of these tricks are old acquainted to ethnography: interviews and participant observations. I have conducted a total of 22 interviews with people involved in the three projects; 16 of these interviews were primary interviews recorded with the consent of my interlocutors and 6 were off-the-record interviews registered as fieldnotes. These interviews were complementary to and complemented by on-site participant observations at TechLab and online participant observations at the occasion of the 2020 update meetings of the UN SanctionsApp. In both occasions I would basically sit around, take notes, ask very few questions, be asked for my opinion, and, of course, observe what was going on. There is really very little that is new here. Talking to people, following them around when possible, making yourself present to parts of their daily routines were, despite my intention of getting to

know more of the app than of the people themselves, are all very traditional ethnographic methods that, I would say, amount to 80% of the empirical part of this research.

The other 20% are what I call 'walkthroughs': exploratory as well as systematic zooming-in and out, clicking, hitting buttons, playing around with the app's interface and features to see what was there, what could I do, what they afforded, checking what users would say in social media with the help of advanced filtering options and following official publications and websites with a certain regularity (LIGHT; BURGESS; DUGUAY, 2018). Everything afforded by digital technology itself, in its 'native' terms. Both UN SanctionsApp and Fogo Cruzado do not require creating user accounts to navigate through their interfaces. An earlier version of Fogo Cruzado's API, however, despite being of public access, still required user registration – possibly to prevent overloading their servers. This part of the research was composed of many screenshots, taken at different stages, that in the thesis help me not only re-telling these apps stories, but effectively showing them.

Of course, this is all assuming that the app was not shrouded in secrecy. In the case of EagleView 2.0, where I would not myself be able to conduct the walkthrough, I would try asking my interlocutors to show me things. I recall, when my internship at TechLab was coming to term, to have been summoned to Ariel's – who was EagleView's project manager at that time – improvised room in the new office to where they had just moved. They offered me a fine glimpse at the latest version of the platform at that time, going through one layer and another of crime analysis graphs, maps with the (I presume, not yet real-time) location of surveillance devices, predictions, among others, looking quite proud of the result at that point. Before and after that, I would be offered other opportunities to take a quick look at the system's many layers, either during meetings or in online chats with other interlocutors in the project.

The positions and occupations of my interlocutors not only in this, but in the other projects would vary: anthropologists, sociologists, journalists, directors, project managers, designers, programmers, graduate and postdoctoral students, research assistants, users. Most of them were cis women, but every programmer, with no exception, was a cis man – an indicative of the still persisting gender hierarchies and configurations surrounding computation. Some would firmly believe that being more transparent was key to give the app its much needed legitimacy and be more open about their views, concerns, but also expectations about their projects. Those more accustomed to talk to researchers would avoid being more open than necessary, but would always present themselves as available to talk. Others would be very evasive and quite

troublesome to reach. Some would be openly critical about their own projects, while others would more easily reproduce the established institutional discourses. In some cases, the team was more internally 'aligned' in this vision than in others. And, as it is the case with ethnographic research, prolonged contact interlocutors would inevitably lead me to develop my own, personal sympathies.

UN SanctionsApp and Fogo Cruzado can be publicly accessible by whoever is interested, therefore, I was able to preserve these app's real names. In contrast, 'TechLab' and 'EagleView' are anonymizations. More generally, and with the exception of 'public persons' associated with the first two apps, every person cited in this thesis have had their names changed. Likewise, I only cite in the manuscript pieces of information from meetings where I was authorized to attend as a PhD researcher and to take notes. My participation in UN SanctionsApp update meetings took place via a platform called Webex and it was negotiated with Thomas Biersteker through a series of e-mail exchanges. In turn, my participation in in-person meetings at TechLab went through several layers of validation, first, with the presentation of an ethics clearance form and then with the formalization of the research through a 'participant observation authorization form' signed by TechLab's director, which would be later supplemented by a document, requested by the Lab's board, that would enumerate the total number of interviews I would conduct and the nature and number of meetings I wanted to attend. Most of the meetings I requested to attend to conduct my doctoral research consisted of brainstorming discussions about the platform and its technical aspects.

It has been some decades since ethnography has been 'imported' into International Relations as a viable methodology, and the debates about how exactly to appropriate it are far from resolved (VRASTI, 2008; VRASTI, 2010; RANCATORE, 2010; LIE, 2013). To some, it is simply another method, among many–one that for sure brings important contributions to the study of international politics, but that should not automatically attached to the political stakes it has in its mother field (RANCATORE, 2010). To others, this import cannot simply cast a blind eye on these political stakes. Ethnography in anthropological research has metamorphosed quite significantly since Malinowiski's Argonauts of the Western Pacific. Considerations that range from the responsibility and reflexivity of the ethnographer with regards to their (textual, scholarly, epistemic) authority, as well as vis-à-vis the vulnerable and marginalized groups subjected to anthropological research, have become part of an ethnographic ethos that equally matter to the study or marginalized groups in global politics (VRASTI, 2008; VRASTI, 2010; POETS, 2020). To

others, still, the use of ethnographic methods to study “the culture of power, rather than the culture of the powerless” (LIE, 2013, p.206) presents another possible venue of appropriation, with its own unique political stakes, including the problem of complicity (KAUFMANN; LEANDER; THYLSTRUP, 2020). What seems to be a common agreement is that participant observation and a particular ethnographic approach to interviews, whether pragmatic or ethico-political devices, may help the persisting and ever-shifting ideological conventions of the field (the Hobbesian state, the Waltzian international system, the personified IGO, global governance, the atomistic individual, etc.) to come undone, an intention which is pretty much shared by this research.

Here, ethnography helps me disentangling at least part of the sociomateriality of digital security practices and the way in which they come into being through computation, its infrastructures and through the whims, tensions and conflicts negotiated into (and by) these (LATOUR, 1995). More fundamentally, through, it takes part in a methodological strategy committed to sketching a parasitic critique of the politics of technology in the field. As Austin notes, "all research... begins with...[t]he abuse of channeling a lifeworld into a text, narrow, distant, and cold. Reproducing only, the cynical might say, a citation count." To be parasitic, in this sense, partly involves converting these abuses "into use and a symbiotic process of exchange between parasite and host or researcher and object" (AUSTIN, 2019a, p.215) in order to build research that works *for* others.

Moreover, this would also mean understanding the conditions of possibility for certain practices which he terms ’world political bads’. What this means, concretely, and in the context of this work, is that I try to be attentive not only to those who are in a way of another subjugated by domination, but also to those who somehow end up carrying it through, or, to better state it, with *what* ends up carrying it through, and – perhaps surprisingly – sometimes also transforming it. To be ’parasitic’, in this sense, begs a re-orientation and re-ordering of the methods of critique in order to cultivate "a nonjudgmental ethic of ’care-full’ analysis and description" (AUSTIN, op. cit., p.224).

With this, I try to offer a serious engagement with a politics of ’what’ (MOL, 2002; AUSTIN, 2019a; LEANDER, 2020) committed to opening possibilities of change (possibly not as ’radical’ in the sense of rupturing as some would wish) from with/in (AUSTIN; LEANDER, 2021), rather than beyond the much familiar ’dirty’ – "in the sense of being not only part and parcel of power relations but always and unavoidably complicit with them" (AUSTIN; LEANDER, op. cit., p.40) – politics of security. In this sense, rather than focusing on denouncing the power and authoritative arrangements at play in the

inner workings of computation, I try to engage with the ambivalent web, voices and vocabularies composing these arrangements, and with those who, or the things that, challenge and help making them endure.

Concretely, this would entail an entirely different story of political authority, one that passes through the processes afforded by these artifacts, rather than wielding them as mere tools. Moreover, it would be a story attuned to the ambivalences surrounding the politics of these practices, with a special interest in understanding how the same infrastructures of domination that support technological expansion through mobile technologies may be engaged, subverted, and appropriated in innovative and sometimes contradictory ways; even when operating under these technologies has its limits; the possibility of complicity being a troublesome reminder of it (AUSTIN; LEANDER, 2021).

An assumption that tacitly legitimizes different kinds of ethnographic research is that of immersion. As noted above, ethnographic work used to be (in some cases, it is still is) defined by the time someone spends immersed in a field that is culturally distinct from the ethnographer's themselves. Equipped with the necessary distancing, they would be able to illuminate the corners of the cave that remain in the shadows to those who are simply too close, too attached to see them. Classic ethnography in this sense resembles a long, equipped deep dive. The multi-sited ethnography proposed here is something else. More likely, it resembles a view from the shore (SEAVER, 2015).

It is hard to establish, given the perspective of an author who has been familiar with computer culture for a long while, that an ethnography of apps would be some sort of study of a different culture. I belong to the current culture of apps, and maybe so do you. These are not the same terms of belonging that we could say that apply to app-makers, but it is for sure not the story of someone venturing through something a priori strange to her experience. It is an ethnography of, at minimum, an acquaintance, which makes it hard to imagine that one would be in the conditions to have the proper distance from the object of research required by this more traditional version of ethnography. Second, to view from the shore does not imply that our feet are out of the water. On the contrary, the waves might still splash onto our ankles, who knows if not drag us further into the water. How deep we go into the water becomes a matter of negotiation.

Of the three apps, I never got to conduct a 'proper' participant observation with Fogo Cruzado. This possibility was ruled out when I first approached its database manager in late 2018, on the grounds that the team mostly worked online and coordinated through a private WhatsApp group. I never insisted on getting access to the group either. This part of the research is therefore mostly

supported by interviews, participation in social media 'lives' where the app was presented and debated and several 'walkthroughs' on its interface. These walkthroughs were also conducted for UN SanctionsApp. In contrast, I could go quite deep with TechLab, although this dive had to come to a halt when one of its directors felt the need to settle institutional boundaries between myself, the intern, and myself, the doctoral researcher, which signals the inherent troubles of getting your hands 'dirt' and doing things from with/in. In early stages of my contacts with TechLab's director and a former project manager of EagleView 2.0, it was originally agreed that I would contribute with the project's social impact statement, but affected by these troubled boundaries, this arrangement would come undone before I could formally kick-off this research.

The analogy of the shore is intended not to suggest a distancing, but more likely a strategy of understanding that becomes desirable because our research objects repel complete immersion, but which propose diving (through interviews, observations, and walkthroughs). These dives may be not deep enough, but just refreshing enough.

These many strategies also make this research somewhat a bastard. It has, as Actor-Network theorists would say, 'followed' its apps (LATOUR, 2005), wherever it could, with its online and in-person interviews, online and in-person (participant) observations and online and in-person walkthroughs. At the same time, it remained only partially content with just 'following' and indeed attempted at deepening the engagement (e.g., by trying - even if failing -, when it could, to participate in the proper making of these apps). It is a bastard for never actually deciding whether to remain in-person or online, online or in-person, 'distant' or complicit, never actually settling with these hazy boundaries, which is almost impossible given the nature of apps and of the work that app-makers do. It is a bastard for composing known methods so unconventionally, although this probably will become increasingly more conventional, maybe the 'new normal' legacy of the pandemics which seemed to probe even further our walk towards the adoption of equally bastard methods in the social sciences. And it is also a bastard for what these methods allow me to do with this research, namely, centering it on the political work of apps through the many forms they may take.

1.3.1
Making the familiar 'strange'

Ethnography has been known as a strategy to get to know, study and write about other cultures – and sometimes our own (STRATHERN, 1987;

DAIGLE, 2016). But there is a part of it, a part which has been fruitfully in dialogue with STS, that directs its concerns to the nonhuman, or, more pointedly, to the companionship established between humans and nonhumans (KOHN, 2013; CADENA, 2015; CADENA et al., 2015). To the extent that this research proposes giving the reader an ethnographically-inspired account of apps (and, of course, their human companions), it inhabits this translation zone. While doing so, it decidedly sides with similar accounts that have decidedly focused their attention on the sociomaterial practices surrounding security politics (ARADAU; BLANKE, 2017; ARADAU; BLANKE, 2018; LEANDER, 2013; LEANDER, 2019a; AUSTIN, 2016; AUSTIN, 2017); and who have embraced the methodological challenges that come with engaging in this sort of research (LEANDER, 2016; KAUFMANN, 2019; LEANDER, 2020; BELLANOVA; JACOBSEN; MONSEES, 2020).

STS and anthropology alike have their share participation in the recent onto-epistemological moves that have populated the field. These moves include 'turns' such as the 'practice' turn, the 'material' turn, the 'ethnographic' turn, among others, which have provided with important theoretical and epistemological innovations in the field (SALTER, 2013; BAELE; BETTIZA, 2021), including many which are integral to this work. While they were not able to resolve the disciplinary anxieties and uncertainties that they were intended to aid with (VRASTI, 2008), these innovations have been part of important inter- and transdisciplinary dialogues, and thus fruitful steps in the effort of delivering a slightly more monstrous version of IR, one that is properly attuned to its sociomateriality. This monster is not wedded to the production of a modest witness imbued with an eagle eye view from above (HARAWAY, 1997), but of a tarnished and situated one – one that, when looking itself on the mirror, will be surprised by its own, unrecognizable form.

In a multi-authored essay published in 2015 in *Hau: Journal of Ethnographic Theory*, Marisol de la Cadena and others discuss the different interfaces between anthropology and STS, both in their enmeshment and estrangement. In an exercise of 'queering the familiar', their discussion not only highlight the fundamental differences in how STS becomes part (or not) of anthropological reflections across contexts, but fundamentally reminds us of how STS's challenges to established hierarchies between humanity and nonhumanity may be contentious and situated (LIE; WEEN in CADENA et al., 2015). Methodologically, the idea of making the familiar strange proposes a counterpart to the long established convention that it is the task of ethnographic research to 'make the strange familiar' – a reminder that cultural anthropology has been historically structured around the practice of ethnography and the imperative of knowing

other cultures. The turn of anthropologists towards 'home', in the aftermath of the Second World War, has brought to the forefront a different concern with studying a culture to which the anthropologist is no longer the disinvested outsider, but an 'insider' with their own stakes (LIE; WEEN in CADENA et al., 2015). Strathern (1987) however notes that to speak of anthropology at home may have less to do with our degree of belonging or familiarity with the cultural contexts we research than with conceptual reflexivity, or the extent to which the account in question renders people's conceptions of themselves back to themselves.[11]

This is what I intend with making the familiar strange: to provide an account of apps and Global South security governance that we can barely recognize, and yet find it oddly familiar. This manuscript and the research that substantiates it are both exercises in cultivating this strangeness. First, with apps. If, like me, the reader comes from a very particular background – urban, surrounded by at least some Internet connectivity and, of course, by smartphones – then apps are no strangers to us. We live in a culture of apps that take part in our daily routines, enabling us to chat, socialize, get informed or access essential and non-essential services more conveniently. In making them strange, my intention is to look at apps as particular manifestations of a contemporary culture of computation, supported by their own unique infrastructures and imaginaries. While we generally accept that apps present some sort of connection between users and developers and also that they facilitate some decentering of power from the hands of companies to those of individuals, we give less consideration to what it takes for them to efficiently reshuffle our perceptions around makers and takers of technology. Making apps strange entails digging through these processes and the infrastructures that enable them, seeing how they both mimic and become 'indigenized' (APPADURAI, 1990), that is, 'hacked', adapted, re-purposed, and reassembled differently (AMRUTE; MURILLO, 2020).

[11]She further notes that anthropology at home is only possible depending on the relationship between a researcher's techniques for organizing knowledge and how the group, community, or 'society' being studied organize knowledge about themselves. She notes that "[t]he challenge of anthropology at home is that it sustains a different structure of distinctions [from an anthropology of the Other]. The ethnographer becomes author in relation to those being studied. The proposition rests on there being continuity between their cultural constructs and his/hers. For they too analyse and explain their behavior much as he/she does... What the anthropologist seems to be doing is just using these ideas in specialist ways. The specialized analysis thus appears to give a further view which encompasses and overrides the original explanations, supplanting them in effect with further versions. Versions can always be challenged, of course... If the ethnographer at home remains a writer it is not so much for those he/she studies, who may well challenge his/her versions, but for colleagues, the main readership." (STRATHERN, 1997, p.26). This manuscript provides its own 'version' of the experiences recounted by those who I have met, humans and otherwise.

Second, with political authority. I propose a situated and processual account of authority. In proposing to consider the three logics of computation – simplification, formalism, objectivity –, I look into the move of making authoritative, which has a hard time finding its reflection in Waltzian ideal types. And it is only ever possible to look at the operation of these logics if we consider the manifold practices and contexts through which they may be enacted (MOL, 2002; SEAVER, 2017). This translates into a question of method: how do we go about tracing and analyzing these practices? My response to it, to bastardize its research methods and to 'get one's hands dirt', is only one among many.

I propose that this question on methods constitutes a third exercise of making the familiar strange. While it refers to the study of the researcher's own cultural context, the idea that anthropology can take place at home also complicates and makes explicit the negotiated nature of the divisions between home and foreign, fieldwork and writing. There seem to be a widespread belief among academics conducting fieldwork that there is a firm division between these moments of the research: that fieldwork must preferably be conducted on a different context than that familiar to the researcher and that fieldwork and writing are two different existing each at their own time, when the case is more likely that fieldwork keeps spanning into writing, be it in terms of how we negotiate our presence in our texts – in my case, not only the choice of writing in the first person, but equally of disclosing the conditions of production of this work –, how much of these conditions we decide to disclose, or because writing requires continuous a revisiting of field experiences through interviews, anecdotes, fieldnotes, memories, recollections, etc.

The style of writing adopted in this manuscript is also a strategy of making apps familiarly strange. Much is discussed about the ethics, responsibility and political commitments that come with the task of 'writing the lives of others' (DAIGLE, 2016), but a different set of questions come with writing about the entanglements between people, things, and infrastructures – especially considering how complicit we end up becoming with the work of the latter. In everyday technological practices, these three are constantly re-negotiating their boundaries. In some cases, blurring these boundaries is most welcome – such as, for example, when we are constantly reminded that technology is not neutral and perpetuates the values and worldviews of their creators. In other cases, these boundaries are made explicit, for example, when we need to attribute responsibility. The writing of this manuscript is intended to translate, in part, these continuous negotiations. It works on what Strathern (1987)) characterizes as a unique characteristic of auto-ethnography, that

is, rendering explicit one's culture contrivances, perhaps with the purpose of some sort of self-knowledge, and also on poking some holes.

As I have pointed out, apps complicate quite significantly the idea that there can be a specific site for this kind of research simply because apps themselves may become sites of study. As such, they are multi-situated objects par excellence, existing here and there, 'onlife' (FLORIDI, 2015; RATTA, 2018), on your smartphone screen and in the hands of their creators, both at once, working in parallel as objects of inquiry and 'sites' of inquiry (DIETER et al., 2019). This is not to say that they are not affected by the places and contexts in which they operate, quite the opposite: place and context indeed matter in how they come to exist, are adapted and used. Fogo Cruzado's own version of crowdsourcing and, later, its struggle to adapt it to Recife, would lead to important changes in the original purpose of mapping gunshots, extending it towards other dimensions of armed violence. Likewise, developing EagleView 2.0 in two entirely distinct contexts, one in which the technological and data environments were regarded as role models, and the other where there were so many holes that it became necessary to 'adapt' the system, would lead to the establishment of a minimum threshold for operating predictions (Fieldnotes, June 2019) and to the idea of having filters that could make the system partly customizable to the technological and data environment of those partners who met the minimum threshold.

Because familiarity can be deceptive, the task is thus one of reinspecting what seems familiar and self-evidently real (CADENA et al., 2015) and, more pointedly, to return familiar concepts with strangeness. The idea that apps are bounded entities or that there are such 'spheres' or 'levels' separating the individual from the state from the international system are both very familiar to us, but at the same time they set very tight limits to politics. In contrast, the bastardized methodology proposed here is intended to call these limits into question, stretching them further and into computation and asking questions about the kinds of contradictions and ambivalences that get negotiated into apps; or that become possible as they travel, are adapted, re-purposed; how apps are made authoritative and what does this tell us about the power that goes with contemporary computation, its infrastructures and manifold 'localizations'–questions that themselves beg us to look at these processes not 'from above' (HARAWAY, 1988), but ethnographically and situatedly, that is to say, in their own contextual enactments (MOL, 2002).

1.3.2
Starting in the middle

I frequently think of this research as a continuum without clear-cut starting and ending points. Of course, one could argue that it started in my first year of doctoral studies, in 2017. Or maybe in late 2016, when the topic of algorithms/computation raised my interest and inspired me to propose a doctoral project that already tied together the three apps. Who knows if not my first encounter with their interfaces and curiosity about their work. Or the different moments when I have started to reach out to my potential interlocutors, spanning through 2017, 2018 and 2019. Or perhaps the day I received the ethics clearance from the university's ethics committee. It is hard to tell.

Throughout our early academic trajectories, we learn to portray research processes linearly and chronologically: we define a research 'object', design a viable methodological strategy, have it approved by our supervisors (perhaps complemented by some other institutional process – a project qualification, an ethics board, etc.), and properly start the research. The reality of it, we all know, could not be more different, messy even.

If we accept the fiction that is the linearity of research. Here, we are left with the fact that fieldwork, even when it does not necessarily require that we leave the comfort of our homes or universities, often exposes us to ongoing situations, events and contexts. As taught by Deleuze and Guattari (1987), we always start 'in the middle of things', with 'start' and 'end' points being no more than arbitrary fictions that we must necessarily pick up to know when to stop following the actors (LATOUR, 2005).

It was precisely 'in the middle' of things that the three apps and I found each other. Being in the middle requires establishing connections with potential interlocutors through the means available to us. I could argue that I have come to learn about these apps by pure chance, or maybe because I already used them, none of which would be the entire truth. My research has benefited profusely from the many personal and professional networks afforded by an affiliation to an institution like PUC-Rio. Institutional partnerships with the Graduate Institute, Geneva, and with TechLab; being offered an internship at the latter per invitation of a former colleague with whom I had worked before; having friends who were friends with Fogo Cruzado's database manager. (I cannot consider myself even part of their target audience, having the undeniable privilege of not living in the commonly affected areas and of having witnessed Rio's crossfires only a few times and from a [relative] safety, in the 'asphalt'). Not everything in research is about luck or chance –

there are many moments that are clearly shaped by personal and professional relationships and structural privileges.

To acknowledge that we can only start in the middle is also to acknowledge the roles that these relationships and privileges play not only in shaping favorable or unfavorable conditions for the research and access to the field-/interlocutors; it is also a constant reminder that we should work to make explicit the fact that these processes cannot be easily disentangled from our own stakes, investments and disinvestments, no matter how concealed under layers of textual prose and fictitious distancing they may be.

In the case of this work, to start in the middle has also the connotation of *being* already in the middle, that is, being implicated. Implicated and co-opted by the people, things, and places where things are made, rather than taking these as merely "objects of study with which we 'engage'" (AUSTIN; LEANDER, 2021, p.51). This of course requires some sort of blurring of "the distinction between these sites and ourselves" (AUSTIN; LEANDER, op. cit., p.51), as well as embracing the ethico-political complications that come from such embeddedness.

Being an intern gave me a more practical understanding of TechLab's internal organization. At the time I was there, the Lab's research areas developed their work independently. The area where I was allocated, following my personal acquaintance with the project coordinator, did not include the EagleView 2.0 project.[12] This project, allocated in the 'Smart and Secure City' area, was composed of an entirely different (and always-shifting) research team, most of which, at least in these early stages of the project, did not work onsite. It was far more difficult to arrive at similar understandings with Fogo Cruzado and UN SanctionsApp and both required me to be more creative in my task of following the actors.

I first met with TechLab's director in late 2017. At that occasion, we discussed the possibility of the internship and I have also made my interest in having EagleView 1.0 as a case study in my PhD explicit. There were no objections to me carrying out both activities, but the exact conditions under which this research would take place would shift radically. Unbeknownst to me at that time, the project was already undergoing important changes. One such change was the funding that would allow TechLab to develop the pilot

[12]These internal divisions had resulted in my research as an intern being carried out somewhat separately from my research as doctoral student. As I will discuss ahead, this separation became ethically relevant as the research had to be re-oriented towards the pilots in cities C1 and C2. Notably, I would participate meetings where each of these areas would very briefly present their research progress and outputs, and, inevitably, EagleView 2.0 would be in the agenda. For ethical reasons, I have never taken fieldnotes during such meetings, not does this work include any data or reflections derived from them.

project with police authorities in two Global South cities – let us call them city C1 and city C2. Second, the political context that enabled TechLab to develop EagleView 1.0 had become unfavorable. So, in 2018, when I went back to the director's office to ask for permission to officially 'kick-off' the research on EagleView, I still vividly recall how their expression was complicated. It was evident that they did not want to close the Lab's doors a researcher, but it was also clear that this would have to be the case, at least in what concerned conducting research that involved the 1.0 version of EagleView. I left their room that day uncertain of whether there was even going to be an EagleView in my thesis. A few days later, I would receive an e-mail with the suggestion to look at the roll-out of EagleView 2.0 instead.

Here you find one of the first major shifts in this research. The initial EagleView was more aligned with Fogo Cruzado and UN SanctionsApp in their normative ambitions of democratization and empowerment, and this was the reason why I have initially chosen to study it. This new pilot, which spoke very neatly to the missing 'second' image of the 'State' in the Waltzian framework, would evidently introduce contradictions and ambivalences to the citizen empowerment and democratization narrative. It was evident that TechLab could no longer lay the claim of citizen empowerment, not with a now far more confidential software whose flagship was having a predictive policing algorithm. This is where, gradually, the words accountability' and 'effectiveness' became more relevant. This transition was furthermore interesting because, at least in the early stages of this new version, there was still the hope of keeping the code in-house and open source.

There is also an extent to which to start in the middle of things is to be prone to the shenanigans of failure and luck. As Kušić and Záhora (2020) point out, failures go beyond closed doors, either in the form of rejections, closures or endings. Instead, failures can be much about dramatic changes in the field as they can be about continuous negotiations extending alongside our practices of doing and writing research. Failure is also connected to luck, chance and timing. As Fogo Cruzado's database manager once joked, I had the talent to pop up in moments where big reshufflings were in place (COUTO, 2021, personal communication). This was the case when I sought contact with analysts from Recife right in the middle of the transition of their operations from the academic-based NEPS to the activist-journalist collective GAJOP and when I contacted them as an internal re-structuring was about to take place, alongside the reprogramming of the app, in February 2021. Chance – or luck, however the reader may judge it – was also behind a casual encounter and improvised interviews – scattered between the corner of an auditorium,

the backseat of an Uber and the table of a bar – conducted with data analysts operating Fogo Cruzado in Recife, during an academic conference, and it was also behind this unexpected proposal of changing my research from the public to the police version of EagleView.

Navigating changes in fieldwork also requires refusing an applicationist approach, whereby we rely on ready made, off-the-shelf, analytical frameworks or concepts guided by the belief that they offer abstract and universal solutions to our troubles (LEANDER, 2016; 2018; 2020).

> Applicationist research operates through the triology: theoretical framework, methodological operationalisation, case study. It is mostly introduced as do the literature review, derive a hypothesis, core process/logic or central concept and then apply it to a case study to check if it holds or should be further elaborated (LEANDER, 2020, p.63).

Generally, this entails subsuming research under an overarching logic. Like during the presentation of an early draft of this chapter, where I was asked to adopt a Foucauldian framework for my discussion on governance. There is nothing wrong with Foucault, of course. The problem lies in the disciplining work that the requirement for overarching, abstract, frameworks do to research. As Leander (2020, p.77) notes, the issue with the "'blanket' of grand theorizing" is that it "'suffocates' the observed", often preventing us from integrating their categories into the analysis. This does not make the research any rigorous, but rather rigid, and inflexible.

This research strategy provides unique takes on the different ways in which digital media is reconfigured and adapted to respond to variations in context, and even to their own experiences with closed doors and failure. It furthermore allows the analysis "a better grasp of the possibly singular and certainly contextual processes at work" (LEANDER, 2020, p.72) where there are no ready-made theoretical frameworks available for us to pose questions about it. Besides, it is very difficult to imagine a medium to long term engagement with digital technologies where these remain static, simply because these technologies are always in process of reconfiguration (EGBERT; LEESE, 2020; EGBERT; KRASMANN, 2020; KAUFMANN; EGBERT; LEESE, 2018), or, to quote Manovich (2013), “remain forever in beta stage.” In this world of permanent change and impure alliances, questions related to what goes in and out, what meaning is ascribed to the work of the app, or through what kinds of alliances it apprehends, borrows, merges, translates and/or accommodates the world, are continuously negotiated.

From my first contact with Fogo Cruzado's database manager in 2017, to the moment when I write this text, 2021, I have witnessed the project undergo several changes, which include not only the two major changes described above, but also smaller changes in how events were communicated in social media (from a more neutral tone towards one which focused on creating a narrative about the victims of armed violence), the creation of their API and the subsequent changes in its interface and in which kind of data can be accessed (e.g., the API no longer delivers information about whether the report comes from users or the press), and changes in how the app positioned itself: from an app that crowdsourced gunshots to a platform and data laboratory on armed violence.

Researching three very different apps has also taught me that our methods and strategies of engagement must be flexible enough to accept and respect the specifics of each of these encounters. I have initially planned to conduct on-site participant observations as my main research strategy for all the three apps. In the end, and perhaps rather unexpectedly, this was only possible with EagleView 2.0.

The multi-sited character of this study is also a reminder of the associations and connections that us, researchers, must continuously establish among discontinuous objects of study, as well as to the contradictory personal commitments and identities that we negotiate as we change 'sites.' For example, I would frequently oscillate between an intern at the TechLab and researcher from PUC-Rio. The latter would be the case at each time when my interlocutors at TechLab sought to make clearer the limits of where I could go and what I could or could not access. In all the three cases, being acknowledged as either insider or outsider would sometimes make my interlocutors more prone to open themselves to unburden professional grievances or their own skepticism with the app in question. Other times, it would lead me to closed doors and frustrating dead-ends.

Lastly, there is the issue of whose categories, mine or my interlocutor's, gain prominence in this research. I am to blame for, oftentimes, carelessly imposing my own. This was the case of whenever I would approach my interlocutors in the early stages of this research, I would use the word algorithmic to refer to the work of their apps. This would trigger a sequence of equivocations that I could not completely understand back then. Equivocation is a term coined by the Brazilian anthropologist Eduardo Viveiros de Castro (2004) to refer to the misunderstandings that occur in the processes of translating and comparing cultures and, more generally, in communications across worlds. These equivocations were present in all the three cases. For

example, TechLab's director and myself held different understandings of what algorithms meant and what they did. To them, the term alluded to machine learning, black boxes, transparency and accountability. To me, it was about computation, more broadly: while evidently encompassing machine learning, it went well beyond it. It was a similar case with Couto, Fogo Cruzado's database manager, although she was careful enough to ask me back what I meant by algorithmic.

Similar equivocations would occur each time I used the term *algorithm*, whether in informal chats, interviews or more generally presenting my research. Thinking in terms of algorithms also created some dead ends, expressed in the way I posed questions, what I meant by these questions and what I have got as response. Once, during an informal chat, I asked a Fogo Cruzado's data analyst if/how the app employed algorithms and got as response that the app did not use any algorithm. In this case, both to me and to the analyst, 'algorithm' alluded to machine learning, an association that foreclosed (to me) the possibility of talking about algorithm as computation. It was when I realized that it was the algorithm operating in assemblages with big data and data mining techniques that my interlocutor and I were jointly co-producing as politically relevant. Realizing that these equivocations resulted in (productive) dead ends, but it has also led me to limit my use of the term during interviews and informal chats. I wanted to hear people speaking of their apps in their own terms and I wanted to look into these apps without the my the pre-conceptions of algorithms and the algorithmic I had acquired while reading the Anglo-European literature on the topic looming over.

1.3.3 Organization of the thesis

This thesis is structured in 3 parts, with a total of 7 chapters. Part I consists of this introduction and chapter 2 ("Governing through apps") and sets out the conceptual framework of the work, alongside with a literature review that argues for a serious consideration of the politics of artifacts into global security governance literature. In chapter 2, I reinstate the claims laid out in this introduction, namely, that an attunement to sociomateriality not only expands our understanding of politics, but may fundamentally help us to account for the disjunctures and hierarchies that get instantiated, reconfigured and challenged through digital technologies, and argue that apps add layers of complication to our understanding of governance, of which I will be dealing with three: simplification, formalism and objectivity. Part II consists of the empirical chapters of the thesis and unrolls these layers more

properly. Chapter 3 explores how simplification is enacted throughout the work of the three apps. Chapter 4 focuses on formalism, while chapter 5 looks at the computational enactment of objectivity in Fogo Cruzado, EagleView 2.0 and UN SanctionsApp. Part III, the last part of the thesis, consists of two chapters.Chapter 6 ("Authority") wanders about what a serious consideration of these logics do to our understanding of authority and the authoritative and about how they could enable us to muse through alternative accounts of of power and authority in global (South) security politics. Chapter 7 ("Concluding Thoughts") discusses the manifold possibilities and necessary commitments of working with/in computation.

Several aspects of this work are inspired and/or intentionally reproduce Annemarie Mol's style in her *Body Multiple*. In this book, Mol partitions her text in two 'layers', with the upper layer corresponding to a narrative of her encounters with medical practictioners diagnosing atherosclerosis and the bottom layer corresponding to pertinent conceptual and methodological discussions in the literature. Mimicking this strategy, those chapters in Part II will be divided in two separate layers floating on the same page. For each chapter in this part of the work, in the upper layer, I will alternate through the stories abstracted out of my fieldwork with Fogo Cruzado, EagleView 2.0 and UN SanctionsApp, their features and the governance work they intend to carry out under the corresponding logic of computation. Rather than separating different stories for each different moment of the fieldwork, the stories I tell in this layer will weaver them together, sometimes alternating between them, sometimes making them part of the same storyline. In contrast, the bottom layer will comprise situated literature discussions that put into conversation fields as diverse as computer science, philosophy of technology, sociology, IR, architecture and STS. The text will be broken down into shorter sections intended to relate to the literature not in terms of their gaps, but of the potential contact points between the different fields engaged here.

Departing from Mol's project, my own appropriation of her style has three purposes. First, to distinguish between those reflections stemming from the episodes and events I have experienced during fieldwork from those that stem from the literature, and therefore attempting to make explicit the multiple sites from which these reflections were assembled. This opens up the text further to the scrutiny of the reader by allowing for a more explicit tracing and scrutiny of eventual conflations between categories that are my own and categories that belong to my interlocutors. Second, this layering comes as an attempt to make explicit the many connections and backs-and-forths between practices and theory, proposing not to separate them, but to see how both feed into one

another.

Furthermore, this way of arranging the text, while it may annoy some readers who are more used to more traditional text-structures, is inspired in Whitehead's descriptive generalizations, which are meant not to reveal some hitherto unnoticed element, but provide imaginative constructions aiming to transform "our modes of thought, the habits of attention and interest that shape our engagements with the world" – especially how we think about security governance (GASKILL, 2014; WHITEHEAD, 2010).

Third, this layering also extrapolates Mol's own because it speaks directly with the practice of computation and with how highly abstract mathematical and logical operations are translated into finite but quite provisional and unexpected outcomes. I have personally lost count of how many times I have seen or read people talking in terms of layers, affordances, instances and instantiations to talk about how computation has this sort of abstract form that actualizes in quite unexpected ways in practice. I see this layering coming across very nicely to the ways in which we can talk about how the coming together of different materials and practices creates a different whole.

Finally, this thesis is an exercise of anthropophagy. Abhorred by European colonizers, anthropophagy was a practice shared by different Amerindian peoples that consisted of eating parts of human bodies as a way of paying respect to someone or as part of a desire to acquire their characteristics. The practice has inspired the Brazilian modernist art movement led by Oswald de Andrade that proposed to 'cannibalize' and assimilate elements from foreign cultures in order not to reflect them, but to produce a unique, multicultural identity. In the case of this manuscript, it is 'anthropophagic' because it uses concepts developed by IR scholars, philosophers of technology, STS and digital politics scholars and philosophers and sociologists writing about power and inequality to think about its own object. This use is filthy and communicative, for it does not seek to remain faithful to the intended original senses of these concepts and ideas, but rather appropriates and twists them by making them talk to each other.

The chapters in this manuscript wander through Donna Haraway's (2016, p.2) advice that we should 'stay with the trouble'. The advice resonated among critical security studies, especially considering the ambivalences that come with digital politics (BELLANOVA; GOEDE, 2020; KAUFMANN; LEANDER; THYLSTRUP, 2020; AUSTIN, 2019b). It is, moreover, the diagnosis of an entanglement with the security objects and practices we eagerly study and with the infrastructures enabling and constraining them. Digital politics, imbued with power hierarchies as it is, forces us to deal with them. Many

have been the attempts to question, problematize, and lay bare the inevitable enmeshment of digital infrastructures with variegated practices of domination and resistance carried out with and through them (KAUFMANN; LEANDER; THYLSTRUP, 2020; LOBATO; GONZALEZ, 2020), as many have also been the attempts to come up with alternative worlds, practices and imaginaries that twist, subvert, contradict, use, redefine and fuss with these hierarchies, attempts that seek to 'provincialize' and 'decenter' digital practices, to 'hack' them and to engage with computing otherwise (AMRUTE; MURILLO, 2020; CHAN, 2013; AMRUTE, 2020). This research inhabits the in-between of these attempts. It is less a call for action than a form of refrain; an exercise of stopping and looking at how these hierarchies take shape, disappear, are challenged, instantiated and used in the governing of security in/of Global South.

2
Governing through apps

Imagine the following acts:

Act 1. *You are in the position of an observer during a UN Security Council session to discuss the application of new sanctions to the president of country X, who has been recently accused of violating international humanitarian conventions for directing attacks against its own civilian population. For the record, because of its history of colonialism, corrupt government, impoverished population and recent history of armed violence and conflict, country X is probably considered part of the "Global South". Now, imagine that you are witnessing a heated debate on how to most effectively design these sanctions and that a representative of a permanent state member presents some visibly inaccurate data on previous cases to prove his point. You then observe one representative of country Z, a non-permanent member of the UN Security Council, repeatedly looking at her phone, occasionally exchanging looks and a few words with her delegation colleague. A few minutes later, she finally has the word and immediately refutes the data that has been presented by country X's representative, suggesting that these data did not correspond to what was publicly known about the case. While making her point, she indicates the application open on the screen of her smartphone.*

Act 2. *Now, a drastic change in the scenario. You are now a Chief of Police, responsible for allocating police garrisons, with an ecosystem of gadgets at your disposal (from apps that show the location of your men and women and that transmit in real time the images from the corporation's newly acquired body cameras to systems with layers of criminal mapping, predictive policing algorithms and dispatching tools) but, somehow paradoxically, a quite tight budget at your disposal. Faced with this scenario, it is your job to use the technology at your disposal in a way that is cost-effective and responds to the predictions and estimations provided by the systems at each 12 hours.*

Act 3. *The scenario changes again. You see yourself transported to a busy day in Rio de Janeiro, Brazil. You are at a bus stop, texting some friends while waiting for your bus to come and take you home after a busy day of work. Just when you have stepped on the bus, you hear three distinguished gunshot sounds coming from a nearby favela. And while realizing that no one in the bus seems*

very bothered by the sounds, you immediately feel your smartphone buzzing in your pocket. After finding some place to sit, you check it to see whether it was a response to a previous text of yours, noting that, instead, the notification on your screen was about the gunshots you have heard two minutes earlier.

The three acts above are evidently fictional. We are reminded by science fiction writer Ursula K. Le Guin (2017) that 'fiction' does not prescribe, it describes. Every fiction is a metaphor about something, and this is the case of the stories above, which were extrapolated from interviews, informal chats and observations conducted during my fieldwork with UN SanctionsApp, EagleView 2.0 and Fogo Cruzado. As metaphors or, as I prefer to call them, creative extrapolations, they did not happen exactly as narrated (might as well), but should provide the reader with a glimpse on how these apps have been put at the service of (in)security governance in and of the Global South.

This chapter explores the governing work of apps vis-à-vis Global South (in)security. More broadly, it grounds the aim and argument of this dissertation, which is to show how, in their very mundane operation, apps perform a triple work: first, their presence challenges the odd scarcity of mundane artifacts in some theorizations of global security governance (LEANDER, 2019b). Second, they trouble our assumptions about how certain technologies participate in Global South security politics and expose the ambivalences of acting with and within the digital. Third, because they re-assemble a variety of practices, ideas, and features, alongside powerful computational infrastructures, apps mess with the presumed universality of computation, an assumption that has much to do with the fact that the history of computation remains predominantly male and Anglo-American, emphasizing too much the achievements of men in institutions like DARPA, the Silicon Valley, or Bletchley Park, while downplaying efforts to 'chase' innovation from elsewhere (CHAN, 2013; MEDINA, 2014; IRANI, 2019).

When we speak of the Global South, we speak indeed of great heterogeneity, if not because the concept collapses 'most of the world' (CHATTERJEE, 2004) that cannot make it into traditional 'Western-centric' security politics. This heterogeneity, however, seldom seems to participate in the making of computation, apparently relinquishing the role of the makers – of technologies, of security governance – to those industrialized places 'up' in the pyramid (MEDINA; MARQUES; HOLMES, 2014). The account held in this manuscript is precisely intended to demolish this view, since, through apps, I intend to show that the South is as much a taker of technology as it is a maker – one which makes through recombining, re-assembling, and adapting –, and that this mak-

ing is profoundly ambivalent, intended both to challenge and to perpetuate power asymmetries in (global) security politics, sometimes doing both at once.

The choice of UN SanctionsApp, EagleView 2.0 and Fogo Cruzado entails an attention to the mundane work 'from below' of these apparently insignificant characters. Often operating unnoticed at a very micro-level of security governance, they take part into different dimensions of in/security governance, be they *top-down* international norms; the *middle-up-down* management of security through policing; or *bottom-up* responses to everyday, lived insecurity, mimicking how diplomats make judgements and decisions, how police officers think and plan, as well as how people talk about armed violence.

Some could say it would be useful to think of the work of apps in security governance as some sort of outsourcing, insofar we are transferring to apps things that we ourselves, in the condition of human beings, can do – only, perhaps, a little slower and more prone to certain kinds of errors. In the course of this research, I have heard this analogy more than once, including during an explanation about machine learning algorithms and open source code repositories. To the extent that it implies the delegation of otherwise human tasks to machines, it seems to work. But maybe outsourcing is not the whole story. If, on the one hand, delegating implies that we attribute the responsibility for a particular task on someone/something's shoulders, on the other hand, it also involves attributing the role of mediators to technical objects, to have them accommodate our whims, smooth out our disagreements and pacify our conflicts. In this sense, delegating resembles less a transfer and more negotiating the extension of the horizons of the things we do things with. These are negotiations about how to make certain phenomena computable, what data collection methods to use, what to include/exclude, how to structure a database, how to design/adjust the app following end-users' expectations and/or specific contractual clauses, balancing between processing capacity, system's performance and costs of development and maintenance, whether to expand to other places or not, etc. And they never actually stop – only become stabilized as the app establishes a work routine.

Authoritative decisions are not necessarily made by apps, but with and through them. This implies acknowledging the profound enmeshment of apps in security practices, including decision-making and judgement about in/security. Incidentally, the emphasis on the *with* and *through* may cast our attention away from the idea of governance, to which I have been resorting up to this point and whose emphasis lies on sticky security arrangements, towards one of governing, which emphasizes the processes through which these arrangements become sticky (or through which this stickiness is contested and challenged).

The difference is subtle, but important: while the former pays attention to somewhat stable and enduring arrangements, the latter is more concerned with tracing their becoming.

The emphasis on the making should also back my claim regarding both apps and the Global South: recall that I have said that apps innovate by re-assembling, a claim that extends to my attention to Global South contexts. As laid out in chapter 1, one of the most interesting ways in which technological innovation is carried out in these contexts is precisely through these reassemblings, by which I mean the improvisations, adaptations, adjustments, and uses that apps undergo both during their creation and everyday operation. In this regard, apps benefit from a marriage of convenience: favored by the spread of mobile access to the Internet in the Global South, they provide easy and at-hand access to information, affording increased access to software with relatively low costs of production and maintenance.

The contexts in which Fogo Cruzado, EagleView 2.0, and UN SanctionsApp operate could not be more different. The first app is mimics the habit of local dwellers of Rio de Janeiro, especially those of areas intensely affected by shootouts, of reporting these events on social media as means to alert their friends, family members and acquaintances about ongoing risks in a particular region and later expanded to Recife, in the Northeast of Brazil. The second app mimics police management of crime, minor offences and other incidents, and was circumscribed to two distinct jurisdictions, at the moment when my field was carried out: City C1 and city C2, where it was piloted with the respective local police authorities. The scope of the last app is the UN corridors themselves, and it mimics the ways in which diplomats are accustomed to make decisions about UN sanctions, thereby providing us with a sense of governing perhaps closer to what scholars of International Relations are used to think: governing rules and practices are established primarily in the North, but the ordering work is aimed at the South.

In weaving through these contexts, I emphasize the role that difference, mismatch and skewness play in enacting computational instantiations of security. Resorting to the 'Global South' as a displacement of great narratives about technology from or about either the North or the South (as if both existed separately), to North-South, should moreover serve as a reminder of the postcolonial condition that permeates digital politics, a condition which, as Hönke and Müller (2012, p.385) define it, "refer[s] to a global phenomenon of interactions based on unequal power relations in an era that goes beyond the world of colonialism, but that has been (and continues to be) decisively shaped by the logic of coloniality." These unequal power relations, as I have

hinted in chapter 1, are less about geographical boundaries than they are about a geopolitics of knowledge that privileges "dominant categories of thought from which and where the rest of the world can be described, understood and 'improved'" (MIGNOLO, 2005, p.36), and that, in the case of digital security politics, have in global tech markets their most alluring promoters.

This dissertation is predicated on the idea that apps are constitutive parts of everyday governance processes and that they blend with our senses in order to help us cope with and decide about the handling of specific in/security phenomena. In what follows, I will take one step behind to familiarize the reader with the literatures that help me to substantiate this claim.

2.1
Constitutive Absences

> What is a ghost? What is the effectivity or the presence of a specter, that is, of what seems to remain as ineffective, virtual, insubstantial as a simulacrum?
>
> — Jacques Derrida, Specters of Marx (2006, p.10)

I struggle to find an image that suits technology's place in the study of world politics. At times, it seems as if it has been always somehow there, silently running into the background like an infrastructure that works just as expected. It is there in Morgenthau's (1967) concerns with the blind enthusiasm with nuclear weapons or in John Herz's (1959) worries with the accelerated pace of technological development, both which would, following their concerns, lead us to doom, to non-politics. It is also there in globalization studies scholars' diagnosis that digital technologies unleash profound changes to longstanding assumptions around authority, borders and state relations (as well as state/subject relations) (RICHTA, 1967; ROSENAU; CZEMPIEL, 1992; ROSENAU, 1992; SANTOS, 1983; STRANGE, 1998). But at times, it magically vanishes: technology seems to be nowhere in particular, except if taken as an external force which influences, impacts and shapes politics. Much like two particles whose existence is independent from one another, technology and world politics collide only for technology to vanish in thin air, leaving us with only its alleged effects.

The image of the ghost may seem at first not entirely suitable to speak of technology. How could it? Technology alludes to matter, to materialization. A ghost, in contrast, is a specter: a haunting, whose presence is most of the time unfelt, a sort of constitutive absence that disturbs without being-there (DERRIDA, 2006). A ghost most likely resembles the gone images of the digital

as virtual, something detached of and beyond our material experiences. But there is a sense in which we could do justice to the image of the ghost and that is in terms of the absurd separation between technology in its materiality and politics in the study of global governance: technology and the conditions under which it is created, maintained and operate.

"The ghost in the machine" is how Gilbert Ryle (RYLE; TANNEY, 2009, p.5) characterizes the Cartesian mind-body dualism, following the idea that mental and physical activities occur simultaneously but separately. 'Ghost' and 'machine', in Cartesian terms, figure as ontologically distinct essences, one which exists in 'space' and the other as a specter that occupies the machine: present, yet never to be seen or heard; existing, yet somehow independently of the body it occupies, unwittingly feeding sci-fi wet dreams with mind-uploading and transfer. But in referring to the image of the ghost in the machine, I am not making analogies of the sorts that world politics is the machine to technology's ghost. Or vice-versa. This would be foolish, senseless and, on top of that, a false syllogism. Rather, I invoke it as a way of stressing the act of separation that characterizes this relation, a separation not between mind and matter, but between security governance and its mattering through digital technologies.

This manuscript is based on the premise that apps are constitutive elements in security governance: they do not simply affect, change or interfere with it, rather, they enact security governance in specific ways. In other words, technology is a means of governance and, as such, it also participates in the making of security politics. And different technologies make security politics differently. My apps are but one way through which this enactment takes place, one which however has important political stakes to how we conceive of authority, difference and decision-making. In advancing such claim, this manuscript aligns itself with increasingly numerous attempts to reconcile with and render 'ghosts' and their materialities present, attempts which have sought to make visible the work of what has always been there, making politics: objects, artifacts, their constitutive knowledges and the object-knowledge-human compositions in which they take part (LEANDER, 2019a; AUSTIN, 2019b; CONNOLLY, 2013).

In the field of International Relations, the concept of governance oftentimes alludes to the instruments, conventions, as well as legal and regulatory frameworks devised to address common transnational issues. This literature, with its emphasis on the changing political landscape of the post-Cold War, has pushed for a shift in IR theorization of security. If, traditionally, states were perceived as the main responsibles for their own security vis-à-vis other

states (security dilemma), for the overall stability of the international system (hegemony, balance of security, collective security) and for protecting their own citizens and intervening when another state is unable or unwilling to do so (responsibility to protect, humanitarian intervention), to this literature, the provision of security is no longer the sole prerogative of the state. Rather, the provision of (in)security is shared among a variety of non-state actors, including militias, freedom fighters, international institutions, NGOs, corporate actors, and others (HALL; BIERSTEKER, 2004; BIERSTEKER, 2017; AVANT, 2005; ROSENAU, 1992; LEANDER, 2011; CARR, 2015). Security governance thus suggests a purposive system of rule articulated around the definition and management of in/security that does not necessarily have the state as its 'referent object' (BUZAN; WæVER; WILDE, 1998; HANSEN, 2000).

This literature has since early paid attention to technological change as part of a broader set of changes characteristic of the then new world order – changes that range from the globalization of national economies, societal fragmentation into ethnic, religious, nationality, linguistic and political subgroups, and transnational phenomena, such as environmental and security concerns (ROSENAU, 1992). In the literature, technological change has been perceived as an enabler of further integration and conflict (ROSENAU; SINGH, 2002), as well as a provider of new mediums of governance (FRITSCH, 2014). It has also paid attention to how these technologies reinforce economic and political inequalities and hierarchies (BUDISH; GASSER; ASHAR, 2018; Internet Society, 2017; WADE, 2002); facilitate or hinder economic development (FOURATI, 2009); participate in humanitarian action and peacekeeping (cite works of crowdsourcing); empower citizens and the civil society to participate in democratic politics (SéNIT; KALFAGIANNI; BIERMANN, 2016; LOBATO; GONZALEZ, 2020) and enable for alternative (but no less conflicting) governance architectures, such as the multi-stakeholder model of Internet governance (MUELLER, 2010; CARR, 2015), and governance by infrastructure (MUSIANI et al., 2015; MUSIANI, 2013).

To state that there is a separation between security governance and its mattering through technology is simply to affirm that part of this literature generally conceives of technology as an external phenomenon that impacts governance. Being there while not being there, technology remains without politics; an extra-human variable, rather than an active participant of governing processes and arrangements. The problem is one of acknowledging the monstrosity of security politics as it is enacted through digital technologies. The question of materiality is precisely a question of how this monstrosity

comes into being: how different technologies, drawing from similar infrastructures, act in ambiguous ways, so as to both challenge and reinforce social, political and economic disjunctions in Global South security politics?

The perspective advocated in this manuscript has the relationship between technology and governance as one of "unprecedented degrees of intimacy and intrusion" (BRAIDOTTI, 2013, p.89). This perspective is inspired by the feminist literature on sociomateriality and its attunement to the constitutive entanglements of the social and the material in everyday life. The idea of embodiment advanced by this literature has it that, rather than something mediating our encounter with the world (and between ourselves), mere prostheses or surrogate, technology is an 'infolding of the flesh'(HARAWAY, 2008, p.249), connecting to us, our worlds and practices.

At a certain point of her book *How we think: digital media and contemporary technogenesis* (2012), Katherine N. Hayles reproduces an argument between physicist Richard Feynman and historian Charles Weiner over the former's thought process. Feynman responds to Weiner's commentary – that his notebooks were wonderful records of day-to-day work – by making it clear that the notebooks were not a record of a thinking process, but the thinking process itself: his ideas could only exist as they were being written down and this process was integral to his thinking. Hayles notes, pointing that cognition is extended and takes place through things, rather than simply in our heads, that "the paper and pencil were as much a part of his cognitive system as the neurons firing in his brain" (HAYLES, 2012, p.93). Similarly to Feynman's paper and pencil, materials and things are integral to 'international' practices: bodies, algorithms, data(-doubles), drones, lists (only to mention a few) are all entangled in attempts to (re)arrange the world. These objects have gained a special place in the study of international security, specially as scholars began to draw from other fields of knowledge (arts, sociology, anthropology, design, etc.) to provide more nuanced understandings of security practices (SALTER, 2013; ARADAU; HUYSMANS, 2014; LEANDER, 2015; LEANDER, 2019a; JOHNS, 2016; AUSTIN, 2016; BELLANOVA; FUSTER, 2019).

These insights open us to the indeterminate relationship between humans, nonhumans and technologies, and also to the extent that they are entangled with a variety of contexts and practices. The conditions under which technologies are produced, used or adapted to are equally relevant to the connections they instantiate and a significant part of their mattering. To re-attach security governance to technology is to attend to this entangled mattering, the making of security governance with and through technology, including through their conditions and contexts of production, which are undoubtedly ambiva-

lent. As such, the attunement to sociomateriality I advocate here not only expands our understanding of politics, it also fundamentally helps us to account for the disjunctures and hierarchies that get instantiated, reconfigured and challenged through digital technologies.

On the one hand, the infrastructures supporting our contemporary digitized lives, including the production of software and software-mediated action, are owned and maintained mostly by US companies. These infrastructures favor the appropriation and commodification of the generative forces of human and nonhumans, in a way that resembles Heidegger's (1977) understanding of enframing, and are also mostly hidden. This hidden work of computation and data exchange has been also referred to as 'metainterface', which, in Pold's words,

> ...aims to be both omnipresent and invisible, at once integrated into everyday objects and at the same time characterised by hidden exchanges of information. As mobile and specialised devices, embedded sensors, cloud services and data capture reach ever further into every aspect of citizens' lives, a metainterface is emerging in which data and software disappear from our devices into the global cloud. (POLD, 2019, n/p).

On the other hand, these infrastructures are employed ambiguously, sometimes in ways that do not entirely contradict (and even reaffirm) extractivist data practices, and sometimes in ways that do not directly meet, and indeed contradict, these infrastructures' purposes of commodifying and appropriating lifeworlds.

The three apps I will discuss in this manuscript are all, to a certain extent, guilty of this ambiguity, not only because they draw directly from these infrastructures, but because they twist and turn them to their own purposes and needs. It is, as Donna Haraway remarks, an ambivalent and indeterminate relationship, ours with digital technologies. An embodied take on apps in the study of security governance must be attuned to such ambivalence and indeterminacy, as well as to the power disjunctures continuously engendered in such a relationship.

2.2 Relating to the literature

To continue with the task of making these absences less spectral, I must first divert from the thread of argumentation weaved so far and properly relate to the literature. Relating to the literature involves putting different

literatures (texts, concepts, interpretations of such concepts, etc.) to talk. In practice, there are many ways of relating, including, for example, building on the existing corpus of knowledge on a particular issue-area, 'filling the gaps' left under-explored and/or branching the existing debates into new directions in such a way as to open new research questions and possibilities. Relating is how academics build authority (MOL, 2002). By literature, I mean a body of texts orbiting around and about a subject matter. If I am writing about the problem of authority in global security politics, you will certainly expect me to back up my claims with evidence, that is, with other texts which, similarly to mine, have also touched upon the same topic. You will expect me to agree and disagree with them, to make the grounds of this agreement/disagreement explicit and to tell you what my own text adds to the existing bodies of texts. Relating to the literature is, in other words, to relate with what has been written (or overlooked) about ghosts. It is about coming to terms with them and making their presence felt.

The way in which this manuscript relates to the literature goes beyond the need of filling a particular gap and could be more closely understood as an attempt at branching the debate through conversations. Conversations are political possibilities themselves: in relating different, sometimes contradictory literatures, they provide us with ways of making rigid disciplinary barriers more porous and, thus, with opportunities for cross-pollination (and collaborations) and 'staying with the trouble' (HARAWAY, 2016). At a more basic level, conversations enable us to see how concepts are shared, given different – albeit not necessarily contradictory – meanings, and travel across places, disciplines, areas of study and uses. Enacting conversations also provide interesting possibilities for us to think through different epistemologies and ontologies, rather than sitting comfortably in the very comfortable couch of literature review.

Thus, instead of building my position on the opposition of different (sometimes, contradicting) concepts and accounts of technology and politics, I do so by making them talk to each other. This can be challenging, to the extent that some such accounts may seem incommensurable or even incompatible. The purpose, however, is not to produce synthesis. It is, rather, to make different concepts and accounts talk in such a way that exposes the limits of theorizing technology and security politics as separate entities, rather than in continuously intra-action. The idea of intra-action was coined by Karen Barad (2007) as a way to refer to the entanglements of both technology and politics, matter and discourse and (why not?) different realities, that, in this text, are core to understand what apps do to security. Conversations make these

entanglements explicit, challenging both the longstanding separation between technology and politics in the study of global governance and international relations, and the odd absence of security/violence in most discussions of science and technology – with important exceptions, especially those that wed science and technology with critical race studies, such as Ruha Benjamin's (2019), Simone Browne's (2015), and others.

But conversations also entail divergence. To Cadena (2015, p.280), divergence amounts to "the coming together of heterogeneous practices that will become other than what they were, while continuing to be the same". In my use of the term, the 'coming together of heterogeneous practices' (of scholarship, mattering, in/security, etc.) is productive of something else in relation to the practices that compose divergences – a difference. Divergence complements conversations by making explicit the exclusions performed in security/politics and its entanglements. Moreover, divergences arising from the conversations established throughout the work make differences – variations in security practices – visible.

Importantly, I engage with such variations both via the zigzagging of anecdotes and conversations to show that differences (e.g., colonial/gendered/racialized patterns of violence/technology production) are reiterated and dynamically enacted and/or overshadowed by both the literature and in the working of security apps. Both moves – conversation and divergence – are partially inspired in Barad's idea of a diffractive methodology, according to which, rather than setting up ideas/texts/approaches/areas of study against other ideas/texts/approaches/areas of study, these should be read attentively through one another, as means to come up with "inventive provocations" (DOLPHIJN; TUIN, 2012, p.50) and "creative possibilities" (BARAD, 2007, p.37). Significantly, they add to diffraction by also building more explicitly on an attentive reading of the practices that matter (to) this text – that is, the logics of functioning of security apps – through other texts, making variations in security practices thereby central to the process of mapping "where the effects of differences appear" (HARAWAY, 1992, p.300).

This manuscript relates to different bodies of literature: philosophy, IR theory, STS, media studies, among others already stated in chapter 1. This chapter, more specifically, places a greater emphasis on the politics of artifacts in Global South security governance. As such, I will start with some considerations on what the literature usually means with this 'floating signifier' that is governance (HOFFERBERTH, 2015).

No longer new to IR, the question of governance is a question of authority in the post-Cold War capitalist order (GILL, 2019). To some,

it has become a hegemonic discourse that successfully integrates counter-hegemonic movements when do not endanger the rules of the game, namely, the prevalence of the economy and of the expansion of capitalist markets (MENDLY, 2020). Mendly, in this sense, considers (global) governance as "a system of arrangements that solves problems, fosters/maintains order and stability, and does so in an inclusive way, through the cooperation of multiple actors on multiple levels" (MENDLY, 2020, p.516).

The plurality of meanings that accompany the idea of governance seems to unsettle the literature. Hofferberth (2015) identifies meanings that range from having it as an analytical description of world politics, to a normative commitment with the idea that more pluralization and decentralization of political authority is positive, and to the impossibility of having both apart. He considers the plurality of meanings desirable, to the extent that it provides the required flexibility for global governance – whether as a new phenomenon, paradigm, or field – to endure.

The question of governance also disputes IR's imagination around political authority. In the original formulation of the concept, the appearance of 'governance' alongside the conjunction 'global' pointed to the "continuous relocation" of authority "both outward, toward supranational entities and inward toward subnational groups" (ROSENAU; CZEMPIEL, 1992, p.2-3). James N. Rosenau, in early writings on the matter, expresses the problem as one of 'governance without government', whereby authority would no longer be regarded as the single prerogative of the Westphalian sovereign state, but would more likely see itself diffused across a multiplicity of other actors, including private corporations and organizations, NGOs, IGOs, technical bodies, and even individuals (for example, experts) (ROSENAU; CZEMPIEL, 1992; ROSENAU, 1995). The question then becomes how this authority is distributed and negotiated. In what would later become an area study of its own, the idea of global governance sought to make sense of how order could exist and be maintained despite governments (ROSENAU, 1992; WEISS; WILKINSON, 2014a; WEISS; SEYLE; COOLIDGE, 2013; MUELLER, 2010; BEVIR, 2009).

The concept of governance is therefore intimately connected to the question of how the world is – or should be – organized. Most of the time, however, the literature finds it difficult to drift away and decenter from its Western-centred orientation. Even the assumption that authority is relocated disregards the manifold ways in which the world was organized politically and has as its reference points are the European and US states of the Cold War and post-Cold War years. It is no different with how the literature treats digital technologies: debates on datafication, surveillance or artificial intelligence are

oftentimes shaped primarily by the experiences and specificity of US, Canadian and western European contexts (MILAN; TRERé, 2019). As Amrute and Murillo (2020) note, even attempts to account for North-South extractive models via terms like data colonialism do little justice to the complex roles that digital technologies take across Southern contexts (FIRMINO; CARDOSO; EVANGELISTA, 2019). I would dare to add, a careful consideration of these roles also has implications for how North-South relations are reproduced and reconfigured through these technologies.

To the extent that authority is displaced from certain bounded subjectivities towards computation, as I have proposed in chapter 1, this manuscript becomes less interested in a focus on governance as a state of affairs and order of things than with governance as governing, that is to say, as continuous processes of arranging, emergence, transformation and challenging that takes place aided by both humans and nonhumans. This move from governance to governing has very practical implications. While the concept of governance mostly focuses on finished, black-boxed arrangements populated by discrete, bounded actors (states, private companies, NGOs, individuals) inhabiting a particular 'level of analysis', the latter allows me to trace the emergence of new governance forms in and through relations, focusing the attention on the making, the coming-together, the (re)configuration and the re-assembling of Global South security politics through technologies like apps; and to understand the latter as "nonconscious cognitive assemblages through which (...) distributed cognitive systems work", and which themselves form "interfaces and communication circuits between sensors, actuators, processors, storage media, and distribution networks, and which include human, biological, technical, and material components" (HAYLES, 2017, p.2). To the extent that apps both embody and mediate, distribute and extend action through modes of sensing, thinking and representing that are similar and yet different from that of humans (TURING, 1950; BURRELL, 2016; ARADAU; BLANKE, 2018), they trouble assumptions of intentionality that the literature usually attributes to governing arrangements (BIERSTEKER, 2018).

2.3
From governance to governing: agency, materiality and action

The move towards governing is intended to shed light onto the processes of making and re-making of Global South security politics and embraces the contingency and indeterminacy of governing arrangements. It also belongs to a world beyond intention, in stark contrast with the world of intentionality built by the governance literature. Long story short, no matter how different are the

governance arrangements – collective security, balance of power, hierarchical or networked forms of organization –, are still the outcome of a purposive order, something intended to function a particular way, by a selected group of actors. Far from suggesting that what emerges from this move is unintended, the very emphasis on processes rather than on finished outcomes highlights the contingency of these arrangements and the complex grey zone situated between the intended and the unintended. This grey zone allows us to very productively explore one important contribution of sociomateriality to the study of security politics, it being the understanding of agency proposed by this literature.

Attention to materials and materiality has come to support the idea that things also have agency – that they do things or have particular effects on particular relational processes (LEANDER, 2019a; LATOUR, 2005). At the same time, not every entity that takes part in an association holds exactly the same properties – these entities are themselves assemblages (BARAD, 2007), their 'boundedness' being an outcome of a process and defined in and through relations, rather than as some sort of pre-given form (RUDDICK, 2012, p. 209).

The emphasis on sociomateriality is premised on the existence of a double distribution. First, the distribution of action. The easiest and most current example to illustrate this distribution is your algorithmic social media feed. The programming of your feed was, at some point, the work of a group of human beings. But the whole purpose is to have an algorithm (or algorithms) make decisions based on what it learns from your online actions, independently of what this group thinks or does. Your clicks, publications, interactions, purchase patterns, the movement of your cursor, the websites that you visit, all should count. The 'decisions' on what publications you will see first, what ad will pop up on your feed, and what content will be taken down, are not necessarily or immediately made by the algorithm's programmers; it is distributed through the 'code' itself, which follows parameters that may or may not have been calibrated by a human being. The fact that there is a vast literature discussing the implications of different forms of algorithmic decision-making to a wide range of human practices (NOBLE, 2018; AMOORE, 2020; FINN, 2017; BUCHER, 2016; HELMOND, 2013; GOGGIN, 2011; GROVE, 2015; GIVONI, 2016; JOHNS, 2016; NAKAMURA, 2009; BEER, 2009; SADIN, 2015; STIEGLER, 2016; CARDON, 2015) should indicate the relevance of this kind of distributed action.

The second distribution is the distribution of agency, which no longer is perceived to pre-exist relations but to emerge from practices enacted by both humans and nonhumans (LANDA, 2016; MOL, 1999; BUEGER, 2015). The

idea that nonhumans and, more specifically, materials do things is grounded on the assumption that things other than human actions are relevant to global political arrangements. Part of the literature has paid a considerable attention to how digital technologies affect power arrangements, by making it more difficult (or easier) for governments to coordinate and control their constituencies, by empowering non state actors and by contributing to shift the dynamics of political conflicts (ROSENAU, 1992; NYE, 2014; DEIBERT, 2011). Another part has focused on how particular objects falling within the scope of the 'digital' do different sorts of political things. This includes social networks (RATTA, 2018), drones (WILCOX, 2016), algorithms (AMOORE, 2017; ARADAU; BLANKE, 2017; BUCHER, 2016; BUCHER, 2018; LEANDER, 2019a) and, of course, apps.

Once more, algorithms offer relevant examples. The use of algorithmic modelling for anomaly detection is said to reconfigure friend/enemy and identity/difference dichotomies at the heart of security practices towards practices of differentiation based on similarity/dissimilarity where "dots, spikes, and nodes offer different vocabularies of otherness" (ARADAU; BLANKE, 2018, p.20). Algorithms also give meaning to and structure data through the creation of data sources in the private sector (e.g., airline companies), which become also responsible for how data about potential terrorist activity is constructed and circulate. Not only data has to be made readable by algorithms (we will also see this happening in predictive policing): it is their work to flag and recommend travellers/transactions for additional scrutiny (BELLANOVA; GOEDE, 2020). But perhaps these data-plus-algorithms alliances are most significant in that they particularize and differentiate, rather than simply governing at a distance: there remains always "some sense of intimacy with the sites, objects, and instances of measurement" (JOHNS, 2017, p.66).

In both cases, architectural constraints (e.g., the way data is structured) and interfaces (e.g., the links between hardware, software and humans that enables data to be accessed, interpreted and acted upon) make it difficult to define where and how security decisions are made, to the extent that they diffuse decision-making across networks of systems, humans and humans-plus-systems, just like the above algorithm that flags a passenger or transaction as suspect but requires further scrutiny by a human agent.

Digital technologies therefore favor a processual kind of authority that troubles the ideal types of the individual, the 'state', and the international system, that have long populated the study of global politics. This claim carries with it expressive political implications. First, it furthers the move initiated by the literature of decentering of security politics away from the state and

paying attention to security practices as they are enacted by a heterogeneous assemblage of people, processes and things. Second, its has consequences to questions of power, and to the study of security politics, to the extent that it opens up inquiry to the contingency and complexity of sociomaterial politics. Because the relationship between humans and nonhumans is heterogeneous, as they travel, computation and computational forms, are hardly able to keep their 'original' configurations, adapting and changing, getting modelled following the intended applications, uses and normative aspirations deposited in them. Their processual character makes these practices situated: even if things are connected, "nothing is connected to everything; everything is connected to something" – which is connected to something else (HARAWAY, 2016).

Let us stay with the idea that everything is always connected to something. If we look at the algorithmic practices that served as examples above, what do we see? We see practices connected to hegemonic centers of power and globally dominant technologies, institutions and forms of knowledge. These are practices that use algorithmic criteria to produce, reproduce and re-affirm social, economic and geopolitical hierarchies between wanted and unwanted, safe and unsafe, deserving and undeserving of attention, relevant or irrelevant, a developed, 'western(-like)' us and its threatening other. As Amrute (2020) notes, practices of computing are not detached from global capitalist, patriarchal and racist structures. We do not know how computing would look like without them, with even the oppositional practices based on computation being fraught with material power/knowledge hierarchies (AMRUTE; MURILLO, 2020; LOBATO; GONZALEZ, 2020).

This manuscript is based on the premise that apps offer creative ways of understanding this embeddedness of computation in global circuits of power, at the same time that they creatively work to reassemble both security practices and the digital infrastructures that participate in them. Rather than implying any sort of unidirectional flow of power from 'technologically developed societies' towards those that are less so, they re-situate security innovation (and all the troubles that follow) at the heart of the latter societies. This is an epistemological as much as it is a methodological project of studying technological practices of (in)security in/of the Global South, one that rejects seeing the South as merely under the shadows of the North or as the contexts where Northern-based theories and knowledge are tested and applied. In looking at UN SanctionsApp, Fogo Cruzado and EagleView 2.0, I am also looking at local design practices that are either based in the South or embody it through contributions from the 'local', either in the form of populations,

expertise, workers, or others, that serve as sources of knowledge 'intractable' security issues, which most often coincide with postcolonial societies. Such an attention to the making of security apps is also an attention to the making of governing practices through them. A problem must first be made a governance problem, namely, governable, before it can be properly acted upon.

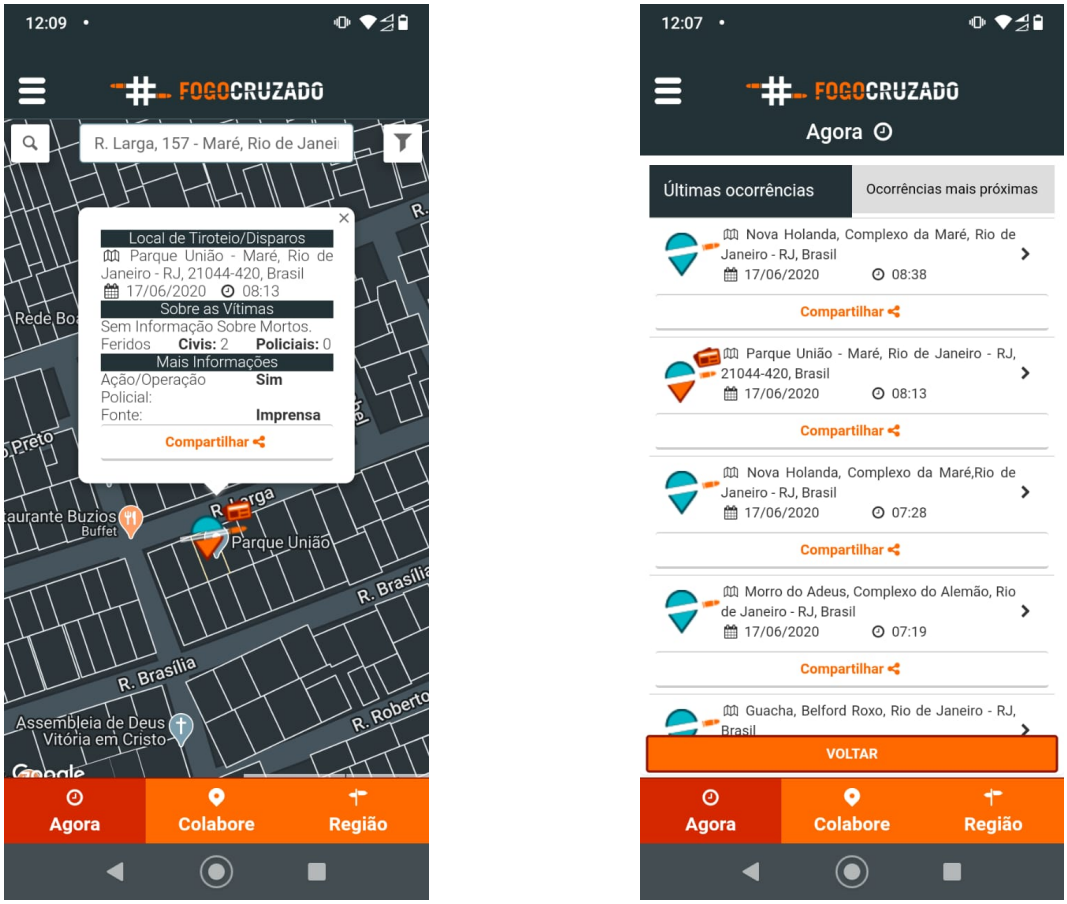
What exactly counts as a problem may change, but it is easy to point our fingers at some habitual culprits. Crime, violence, conflict, for example. These issues with which our ideal types of chapter 1 must somehow cope, eradicate, at best learn to live with some resilience. In principle, you are told, they should affect everybody in our binary scales, rich and poor, North and South, top and bottom, us and others. In practice, not only do we know that they will always affect those strata of society differently, but we also know that they only become intractable when afflicting the latter, the exotic others who are unfortunately chronically unable to keep crime, violence, conflict, etc., in more manageable levels by themselves.

In what follows, I will sketch how these issues become issues in the eyes of our apps, situating their place as parts of the increased recognition of the role of artifacts as mechanisms of (security) governance, alongside code, data mining, algorithms, weapons, international treaties, numbers, and techniques of varied sorts, but focus on what they are attached to. This part of the chapter should also re-familiarize the reader with the ambivalent governing strategies proposed by the three apps studied here.

2.4
Computing Global South insecurity with apps

Allow me to use a short anecdote and some images. I put the anecdote in italics to distinguish it from the rest of the text.

It is 8:08 in the morning. A helicopter from a local media outlet flies over Complexo da Maré, one of Rio's largest favelas complexes. The helicopter accompanies the actions of police officers down below, which are advancing into Parque União, one of Maré's many communities, as if they were invading an enemy's territory. Next to some police officers, bystanders walk, some hurriedly, some attempting to distance themselves from the confusion, some nonchalant. As an intense shooting is heard, police agents and bystanders run to take cover behind walls and buildings. This is all happening next right next to the city's biggest and busiest road, Avenida Brasil. Inside the community, an artifact – possibly a stun grenade –, of unknown origin, explodes next to another group of police officers. 8:12. Intense shootouts are heard and the



(a) Shootout pinned on Fogo Cruzado's map

(b) Recent occurrences interface

Figure 2.1: Fogo Cruzado's register of Police operation in Complexo da Maré

whole action is captured by both smartphone and TV cameras, and reported by dwellers in social media. In a walkway that crosses Avenida Brasil and that is situated right next to one entrance to the community, bystanders try to record the events while looking for a place to protect themselves. In a matter of seconds, 20- or more minutes of action will be featured in Fogo Cruzado's list of 'recent' events and map.

The scenes I describe above were retrieved from videos posted in social media and broadcasted live by media outlets.[1] They are both usual and unusual. Usual, because they provide a glimpse onto the routine of part of the inhabitants of Rio de Janeiro, one which is stained with loud and sometimes bloody conflicts between police and drug gangs, between different drug gangs and between the traffic and police militias. Unusual because this routine is seldom televised. Events like the one described in the anecdote above happen

[1]Available at: https://globoplay.globo.com/v/8631492/ and at: https://www.youtube.com/watch?v=JeT9kXCQ3JU, (Accessed 25 July 2021)

in smaller scales almost on a daily basis, but most of the media's attention only comes when they extrapolate the boundaries of the *favelas*.

It is precisely the fact that these conflicts are recurrent but seldom accounted for in media outlets and by official statistics, that Fogo Cruzado finds the justification for its existence. The first narrative surrounding the existence of this app was that it was supposed to work as a Waze of bullets, in which users could report having witnessed an event involving firearms: gunshots, shootouts, conflicts between armed groups. The general purpose however, was more far-reaching: to have these inputs to produce violence categories more attuned to actual insecurity dynamics – in which the state, either by action or omission, is a protagonist.

To say that insecurity is computed is to make reference to a process of recursive translations occurring at multiple levels – semiotic, linguistic, sensory, ontological, infrastructural – that happen as apps try to adapt their computational infrastructures to particular situations and contexts, compute data and travel from one context to another.

Commercial or not, apps are embedded in larger commercial infrastructures, ranging from app stores to application programming interfaces (APIs) that allow them to draw data from a particular service (ARADAU; BLANKE; GREENWAY, 2019; MORRIS; MORRIS, 2019; GERLITZ et al., 2019; HELMOND, 2015; GOGGIN, 2011). These infrastructures are profoundly entangled with the many visuals and procedures on which apps depend, from interactive maps and menus to real-time data collection and processing and many are provided by corporate platforms, like Adobe Flash, Amazon, Google, Apple, etc. Fogo Cruzado, for example, makes use of Google Maps API to provide users with geolocated data; UN SanctionsApp was originally programmed in Flash; and EagleView 2.0, during tests, relied on Amazon Web Services to store and process data. It is during an app's design phase that its creators must decide on which services their technology will be built. This stage comprises decisions as to what data will be collected, how it will be stored and used, and which features the app will include. Most of the time, this work also requires at least basic knowledge of programming commands in English.

To the extent that apps borrow from third parties' services, they still need to adapt, (re)use, sometimes even (re)combine these services. For example, in an informal chat with Fogo Cruzado's database manager who, in our first meeting, I was allowed to call Bel, I have heard about their difficulties with Google Maps' georreferencing. I will assume that everyone who has needed this service might have already had the displeasure of not finding the correct address, or of having been sent to the wrong place (if you have not, good

for you). The difficulty that Bel described was exactly this: Google Maps' georreferencing requires pinning down the desired location. But many of the addresses where gunshots and shootouts are typically reported are located in periphery neighborhoods and slums with cartographies that may be uncertain even to local authorities and inhabitants – let alone to Google Maps. She gave me the example of Recife, where people routinely refer to certain localities following their historical reference as "Engenhos" (=mills) – an everyday division of the space that does not always coincide with the official names and boundaries established by local authorities and used by Google. Since the Engenhos and other peripheral locations are often not geolocated, Fogo Cruzado's team has built a "manual" mapping on a spreadsheet, consisting basically on trying to find out the reported place including by asking their acquaintances in the local communities for information.

Semiotically and aesthetically, a gunshot is (re)produced twice: first, when a bullet leaves a gun's chamber, and, second, when an occurrence of gunshot is pinned down on the map. The half blue, half orange pin symbol that we see in the screenshots indicates that a shootout has happened where people were wounded. The team behind Fogo Cruzado has developed a whole set of symbols aiming to provide a more nuanced report of the situation at hand. Orange and blue pins crosscut by a bullet refer to shootouts with and without fatalities, respectively. In turn, an orange circle over two crisscrossed bullet trajectories sign the existence of multiple shootouts. The platform also relies on symbols such as a newspaper slightly above the bullet, to indicate whether that source of a report is a news media outlet, and a badge in the same position, to indicate whether the shootouts took place in the context of a police operation. These symbols have color and form, but no sound or texture.

Many of the aforementioned levels of translation can be seen when apps mobilize these infrastructures to turn any intended phenomena, behavior, or event, into data – visual, numeric, or otherwise. Semiotic translations occur, for example, with user interface designs, and with the icons and symbols used to represent certain phenomena (figure 2.1 above). Sensory translation goes somewhere beyond the work of sense-making by sensors that is discussed in the literature (JOHNS, 2017; SADIN, 2015), to the extent that it depends on how humans and apps negotiate ways of collecting, structuring and making insecurity seen and felt, even at a distance. To stick with the case of Fogo Cruzado: in interviews, I usually asked my interlocutors to describe the trajectory from a gunshot until it became the numbers and maps. The anecdote below is extrapolated from their responses to illustrate what I mean with sensory translation.

Fogo Cruzado draws from different sources – the reporting of events made by users in the platform, reports in media outlets and on social media – and has its team of data analysts validating each report. There is no automatic sensor to detect gunshots, only human ears. The closest the app gets to 'automation' is with its social media filters that allow analysts to detect whether someone is talking about 'gunshots', 'shootouts' , 'shootings' and like synonyms. This may be considered a sort of sensory work, since it is designed to capture user activity in social media. In addition to asking users about details of the occurrence and checking the context – were there victims? Were these victims police officers or children? Was there a police operation in course? Etc. –, analysts also rely on a mantra:"a gunshot is seldom heard by one person alone", that has it that if a gunshot indeed happens, more than one person will definitely talk about it. Another means of validating is checking with community leaders and/or local WhatsApp groups. Once the analyst gets the confirmation, s/he validates the report in Fogo Cruzado's dashboard and it becomes an occurrence in the map. Exceptions to the validation process are made to 'super-users', who enjoy high levels of confidence, and whose reports automatically go into the platform.

Linguistic translation, in turn, may happen at different instances, such as when data is collected. Part of the work of annually updating the UN SanctionsApp involves scanning for updates in UN documents and also local news media reports on the current political, economic and social situations of targeted countries – not all of which are in English. Thus, the team operates a division of tasks based on the linguistic knowledge of each member, which allows them to cover at least 10 different idioms and combine different data sources with more detail. This is linguistic translation quite literally understood, and it happens when a given content is translated to a given vernacular language (in some cases, also adapted – the combo translation plus adaptation is generally called 'localization').

A different instance of translation has to do with translating anything to an idiom that is intelligible to a computer (meaning: numeric form). This work is necessary for anything to become calculable and representable through computational means and goes beyond linguistics: it is also an ontological work that renders the world legible in a particular form. Even interactive features, like the one which allows users to navigate through UN SanctionsApp interface, depend on these combined linguistic-ontological translations. The premise on which it rests is that of the hypertext, with which app-makers create back and forth linkages between different parts of the app in ways that allow users to go to one menu and end up in another. This premise was devised to mimic the

app's target audience's analogical mode of reasoning, which I will discuss in more details in Part II. The interactive linkages in UN SanctionsApp's content are performed thanks to data arranged in a quantitative database, which is the outcome of the work of the Targeted Sanctions Consortium (TSC).

Finally, translation may also be necessary when an app travels, and, sometimes, it may occur within the same idiom. We know that some apps are designed with view of a limited target audience. EagleView 2.0 has police departments in Global South cities, while UN SanctionsApp has diplomats of non-permanent country-members at the UN. In some cases, this delimitation may prevent the app from traveling too far: because it is specific, its relevance and use become more restricted to particular institutions and contexts. This does not always translate into having a secretive app: UN SanctionsApp can be openly downloaded for free in any app store. This app, despite the fact that it is widely available for download, has a very limited relevance to any person who is not directly interested or implicated in the design and management of UN sanctions and, thus, does not travel much farther than the already established policy circles of the Security Council. This focus and target audience also help explain why the app's content is entirely in English.

Other apps, however, travel across more heterogeneous contexts. This heterogeneity may, at times, challenge the overall coherence, methodology and strategies initially devised by app-makers. This is the case of Fogo Cruzado, and also of EagleView 2.0. Both are supposed to operate in more than one location. And both had to deal with important variations in context that required significant adjustments, even changes, in their design, data collection methodologies, publicizing strategies and even institutional partnerships.

EagleView 2.0, for example, has gradually seen the centrality of crime prediction wane from its design: from the moment when the project was proposed, to the moment when I 'stopped' doing the research, crime prediction went from the main feature to just another feature. Its 1.0 version was launched at a time when crime prediction platforms (and the subsequent concerns with their implementation and use by institutions that are known for being profoundly discriminatory) were spreading across the Global North like wildfire. Its 2.0 version comes a only a few years later, this time with a more 'skeptical' approach to the promises of prediction, motivated at least by three overlapping trends: First, contractual obligations required from EagleView 2.0 a deep engagement with algorithmic transparency and accountability, which in turn required the adoption of good data collection, processing and analysis practices. Second, some police officers – especially those working 'on the ground' – have demonstrated skepticism regarding what place-based prediction

can add to their practices. And, third, because to speak of the Global South is to speak of great heterogeneity, crime prediction would be incompatible with some police departments' computational infrastructure, policing and data collection practices – either because these infrastructures and practices were 'too ideal' and crime rates too low, or, conversely, because they were too unreliable or simply lacking.

Having to deal with such heterogeneity, the solution devised by the development team was this: depending on the conditions and structure offered by the police department contracting it, EagleView 2.0 could work either as a standalone system or as an API. As an API, it could be coupled/de-coupled to crime management systems already in place, adjusting itself to the customer's infrastructures and practices. As a standalone system, it would provide a comprehensive crime analysis and police management interface to their Global South customers, but the inclusion of predictive capabilities would be conditioned to whether crime/occurrences data would meet certain standards of data collection, processing and management, which were established following accountability concerns (ARIEL, 2019, personal interview).

In the case of Fogo Cruzado, its 'travels' could be said to have a more limited impact if compared to the case above. Still, in one of the last chats we had before I decided to stop searching her for interviews, Bel described them to me as major changes. And major they were, indeed, since they involved not only changes to the platform's interface, but also institutional changes, whereby Fogo Cruzado would take one step beyond its condition of platform to become an non-for-profit Institute.

While these travels certainly required the team to 'localize' its social media filters by using local slang, the most important changes (beyond, of course, the above-mentioned institutional changes) had to do with what the app computed as insecurity (and how). The consolidation of the data collection methodology and of the scope of the insecurity objects covered only came with the expansion to Recife. This is another thing I will explore with more detail in the empirical part of the thesis, but it requires at least some sketch at this stage. I started to follow Fogo Cruzado in early 2017 and, when I set-out to fieldwork in late 2018, the app had just begun to operate in Recife. Having accompanied their activities through interviews, lives in social media, publications and public events, I tried to trace part of this work from afar. Looking back at that period, two shifts stand out. First: since then, Fogo Cruzado has significantly expanded the categories of violence featured in its platform. The initial focus involved two manifestations of armed violence in Rio: stray bullets and armed confrontations in broad daylight. In contrast, violence dynamics in Recife differ

significantly, with none of the two categories being actually central. More central are homicides and confrontations in prisons. These may appear to be small differences, but which are nevertheless telling of the continuous re-arranging involved in governing with and through apps.

Second, the shift from an emphasis on 'neutral' communication towards storytelling. From the beginning, Olliveira rejected using the language that many media outlets and TV show celebrities and presenters use to communicate episodes of violence, which is itself violent, stigmatizing and inflammatory. Many victims of gun violence are immediately labelled criminals, outlaws, since the condition of criminal authorizes elimination by the police or by rival groups. Olliveira, however, wanted to avoid creating and perpetrating stigmas around the victims of armed violence, and initially focused on what they called 'neutral' communication. The problem was that, in Recife, where most reports are of homicides, this neutral language created a repetitive formula that further discouraged engagement with the app's social media channels, where publications were basically repetitions of the message 'a man was shot...' only with changes in place, date and time. The shift towards storytelling would 'give faces to numbers' and help contextualize the stories and stakes of some of the victims of armed violence.

I will address both Fogo Cruzado's and EagleView 2.0's travels with more details in the empirical chapters. For now, I want to stress that these many translations with which apps engage have important consequences for security politics. First, they open up space for acknowledging the heterogeneous contexts to which apps adapt and that also end up shaping them. These contexts also significantly trouble the idea that digital technologies are deployed mostly to 'improve' in/security politics. I say trouble because, as we will see with the three apps, there is as much endorsement of the power differentials that shape both global and local security politics, as there are contradictions and challenges to them. This is a much welcome decentering in a field that has long been known for its western centrism.

Second, and connected to this, they allow me to theorize *with* and *through* the South and to tell stories of (in)security governance and the power of digital technologies that acknowledge both their own situatedness and, as Haraway (2016) rightly puts it, undeniable global connections. This adds to current efforts to theorize computing and computational governance *from* the Global South (AMRUTE; MURILLO, 2020), while going beyond the idea that we should theorize *about* it. To emphasize the with and the through is to both recognize the profound connections that these practices establish with centers of power, including the corporate ones, while situating the South also as a

site where theoretical and technological innovations happen, sometimes in more familiar, sometimes in more distinct shapes. The many re-assemblings that apps perform in these contexts go well beyond the so-called 'will to improve' (HöNKE; MüLLER, 2012, p.385) that has long accompanied the sticky assumption that whatever lies outside the West must either 'modernize' or else perish.

This by no means implies that there is a fundamental difference in how apps instantiate (in)security governance in these contexts, nor should it imply an exoticization of the South. Rather, it suggests that the security practices that get entangled with them must be studied situatedly. These practices, and the many re-assemblings that apps perform, are decisively permeated by unequal power relations. At the same time, they should trouble and even reconfigure enduring divisions between, on the one hand, a modern, civilized, technologically advanced 'I' and, on the other hand, an other that must be described, understood, "improved", modernized (MIGNOLO, 2005).

Finally, attention to the many re-assemblings that take place through apps should also support the case for a processual approach to governance and authority. An interlocutor in Geneva once rightfully noted that they thought that the case of the UN SanctionsApp was too specific and perhaps an outlier, to the extent that it sustained profound connections with the expert authority of its creator, Thomas Biersteker, to which I conceded, but added that I doubted that diplomats would even think of this when they are consulting information about a particular episode, policy instrument or sanction regime. What I meant was that there was that an app's authority comprised both claims at once – that the app indeed embodied their creators' academic authority, but, because it is of embodiment that we are speaking, it also goes beyond that authority. It is thus not merely a question of reflection. It may be odd to say this, but materiality diffracts. An app's authority is not simply a reproduction of its creator's knowledge, nor is it tied to a bounded subjectivity like the ones I have brought up in chapter 1; rather, it overflows, being continuously re-enacted through its interactive menus and maps, colorful and discreet icons, hidden algorithmic procedures which Wendy Chun (2008) calls daemons, as well as through their attachment to capitalist infrastructures of computation.

2.5
The politics of security apps governance

I would like to propose looking at the politics of these three apps under particular frameworks: to different extents, each app promotes a form of

governance with the purpose of advancing a particular understanding of democratization within security politics, local or global. Therefore, these forms of governance aim at very different purposes. I will look at three: to *empower [citizens] with new decision-making tools*, to *increase public sector modernization and governance*, and to *network dispersed contexts and knowledge*. It is not by coincidence that these frameworks match with the normative ambitions of our apps, indeed, the flexibility of computation is also to allow us to have so many different (and competing) understandings of democratization.

The first framework, concerning the empowerment of citizens with tools for decision-making is integral to the early expansion of Fogo Cruzado in Rio de Janeiro. Indeed, in the eyes of Olliveira, state failure in ensuring citizen security and safety begs alternative forms of mobilization and action that do not depend on state bureaucracies. The spirit of Fogo Cruzado, it seems, is to provide one such form of mobilization, first, by providing local dwellers with a system of notifications of gun violence and, secondly, by generating a robust quantification of this phenomenon - given damage to public security policy caused by the absence of official numbers.

This framework is by no means exclusive to Fogo Cruzado and Rio de Janeiro. Indeed, where public authorities are taken to be unable to 'deliver the social contract' (MUGGAH, 2014, p.345), or, worse, are themselves the sources of insecurity, we see the proliferation of alternative, sometimes even informal modes of governing insecurity, as well as a call for solutions that either come from citizens, or attempt to empower them to act. In this case, what is sought is a co-production of security politics with and through digital technologies. Here, the role of these technologies is to decenter decision-making from more 'traditional' forms of security knowledge production, and enable it to be widely shared with and empowering to citizens.

Next is the aspiration to modernize the public sector and its governance mechanisms. Here, modernization can be read as an immediate synonym with equipping with digital technologies while adhering to neoliberal standards of cost-efficiency and performance measurements. Sophisticated systems are sold to governments (sometimes, developed 'in-house') with the promise of integrating a vast array of knowledge, while saving time and resources, and optimizing decision-making. These systems may or may not be posed at the service of 'democracy', to the extent that, as we will see with EagleView 2.0, it is argued that they would provide logs and registers of the variables necessary to make a decision, thereby facilitating accountability. As I was told in an interview, you cannot scrutinize the brains of decision-makers to understand how they arrive at a particular decision, but you can audit a predictive system.

Here, in view of the 'challenges' presented by violence and crime to state authorities, the role of technologies is to enhance decision-making, and to improve the efficiency of state performance. The overarching goal is to "do more with less" or at least to do more with what is available to state authorities.

The third framework concerns the networking of policy-relevant knowledge and its corresponding contexts which we see dispersed in the practices of experts, diplomats, politicians, and groups operating 'locally', 'on the ground'. In this case, knowledge dispersion is paradoxically a synonym of concentration: only those with the available resources have proper access to it. This creates an asymmetry with dire consequences for international security politics, to the extent that those without access to policy knowledge would be ill-equipped to properly influence the design of policy instruments. By tying together a sort of institutional memory of UN sanctions, the purpose of UN SanctionsApp is to make it available beyond the restricted group of players who have traditionally dominated the design and implementation of UN sanctions, providing other members of the UN Security Council with a sort of leverage against this concentration of power in international security policy-making.

Here, (and maybe also in the previous cases) the app acts as a prism, first assembling together knowledge that is dispersed throughout many different practices, and then spreading it in the form of real-time sanctions knowledge.

The way that these apps arrange and make knowledge available to their users is intimately connected to a thrust to make insecurity phenomena known, and to find solutions for them. The contours they establish for security governance and for their 'democratizing' purposes are nevertheless ambivalent. On the one hand, apps disperse and spread, they make information and knowledge more widely available than before. All you need is to download them. Seen from the surface, they concur to security practices in place (e.g., policing, sanctions design), while also affording new kinds of practices (e.g., counting gunshots, democratizing sanctions design). It is not rare for these apps to integrate informal mechanisms of governance either, as is the case of the training courses offered by UN SanctionsApp creators and the opportunities for networking they provide.

On the other hand, apps still cannot be detached from the networks, associations and groups that create and operate them, nor from the infrastructures on which they rely. So even our most transparent apps find it difficult to disentangle themselves from fairly opaque, formal and informal arrangements, whose contributions to democratic politics may be questionable. I am more specifically referring to the corporations who own and operate many of the infrastructures that facilitate or entirely afford the development and opera-

tion of our apps, and to the many computational processes enrolled in it, and which become crucial sites of governance by delineating the contours of 'crime', 'violence', and 'conflict'.

As Herz and Hoffmann (2019) suggest, "[t]he concentration of power in networks, associations, and groups that do not face public scrutiny and that circulate knowledge in restricted environments" is concerning. But perhaps more concerning than the opacity of these infrastructures and the groups operating them, is how they entangle themselves to our practices, to the point of making it hard to discern (if at all) when they start and when they end, and rendering the colonization of life by computation virtually inevitable.

Part II

Logics of computation

3
Simplification

> One way or another, the garden is going to turn out as it turns out; our problem is that we don't yet know how that will be
>
> — Alfred Gell, 1994. *The technology of enchantment and the enchantment of technology*, p.57.

> "I still remember. He said: 'keep it simple. Don't make it too many bells and whistles'."
>
> — BIERSTEKER, 2020, personal interview.

'To keep it simple': the request that Biersteker reminisced during our interview is the imperative for most apps. But to keep *what* simple, exactly? For sure, an app must be easy to use, and it must be intuitive for its users, otherwise people will simply not bother with it. 'User-friendliness' is a must that requires making computation look uncomplicated. More than that: enticing. The task is to create an interface, something which can, first, bridge between not-so-computer-knowledgeable humans and complex computational processes, and, second, do so in a way that makes the non computer-knowledgeable humans attracted, somehow tempted to establish contact through that bridge. Graphs, menus, maps, dashboards and icons, all these are made to soothe your contact with your screens, while conveying information, as objectively and fast as possible. At the same time, this simplicity may be quite tricky. It may be tricky to the extent that simplicity entails arranging, and arranging entails governing. The appearance of simplicity is important for governing.

These graphs, menus, dashboards, etc., may tell you how information is spatially distributed – thus, they may convey a sense of spatiality that can overlap or conflict with the non-digital kind. Technical affordances, like APIs govern how the app stores, accesses and downloads data; including by defining access privileges to information. However, the possibility of selection through menus and customization of content gives the impression that the user is in control.

A quick Google search will show you that 'to simplify' entails a number of associated verbs: to clarify, to disentangle, to facilitate, to cut down, to reduce. Simplification, according to the dictionary's definition, entails a reduction of complexity, it is part of making something complicated easier to do or understand. Simplification is, at the same time, a process, a logic and an affect. In the first two cases, simplification is an operation that requires both the

translation and carefully curated reduction of complexities – I add 'carefully' because, in the context of simplification, it is not necessarily desirable for complexities to completely disappear from consideration (as our associate verbs suggest, they may be 'disentangled' and be simply cast in a different way). As a process, it involves the translations and (re)configurations that take place when a computer processes information or when this information is made computable. As a logic, simplification is about arranging information in a way that makes sense in the overall architecture and design of an app. As an affect, simplification speaks to the feeling of simplicity enacted at an app's interface as a result of the (re)translations, (re)configurations and (re)arrangements performed in and by the making and operation of the app. Likewise, decisions about whether a report was true or false are not present in Fogo Cruzado's interface nor are UN SanctionsApp narratives about active sanctions regimes.

Simplification, in this manuscript, is a multiple: not one thing, but an expression of many things and beings intra-acting. Think, for example, of the amount of work, human and machinic, required to build a predictive algorithm. And then of the amount of work required to translate events into an algorithmic readable language and then back into a language intelligible to humans. This work is not shown in EagleView 2.0's dashboard, despite being part of it. Similarly, the information that priority occurrences were selected by local police authorities rather than by some form of automated calculation or research expertise, is nowhere to be seen, nor are decisions about whether a report is true or false are not part of the interfaces of Fogo Cruzado or UN SanctionsApp's narratives on sanctions regimes.

Monstrous technologies

Apps sometimes are like monsters. Think of doctor's Frankenstein's creature. Of course, the monstrosity of apps is not entirely in the molds of this creature, but it has some odd resemblances nevertheless. In Mary Shelley's romance, the creature's origins are an ambiguous process, which we only know to involve animating matter and weaved-together body parts collected from a dissecting room and a slaughter house. Also differently, the creature, rejected by its creator, is never given a name. But a little bit too similar to monsters, apps acquire a life of their own. Monsters are originally intended to be something not monstrous, but become so as they deviate from their creators' expectations – either aesthetically, cognitively, or in practical terms – and start demanding more and more attention, more time, more energy, and sometimes even acting for themselves, thus risking (or effectively) getting out of control. The literature teaches

There is a reason for that. A detailed account of the work of these apps would overload their interfaces with too much information. There is a fine balance to be found between what goes in and what goes out of the interface in order to make it work, a decision which, as those familiar with STS in International Relations know very well, is fundamentally political. Simplification is a pre-requisite for action and a fundamental aspect of governing insecurity at basically any field of action, but it becomes particularly enticing as an effect (and affect) of computation. The discrete symbols and operations behind computation, alongside the many elements that apps assemble together, have wide affective and aesthetic implications. Most notably, in colonizing the realm of the uncomputable, namely, to make it computable and able to produce unique senses of truth, spatiality and reality.

EagleView's 1.0 interface showed a map of a urban area covered by squares and their hues of red, and green. Contrary to the expectations that the algorithm could intensify the stigmatization of poorest neighborhoods often associated with 'violence' (slums, irregular occupations), these regions were not even included in the map, and when they were, most appeared in green. Among the many possible reasons for this are that official data on criminal occurrences in these regions was either incomplete or lacking; that this lack or diminished number of incidents are due to low reporting and lack of trust in the police; that the conflicting geopolitical partitioning of the city's neighborhoods make it difficult to compile crime data (slums and irregular occupations, in addition to having their own internal geospatial divisions and communities, tend to oc-

us that our relationship towards monsters is one of continuously trying (and failing) to control them (HARAWAY, 1991; LATOUR, 2012). In ancient maps, monsters were usually there as an indication the limits of western knowledge (DAVIES, 2016). Stories like Frankenstein's above have, in their own turn, worked as precautionary tales about how far should humanity go with technical development (WINNER, 2001). This same literature, however, asks us to think differently about monsters. Science and Technology scholars have critically reflected on matters of power and control with respect to scientific and technological advancements. The monster allegory is, for some, a moral lesson that should teach us about the limits to our ambition of creating monsters. Distinctly, Science and Technology scholars argue that we should learn to love then – or, at least, to live with them (LATOUR, 2012; HARAWAY, 1992). In security studies, this is also reflected in claims about 'living with' or 'taking' the trouble. (BELLANOVA; JACOBSEN; MONSEES, 2020). Haraway (1992)

cupy more than one 'official' neighborhood); or simply that the range of crimes predicted by EagleView 1.0, which included violent crime against life (homicide, bodily injury followed by death) and property (robbery), are really more acute elsewhere.

The message that this kind of map conveys is different from that of the proprietary platform. Covered in hexagons with customizable color-scales and features, the proprietary map holds a subtle call for action, rather than a precautionary or didactic message. It provides the user with, as I joked with my interlocutors, 'information overload' with many of its filters – location and time of past incidents, location of police surveillance infrastructure (e.g., CCTV cameras), general crime and policing statistics, and the predictive layer – being agglomerated in the screen in front of me. The optimization/allocation layer was still being developed by the time I have got my glimpse on the platform.

The contradiction between having a predictive policing platform open to everyone's access and having a proprietary one was resolved when the first finally went offline in October 2021, burying with it – at least temporarily – the ambition of presenting a contribution to the public debate around public security. The glimpse it offered was brief and only reflected the data sent to TechLab to make the predictions. The same data was already outdated from the moment it was launched.

To simplify, it appears, is more than merely a work of pruning, or smoothing out hard-to-compute raw edges and giving them the appearance of computable. It is also more than fine interfaces. Computer simplifications

reminds us that while these monsters are gestated by us, they are particularly under no-one's control. Hence, rather than signifying any sort of otherness, we are deeply implicated in a monster's continuous (re)creation. Yet, this does not mean that they should be abandoned at their own luck, as doctor's Frankenstein's creature, but rather inspire care and responsibility. Given the apparent simplicity that an app interface conveys, the idea that it could be a monster sounds amusingly odd, but reasonable, nevertheless. The monstrosity of apps is directly related to their liveliness, to the inability of their creators (or maintainers) to disentangle from them and to a sense that they are unstoppable. To rely on an comparison I have heard during fieldwork, when compared to books, apps continuously demand attention, trapping its creators in a continuous flow of updating, maintenance and reconfiguring. Chun (2008) connects this sense of movement to the illusion of liveliness, which is not a fact but a feel, a sensation, structured around a sense of causality produced as we navigate and move through the

involve painfully complicated processes of translating, combining and recombining events, things, people and objects in a new, digital materiality. A sort construction of multiplicity, but in a formal idiom. These simplifications are powerful processes because they (re-)arrange, in and through maps, filters, grids, sets and arrays, a multitude of multiples, be they events, symbols, pixels, points, pins, ideas, concepts or links, and give them new meanings and purposes. And they may be openly available to all, or only to quite VIP groups of people and institutions; may or may not work to marginalize, hide, conceal; or, conversely, may or may not work to highlight, bring into light and expose. Whatever the case, computer simplifications are somehow always there, performing shortcuts that – perhaps a little bit too contingently – put computation at the service of governing arrangements and offer us formal companions with which to do the work of simplification.

3.1
The liveliness of apps

UN SanctionsApp was originally intended to be an outcome of a larger research project. Outliving this initial purpose, it became something else. This deviation started from the moment it tried to distance itself from the 'static' design of other apps previously commissioned by the UN. Unlike these apps, I was told by Biersteker, they wanted something that enabled users to navigate in nonlinear ways. In addition to the ambition of interactivity, the app also was conceived with a normative purpose: to give non-permanent members of

web. Liveliness, understood as such, structures the feeling that our own desire drives the movement. Think, for example, of the sense of real-timeness of computer applications. As Chun notes with regards to Realplayer, "the notion of real time is bleeding into all electronic moving images, not because all recordings are live, but because grainy moving images have become a marker of the real. What is authentic or real is what transpires in real time, but real time is real not only because of this indexicality – this pointing to elsewhere – but also because its quick reactions to user's inputs." (CHUN, 2008, p.317). The literature also shows that the sense of reality produced by computation is an outcome of particular techno scientific practices, collective actors and their situated work in time, place and cultural practices. This sense is, I want to argue, a product and affect of simplification, or the concealment of the negotiations, frictions and power circuits running alongside the work of an app. These power circuits are at unusual places, such as at the impre-

the UN Security Council access to information in real time, in order to enhance their capacity to influence the sanctions committee.

Biersteker reminded that the app had become part of the institutional culture of the Security Council sanctions branch, being used in training courses to diplomats. He was very clear, however, that, unlike publishing a written report, maintaining an app is no easy task. "I sometimes say, well, we created this monster. Because there is demand to update it all the time and, unlike a book, which I can finish, publish and put it on the shelf, the app is alive... And so, it is like this monster we cannot stop." (BIERSTEKER, 2019, personal interview).

Biersteker's observation is a reminder that apps, at times, seem to be alive. This sense of liveliness has multiple sources within the amount of computational and human work required to keep an app up-to-date and functional. The work of and with an app only actually stops when it is discontinued and/or permanently taken out of the App Store. This liveliness is profoundly connected to an app's efforts to simplify. Simplification does not take place at one level only – it is not merely a reduction of reality to a grammar that can be understood by computers. It is, instead, a collection of decisions and negotiations, some which keep troubling their creators after the app is fully 'in the wild'.

cision of the boundary between physical and non-physical, aggravated by miniaturization (HARAWAY, 1991). As argued in chapter 2, they also run in the infrastructures in which apps are embedded and embed themselves and in their reality-making affect. This is the second part of the argument. Haraway (1992) recalls that the word 'monster' has the same root as to demonstrate, signify. If we go alongside this road, then simplification is not simply (if the reader will allow me the pun) a process of concealment and assimilation of monsters. Simplification is signification through practice. By simplifying, we make divergent things fit together, as if they were never at odds with each other in the first place. We give a different appearance to the negotiations and frictions that are both constitutive of the app and of its stand towards insecurity. It is through this process that apps reshuffle our senses, exposing us to new affects and effects that will significantly shape our sense of the world. To simplify, in other words, is to take monsters out of sight, which does not mean that we cannot still feel their presence, follow their traces. The third articulation of the allegory of monsters is

The life of UN SanctionsApp may be located at the crossroads where the desire of interactivity meets with the aspiration to democratize access to UN sanctions knowledge. The democratization discourse precariously ties the architecture of the app together. I say precariously because there is no necessary link between, on the one hand, the desire for interactivity and, on the other hand, the normative aspiration of democratizing access to a specific content but, in the UN SanctionsApp, these two things are entangled together. First, interactivity makes access to content easier. Analogies can be traced through the app hyperlinked infrastructure and specific terms can be found with the help of a simple 'search' command. Second, the app offers systematic wording to draft new resolutions, a vocabulary containing the systematization of the language historically used to negotiate and write resolutions, tied together, again, by the app's hyperlinks.

Similar to EagleView's filters, Hyperlinking provide UN SanctionsApp creators with a way of arranging knowledge and materializing the imperative of interactivity requested by the 'potential users' with who the team talked before jumping into the design of the app properly.

It was a risky bet, Biersteker admitted as we chatted in his office. This is the third interview since I started the research. He tells me that the idea of hyperlinking was a response to a brainstorming session with UN Security Council representatives in New York. But while it made sense conceptually, nobody in the initial team was versed in computation. How, then, could they turn concept into programming?

their inappropriateness. When made evident, monsters provoke both marvel and strangeness (and, sometimes, a degree of skepticism). Their difference is both fascinating and frightening, not because they embody some kind of otherness within the self, but because they expose us to our own true colors. This articulation invites us to consider what happens when the monstrosity of apps meets with friction: the differences, complications and discomforts that they create or must deal with. It is here that, perhaps unexpectedly, security politics makes its comeback to the main stage. What kind of monster unsettles our assumptions about how security politics works, if not the monsters from within – those that are either concealed or assimilated?

The inappropriate monster invites us into thinking the different political possibilities of monstrous encounters. Its presence must always be justified – it is either a collateral effect of the power of technological monsters or that which, when it concerns distribution, is on the side of

UN Security Council's decisions are based on a logic of precedents, where country representatives go back to previously agreed resolutions and adapt language from there. Most sanctions resolutions are historically drafted by only 3 permanent countries, who have their own archives on previous sanctions regimes, which grants them a degree of mastery of the language used in previously agreed resolutions. The app's menu "Types of sanctions" is designed with this discrepancy in view: it contains language alternatives to representatives that do not own their own archives, while the "Cases & Episodes" menu gives access to detailed information on country cases and ongoing resolutions. The role of hyperlinking is to guide the user across the connections between the qualitative information on country cases, specific documents, keywords and wording samples.

A simple but potent form. The hyperlink, or hypertext, is a key organizational concept of the Internet. The basic idea behind it is to make references to other texts or documents that the reader can immediately access with a click, a key-press set or a touch on a screen. This chain of referencing creates an interconnection between different texts, allowing the user to move forward or back as they please only by performing a click. Hyperlinks also participate in the production of what we call 'real-timeness,' or the sense of immediacy stemming from a computer's response to particular inputs. According to the dictionary definition, real time points to the actual time during which something takes place. But if we look at its computational definition, multiplicity abounds. This is because real-time in computer applications is not one thing, but rather the outcome of a sequence of processes and operations happening in a relatively short time (sometimes on the range of milliseconds) and usually

the wronged – if nothing else, because it makes politics more complicated. As John Law (1991) suggests, at minimum, monsters make heterogeneity explicit. Think of the stories about our apps and how they bring many different things together, make them overlap and construct and maintain differences and similarities. In invoking the perhaps already cliché allegory of monsters and technology, I want to make explicit to the reader the politics of simplification and its power "to infiltrate, to stiffen, to reorganise, or to dissolve what we more usually think of as 'social relations'" (LAW, 1991, p.18) in the context of in/security politics.

Interface affect

We are today far more intimate with our computer screens and apps than we used to be with the televisions they are for some time replacing. This intimacy is evident in our daily movements: approximating them from our faces and bodies and

as a response to a particular input. In the case of the UN SanctionsApp, the sense of real time is part of a sequence of processes that seem to start with the action of a user that involves checking for information about a particular country case, wording or document.

The "Analogy Finder" menu of UN SanctionsApp (Figure 3.1) was elaborated to mimic the analogical reasoning that is typically part of the UN Security Council procedures.

Suppose that you are a diplomat and want to find a similar case to that which you are discussing in one of the sanctions committee meetings. "Analogy Finder" allows you to select a number of keywords connected to UN SanctionsApp qualitative database of active sanctions regimes, in order to compare events from similar contexts or contrast their differences. Let us say that in order for you to base your intervention, you need access to comprehensive sanctions cases where the impacts of sanctions on the population was high. The app allows you to combine one or more keywords to see the country cases and documents associated to the search, giving you the feeling of being able to have real-time access to an institutional history on sanctions.

Apps do things by simulating how people think and act. The simulation of analogies, in particular, is debated in computer science conferences worldwide, especially in the context of computational models of analogy in machine learning. Questions of representing relational structures and the mimicry of

keeping them along, in our rooms, pockets, laps and hands, as if they were a sort of dear companions. We spend a long time immersed at their interfaces while commuting, working and having some leisure time.

The literature has given different names to the mediation of social and commercial interactions by these screens, apps and digital platforms, which hinges on sophisticated, tightly designed forms of abstraction and simplification. You have probably already heard reference to “surveillance capitalism”, “platform economy/capitalism” or maybe “interface economy” (FINN, 2017; SRNICEK; SUTTER, 2017; ZUBOFF, 2015; GILLESPIE, 2010). Each term emphasizes a different aspect of this brave new world mediated by digitality. Those relying on the term ‘platform’ tend to emphasize the capitalist structures built into digital technologies. This is the case of the prevalence of digital platforms like Amazon, Uber, Airbnb, Facebook, etc., in the conduction of our routines. The emphasis on interfaces, in turn, calls our attention to the ways in which such economy abstracts away regulatory, political a-

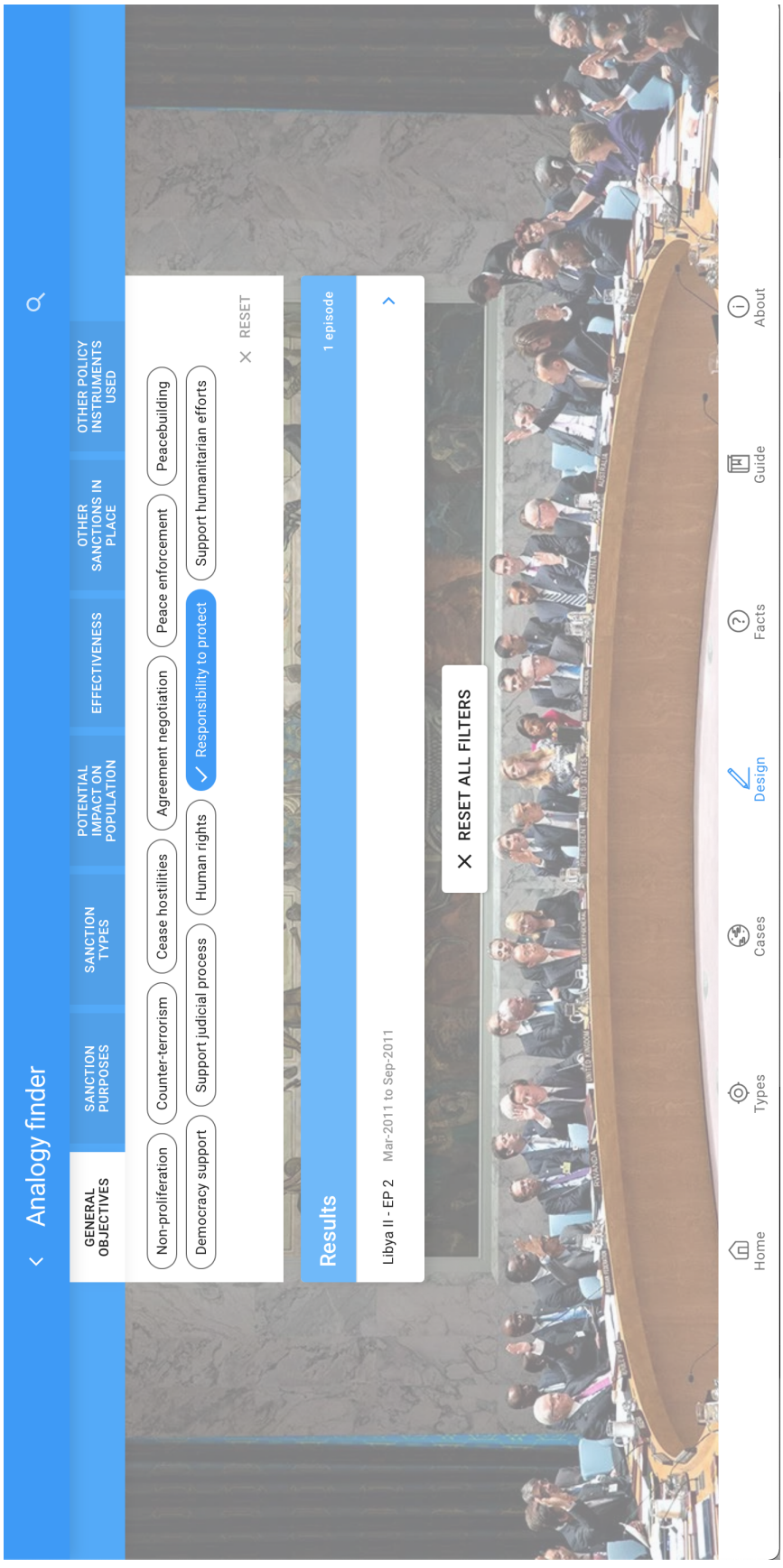


Figure 3.1: UN SanctionsApp's "Analogy Finder" menu

the generality and flexibility of analogical human reasoning by machines abound. The way in which UN SanctionsApp enables one to build analogies is, however, simpler than that. Unlike machine learning, it does not intend to make the analogy by itself. Rather, it affords it.

Machine learning applications produce analogies by contrasting abstract relational structures in their input domains. In contrast, in UN SanctionsApp, it is the hyperlinked architecture that enables them. If you access the Analogy Finder menu in the app, you will promptly see a number of themes – general objectives, sanction purposes, types, potential impacts on population and effectiveness, in addition to other sanctions in place and other policy instruments used – and a number of specific keywords associated to each theme (e.g., non-proliferation, democracy support, counter-terrorism, effective signaling, effective coercion, legal tribunals, etc.) which you can use to filter the app's qualitative database. Each keyword is associated with one or more country cases and a country case is associated with more than one keyword. Users can then combine keywords to find cases where the theme and keywords in question have been previously addressed. It is up to them, not to the app, to continue with the mapping of relations.

3.2 The betrayal of translation

See this short fictional anecdote, which reproduces an interaction between an user and the Twitter account of Fogo Cruzado. The anecdote is based on real tweets. Retelling it, rather than showing a screenshot of it, is intended to prevent the real user from being traced down:

nd other sorts of frictions. Using Uber as reference, Finn notes that "all the socioeconomic infrastructure gets swept away behind the simple software interfaces that connect riders with drivers, and a legal interface that abstracts risk away into generalized blanket insurance policies covering every driver and passenger." (FINN, 2017, p.124).

Computer simplifications hide away the socioeconomic infrastructures of most commercial apps. Even when an app is not necessarily commercial, most still depend on these infrastructures. And few are actual parasites, feeding from them without giving something back. This concealing, Finn recalls, is effected through interfaces. But what is an interface? Is it something through which we frame the world, in the molds of a window or a door? Is it a screen, a surface made of glass, or maybe plastic? Is it both? Or maybe neither? And how relevant are interfaces for the topic of simplification? If you look at the literature, interfaces can

You are at home, minding your own business, when you suddenly hear those distinguished sounds of gunshots. The sounds are close and you decide to make a publication on social media about it. You write, on Twitter: "omg! hearing gunshots right now" and, a few minutes later, you receive a notification that someone has interacted with you. The reply to your tweet says: "Good evening, can you tell us the approximate location of the gunshots? You can send it to us via DM!" You direct reply with your position and the other account replies back, informing you that they have just registered your report. The interaction ends like this.

The anecdote above replicates part of what makes the bulk of Fogo Cruzado's data collection strategy: active filtering through social media and interaction with users. The other part consists on receiving reports directly in the app and website. In the media, this collection strategy is called crowdsourcing. Typically, crowdsourcing implies using the knowledge and (voluntary) work of Internet users to produce content. This is, for example, the case of collaborative maps, where each user individually provides a tiny piece of information that will compose the whole 'picture'. This kind of map has been employed widely, to monitor traffic flows, as well as humanitarian catastrophes. Because of its relatively modest user base, however, Fogo Cruzado had to adapt and start to actively search for publications that mentioned particular keywords associated to the routine of gunshots, rather than simply waiting for reports to come in. The linguistic filters that perform the search capture pre-determined keywords, with the following step being having data analysts

do many things: they discreetly orient our behavior, they hide power, they channel power, there is something ideological about them, they simulate, they produce unreal visions that nevertheless pass as reality, they unify visions of the world, they embody tensions and contradictions, they fool us (CHUN, 2008; GALLOWAY, 2012; FINN, 2017). Media studies have looked at interfaces in two distinct ways: either they are media or they are mediation. As media, the focus is on interfaces as things that act as containers for their message which, following the famous quotation "the medium is the message" by McLuhan (1994, p.7), is embedded or encoded within. But Galloway (2012) warns that this media-like philosophical orientation tends to agglomerate and reduce the many into one thing: "The interface is this state of "being on the boundary". It is the moment when one significant material is understood as distinct from another significant material. In other words, an interface is not an interface is not a thing, an interface is always an effect. It is al-

to interact with the authors of the publications in which keywords were flagged. While crowdsourcing typically demands direct engagement of the user, in the version performed by Fogo Cruzado such an engagement is not entirely required.

The becoming of a gunshot, namely, of its computational mimicry, is composed of different movements: the first movement is the filtering of social media for information and user reports on the platform. Here much of the work is performed by data analysts digging out for information – with the help of social media filters or directly from the press. When a report is submitted directly by an user, it goes to Fogo Cruzado's dashboard, where it will wait for validation by a data analyst. Once its veracity is checked, two things can happen: if the whole process happened within a 30-minute window, the event is registered on the apps' database and a notification is sent to users who have the app downloaded and installed on their phones with the location settings on (you only receive notifications for nearby occurrences). The service pins the location of shootings on a map that borrows from Google Maps' geolocation services and publishes this information on its Twitter and Facebook pages. However, if the process extrapolates the 30-minute limit, the event is only registered in the database and no notification is sent to users. Here, real-timeness gives as a deadline for computing operations, playing the role of that period of time in which the these operations must be finished.

Based on the commonground assumption that mouth to mouth communication travels faster than news reports, Fogo Cruzado's crowdsourcing tries

ways a process or a translation" (GALLOWAY, 2012, p.33). As mediation, interfaces are situated in a liminal zone between the medium and the actors that operate around and through it, sometimes collapsing the distinction with the medium. To the extent that computation simulates doing, (GALLOWAY, op. cit., p.22), it instantiates a practice. The simplest example of this would be that the folders which we see on our desktop – and more likely all of our desktop environment – and which we conventionally call 'folder' are not exactly folders, but their simulations. In his understanding, interfaces simulate a thing "so effectively that 'what it is' becomes less and less necessary to speak about." (GALLOWAY, op. cit., p.13). The more successful an interface is in its functional mandate, the more likely it is that it will erase the traces of its own functioning. Quoting Michel Serres, Galloway emphasizes the dialectic at the heart of interfaces: "Systems work because they don't work. Non-functionality remains essential for functionality. This can be formalized: pretend there are two stations exchanging messages through a cha-

to mimic the dynamic mode of engagement of the community's WhatsApp groups and chats. In daily coexistence, community leaders, neighbors, acquaintances, friends and family members communicate via social media and chat apps, sharing trivial and relevant information, such as food recipes, the status of the traffic, news headlines and, of course, news about crime and ongoing conflicts in the neighborhood. In its embryonic stage, Fogo Cruzado was a mere spreadsheet, where Olliveira manually added data about gunshots that were collected from news headlines and Facebook posts. The task was thankless, since it was impossible to actively map every report and the frequency of these events in Rio is not trivial.

The app, as the reader may have already noticed, is tailor made for Rio. Having people to talk so openly about armed violence on social media is not something that happens everywhere, no matter how ridden with this form of violence the place may be. Statistically speaking, Rio de Janeiro is not necessarily the Brazilian city where you will find the highest rates of armed and criminal violence – most such places are located in the North and Northeast of the country. It is the manifestation of this kind of violence there that is quite specific: it is widespread, publicly heard and felt. Because of these dynamics, some users consider this kind of service to have an assuaging effect: it is possible at least to confirm that the sound just heard is indeed a gunshot, as well as its origin and distance. This considered, when the app, imagined and designed after this specificity, travelled to Recife, of course there would be frictions.

nnel. If the exchange succeeds – if it is perfect, optimal, immediate – then the relation erases itself. But if the relation remains there, if it exists, it's because the exchange has failed. It is nothing but mediation. The relation is a non-relation" (SERRES *apud* GALLOWAY, 2012, p.25-26). Similarly, when emphasizing the spectrality of digital media, Chun notes that "interfaces stand in, more often than not, for the computer itself, erasing the medium as it proliferates its specters, making our machines transparent producers of unreal visions" (CHUN, 2008, p.318). Her interest is not in exorcizing the spectral or the visual, but in understanding how spectrality lies elsewhere: "Capturing ghosts often entails looking beyond what we 'really' see to what we see without seeing, and arguably, digital media's biggest impact on our lives is not through its interface, but through its algorithmic procedures" (CHUN, 2008, p.323).

Apps typically to simulate "real-time" not in a way that matches live events or recordings, but as a reaction to user inputs. This happens with hyperlinking, filtering, crowdsourcing, and similar processes. Crowdsourced apps and maps, for e-

They want to reproduce [in Recife] an app that was created for Rio just like that. They don't get it why in Rio you have more than 500 shootouts a day, while in Recife you have 5" These were the approximate words I have noted down from a chat with former analysts from Recife, in the second year of the app's operations there. The numbers they gave me were obvious exaggerations, intended to make explicit the variation in numbers between the two places. Fogo Cruzado's enactment of gunshots depended on these being widely heard and reported, following the mantra "a gunshot is seldom heard by one single person" (COUTO, 2018, personal interview). But to the Recife analysts, these reports were scant. This was because gun violence there was less about different factions disputing territories and more about situated gang disputes, which translated into differences in how gunshots existed: in Rio, they are constantly heard, but, in Recife, it was difficult to track them: "no bullet is wasted", one analyst tells me "we don't live in the city constantly hearing gunshots" (Fieldnotes, June 2019).

This did not mean that gunshots could not be found at all. Analysts in Recife had to innovate further to collect them, relying on media reports that were not originally central to the methodology used to collect information, such as radio and TV shows. When the operation shifted hands, from the academic Núcleo de Estudos e Pesquisas em Política de Segurança (NEPS) to the activist Gabinete de Assessoria Jurídica às Organizações Populares (GAJOP), the innovations continued and bounced back in the form of new indicators and categories of violence, and of changes in the app's interface and

xample, show what appears to be real-time information based on the information they receive from users, often relying on proprietary databases with different levels of user access. This arrangement is beneficial to both app creators and companies. The latter grant the former access to comprehensive data infrastructures and receives data, inputs and economic compensation in return. Google Maps, for example, has pioneered in providing free access to its cartographic databases and only later have many of its services become paid. In many aspects, Google Maps' databases are "more comprehensive and more accurate than that of governments, and extensive enough to be considered part of the information infrastructure" (BUGS; BORTOLI, 2018, n/p). In the context of crowdsourcing, it does not matter whether the event is ongoing or not, or if it just took place or not: the sense of real-timeness is created at the moment that the input appears on the screen. As Chun (2008, p.318) notes, "the source of a computer's actions always stems fr-

in its institutional organization.

Translating gunshots into computable objects required adapting the methodology back to what used to be the embryonic project of Fogo Cruzado: looking for what the press was saying about gun violence and organizing this information on a spreadsheet. It was at that stage of the life of the app that radio and TV shows became invaluable sources of information to complement the scant data coming from user reports. Whereas the project found similar reactions from public authorities in both Rio and Recife – refusal to acknowledge the data as valid –, when it came to users, its effects were somewhat mixed. In Recife, not many people used or knew the app. Those who knew, held little interest in keeping it, for it did not seem to make a difference in their routines. In Rio, it had more adherence. Yet, it was unlike what the Recife analysts imagined, since the app was mostly used by activist groups and NGOs. Most people I talked to in my search for users of app, when asked about it, were not familiar with Fogo Cruzado, but knew the 'competition', 'Onde Tem Tiroteio' (OTT, translatable to 'Where is the Gunshot"), instead.

There is the famous dictum by John Law that 'to translate is to betray'. In the case of Fogo Cruzado, translation betrays the amount of work (and friction) implicated in putting together such an app, alongside the many small innovations that get reassembled into it to keep it operational and make it circulate. It also betrays a particular ethos of building authority, one in which having the data noted down in a spreadsheet alone would not do. It betrays a laborious work of simplification, as ironic as this sentence may sound, a work

om elsewhere." With this, she is referring to how the computational sense of real time makes it appear as though computer action is only caused by outside events, such as mouse-clicks or streaming video. For Chun, these real-time interactions erase the movements within the computer and the act of computation itself. She and Galloway, through different means, show that what we call interface is not only restricted to the screens in front of us. It is rather many processes combined together, a specter which works by trying to disappear from immediate vision, but which still remains felt and experienced. Galloway calls it an effect. It could also be called affect. Computers simulations do not necessarily trap us in state of unreality, they are quite real and multiple. The sense of real-timeness discussed here suggests that the movements that produce the specter are as 'there' as the specter itself and, as presences, they affect us.

Materially-affective security

In the security studies literature, the idea that interfaces affect may parti-

that works to consolidate some multiples in a unit.

What comes out of the translation of the gunshot into its digital version gives us an entirely different thing than the stray bullet that was supposed to be traced from the start. It may sound rather obvious, but a bullet that is pinned down in the map cannot go through your body the same way the stray bullet can. Yet, there are other things it can do. The computable gunshot is an entanglement of interfaces, sensory experiences and quantification practices that, in different ways than the gunshot that leaves the gun chamber, affects how we can know and sense violence. The simulation of a bullet translates "reality" into data, making a problem out of it, something whose absence can be disputed and potentially governed. The app also negotiates the contradictions of making an assessment that seeks to be truer to peoples' realities by producing a simulation of these realities. Such simulations do not only reflect what is already there: they also change how we talk and act over violence, radically or not. They make the act of checking for events part of the insecurity routine of some, and, for good or for worse, push gunshots towards the public debate around urban violence in ways that may either meet or contradict the official numbers. The spectral is not only very much real, it is very much felt.

3.3 The magician's trick

Suppose that you are a panel expert member focusing on the conflict in the Democratic Republic of Congo. You know that the large resistance army, named

cipate in the somewhat recent material/aesthetic/affective turns in security politics. Its basic sensibility is to recognize how security politics is aestheticized, mediated by a number of materials and technologies and sociopolitically dominated by affect and emotion (AUSTIN, 2019b). In other words, that people see, feel and hear about the world in heterogeneous ways that are also materially and sociopolitically distinct from other times. If in the 1990s and in the early 2000s, material-aesthetics encounters with war and conflict were primarily broadcasted 'live' on TV, with a more detained focus on the at-distance bombings and on carefully curated narratives dividing the parties between good and evil (GALLOWAY, 2012), today, these experiences are transmitted 'live' in the Twitter and YouTube accounts of individuals, fragmented, mixed and re-mixed, turned into memes, distorted and re-composed into surreal narratives (RATTA, 2018). In both cases, visuality – both as 'sight' and material-aesthetic production based on instruments of measurement that continuously re-arrange the conditions

Lord's Resistance Army insurgency (LRA), operating out of Uganda is a 'spoiler' that has been around for a while, but not just in Uganda or DRC. They also show up in Central African Republic and in South Sudan. Once you type LRA in the UN SanctionsApp, it will link you to multiple sanctions regimes and episodes. Whereas UN sanctions regimes are typically country-based, this pattern indicates that the same actors are showing up in four different countries, thereby favoring a regional, rather than country-specific way of looking at the world, and tells you, our dear expert member, that it could be a good idea for the committee to coordinate its activities vis-à-vis the same actors.

Now, still as a panel member, you want to know more about a particular vessel that has been involved in sanctions evasion. Even if the UN does not have in-house capability to monitor trends of sanctions evasion around the world, the app may help you with that. It provides a comparative look on some of these trends by pointing that a particular ship could be the same ship transporting goods out of North Korea and Iran, for example. By comparing similar trends, cooperation patterns for sanctions evasion emerge, which can be sought simply by resource to the search function of the app.

Above, I gave you a story where you, our app-user, carry on a very simple task – to find commonalities between different sanctions cases - as part of your decision-making process. Perhaps 'commonalities' is not the right term. What you are looking for are *regularities*, namely, *patterns* that repeat in an almost predictable manner. Without the app, the work of finding these patterns would

of vision of objects and bodies – has remained politically significant to assert one's power (HOCHBERG, 2015; GREGORY, 2010). These variegated sensory experiences affect how we perceive, act and feel about the world. When narrating her encounter with la Virgen's tree, which trunk is said to resemble the image of la Virgen de Guardalupe, Gloria Anzaldúa reminds us that sensing is never simply a direct exchange between bodies (human or otherwise) and their immediate environment. Rather, sensing is a compound – of bodies, language and materials: "[i]t feels like the tree is teaching me how to perceive not only with the physical eyes but also with the whole body, and especially to see with the eyes of my other body. The Guadalupe tree reminds me of something I'd forgotten – that my body has always sensed trees' special relationship to humans, that we have a body awareness of trees and they of us." (ANZALDUA; LOUISE; KEATING, 2015, p.24). Anzaldúa's

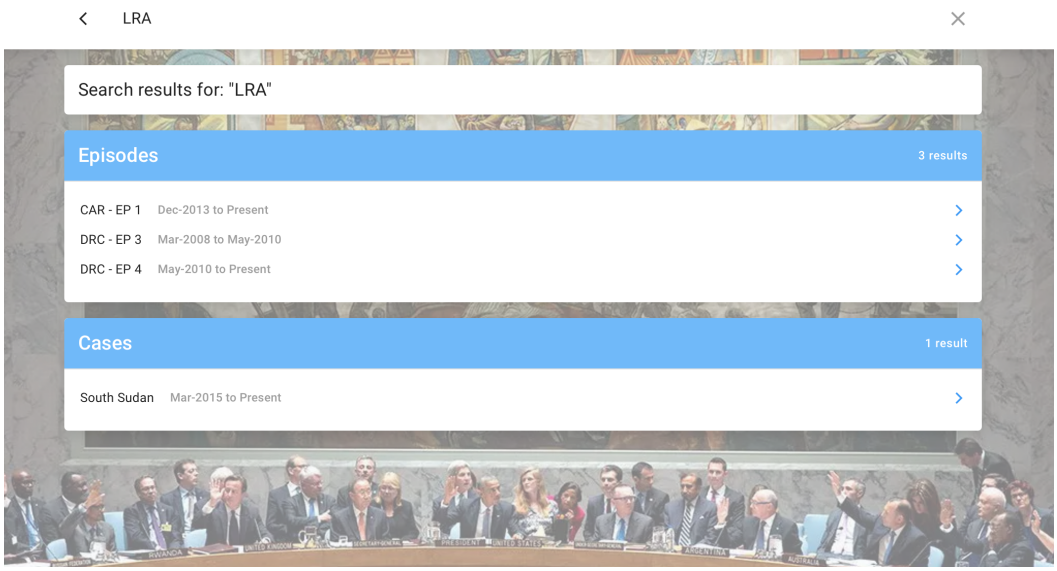


Figure 3.2: Search for the term "LRA" on UN SanctionsApp. Screenshot from October 2021.

be more troublesome. It would require you to study country cases individually, memorize the regularities among them and write down extensive notes before connecting them together and arrive at your decision. The app, however, makes this task easier for you. In fact, it does the job for you.

In chapter 4, I have spoken of the heteromatic emergence of rules of decisions, where humans, to different degrees, help creating, establishing, or shaping them – an example being the work of 'coding' events within UN San-

encounter with spirituality through la Virgen's tree finds an odd resemblance with how our apps participate in our sensory experiences of the world. The spiritual experience aside (I doubt an app would contribute in any way to a spiritual experience, although I can always be wrong), like trees, apps may be as aware of us as we are aware of them. But their awareness, unlike a tree's awareness, depends on them collecting and making sense of data about the things that interest them. It can be data from sensors, such as location data, or data that is 'manually' collected by us, humans. As Johns (2017, p.61) notes, "[s]ensing (...) refers to the work of eliciting, receiving, and processing impressions and information, both in the mode of intuitions or feelings, and in terms of data." She includes in the definition corporeal, individual and collective sensation, as well as mediation by language and technological interfaces. "(S)ensory data are never raw", never just about the body, as if it could be separated from the mind. As discussed in chapter 2, governing

ctionsApp database (recall also that this coding is *not* coding in the sense of programming the app, however important it is for its operation). In creating a common vocabulary for these events, one that can be apprehended by humans *and* computers, the practice of coding sets the conditions for finding regularities in them. It is what allows you to quick search for "LRA" in the search menu and have in your findings 3 episodes (1 on the Central African Republic, 2 on the Democratic Republic of Congo) and one country case (South Sudan) (see figure 3.2).

The search function that basically anyone can perform in the app both allows you to find country cases, episodes, or common vocabularies from these regularities – which existence as a form of understanding the world we owe to the emergence of statistical thinking in the 18th century –, while also depending on having someone or something to make them properly 'findable' within a computer environment. In the case above, this is done through hyperlinking. Once the regularity has been established, all that app creators need to do is to connect them to one another. In fact, many apps depend on making patterns computationally 'found' to deliver their promises properly. The work of detecting patterns is par excellence the basis of contemporary computation, human or machinic.

Well, maybe detection is not the right wording. To speak of pattern detection (or finding) implies that we accept that the regularities to which patterns refer exist as independent ontological entities 'out there', floating around, only waiting for us to stumble across them and exclaim: 'Eureka!' That is evidently a way to see it. After all, these regularities are something we

processes are inflected with the mediation of materials and technologies, including this form of sensory mediation. Specifically, the way in which the material world routinizes certain functions, encourages and affords actions, produces habit and repetition and leaves space for the unexpected is part of digital technologies' attempts to merge with the fabric of the everyday (LEANDER, 2019a; BELLANOVA; FUSTER, 2019). As Austin (2019b, p.264) notes, materials produce resonance as they merge with and combine with our bodies, "augmenting our own being in the world and making particular human desires or needs possible." This resonance, we can understand in terms of their affect and aesthetics. Austin distances his use of the latter concept from the formalist understanding on art, beauty and taste, characterizing it rather in terms of a "a mode of experience that rests on the directness and immediacy of sensuous perception" (BERLEANT *apud* AUSTIN, 2019, p. 265). In this definition, everything that is in the world and can

can certainly observe, scientifically and empirically speaking. But what if we tried to look at patterns as these things that emerge *from* the intra-actions between entities and events in the world and our measuring techniques, or instruments? Not as something that, like a firefly, we can find free-floating out there, but something which existence as an entity is first and foremost owed to the may intra-actions between events, things, entities and our measuring instruments/techniques?

> According to the data, shootings decrease significantly on rainy days and on holidays. “On Mother’s Day and Christmas there was almost no gunshot." But they increase a lot in summer. “The numbers explode, I don’t know if it is the heat, the flow of tourists... someone should do a study on this,” wondered Cecília, finishing her coffee cup without taking her eyes off her cell phone. At that very moment, she confirmed the information of another shooting, this time in Cerro-Corá, a community in the Laranjeiras neighborhood, in the South Zone of Rio, which occurred the night of the previous day. It was the first registered on the site since July 2016 – and another one in an area covered by a UPP (FILGUEIRAS, 2017, translation by the author).

Above, we have an excerpt from a interview that Fogo Cruzado’s Cecilia Olliveira gave to a journalist in 2017. In the interview, Olliveira continuously return to our patterns, first, when she says that there are almost no registers of gunshots in holidays like Mother’s Day or Christmas, and, second, when she stresses the increase in reports during summer. She even wonders about what

be sensed cannot be excluded from the realm of aesthetics, since it entails a distinct mode of experiencing which produces meaning, emotion and action through affective states, rather than through sign relations alone. In more practical terms, this material-aesthetic-affective sensibility resonates with the the idea that, rather than effects alone, interfaces affect. This is the case of the sense of real-timeness, which, as Chun (2008) notes, either does not correspond to what is happening ‘live’ and/or is an outcome of a sequence of movements that take place as a reaction to our inputs. For an interface to be affective, it does not require any sorts of correspondence with any reality ‘outside’ of the computer, because, if you have been following the argument thus far, there is no such distinction. Rather, the affective capacity of interfaces is directly connected with the potential of computer simulations for producing multiple, some-

could explain this, but concludes that someone would need to carefully study why is this the case.

Anyone who lives firsthand the frightening reality of armed violence in Rio of course may know by heart this what Olliveira describes - that sometimes you seem to have more shootouts than others. Some may guess that it could be related to the presence of the police or local disputes for the monopoly of drug dealing businesses, but few would go as far as to establish correlations with holidays (unless we are speaking of soccer games, when you may reportedly have an increase in the number of gunshots heard), season of the year or, who knows, the weather. This kind of regularity is seldom observable with the naked eye and more often than not requires our instruments in order to become a pattern.

Establishing these regularities, allowing them to emerge - this is more or less the work that Fogo Cruzado does. In counting gunshots the way it does, it also counts other things: the places where they took place, their frequency, the period of time in which they happened, the possible causes, victimization patterns, etc. Here, the filtering and mining work of analysts converges with the many computational infrastructures mobilized by the app – Google Maps georeferenced database to enable both analysts and users to pin down the location of the event, partial connections with social media websites both to collect and to reach out to users – in a quite heteromatic fashion. All this data serves to highlight and analyze the regularities surrounding gunshots and establish correlations between them, including whether the season of the year affects the number of events.

times ambivalent senses of reality that, like Anzaldúa's spiritual encounter with la Virgen's tree, might feel or appear to be surreal, which, nonetheless, does not make them less real.

Translation and world-making

Let us now return to our inappropriate monsters. I tried to argue that monsters are useful allegories for our relation with both technology and difference. As allegories for our relation with technology, monsters lay bare the sense of liveliness stemming from our inability to disentangle from and stop them. This sense of liveliness is also related to how digital technologies work by providing immediate, sequential responses to users' input. As allegories for our relation with difference, monsters invite a particular form of introspection: they invite us to look at the complications and discomforts produced when apps leave the planning boards and sheets in the spaces where they are gestated and start their journey 'into the wild'.

Very interestingly, Fogo Cruzado uses similar strategies to turn the thrust to compute mainstream 'insecurity sources' (criminality, threats to the state) against itself. It resorts to similar techniques as other crowdsourced maps – georeferenced databases, enticing interfaces and even borrows from extractivist platforms - to re-write the local insecurity vocabulary. It mobilizes the patterns it 'detects', for example, that the number of reported incidents and victims increase during police operations, to raise what could be perhaps uncomfortable questions to local authorities: what happens when those who supposedly should make us safe, become themselves producers of insecurity?

The work of detecting patterns is par excellence the basis of contemporary computation, be it human or machinic. Not only it is a mode of knowing insecurity phenomena, it is equally necessary to enable the operation of computational processes, like UN SanctionsApp's hyperlinking. And as we have see with Fogo Cruzado's detection of the regularities surrounding armed violence, it is also what emerges from this work, becoming a vocabulary from which to speak (and dispute) 'insecurity'.

Despite having started this section with the stories of both UN SanctionsApp and Fogo Cruzado, during fieldwork, it was with EagleView 2.0 that I have heard the most about pattern detection. Being a predictive policing system, the core of EagleView's work is to have its predictive algorithm to operate over patterns in past criminal and other kinds of incidents. Very crudely put, the algorithm should run through this data, find the regularities in them, and combine the occurrence of these regularities with other factors (location of in-

I can think of two, non-excluding ways in which the literature engages with the practice of technology. One is by looking into its assembling: the plans, decisions, improvisations, adjustments and everyday negotiations involving the different sorts of knowledge that will compose a particular technology, the ways in which this technology is coupled in the existing technical ecosystem or tries to reshuffle the relations that existed prior to its introduction, and the resistances and frictions they meet along the way (PERON; ALVAREZ, 2019; DUARTE, 2019; SEAVER, 2018; CARDOSO, 2010; LATOUR, 1996).

For example, the introduction of Closed-Circuit Television (CCTV) surveillance cameras to policing practices in Rio de Janeiro has required police departments to establish command and control centers from which monitoring could take place and hire a body of retired and/or on leave officers, most of them barely familiar with computers, to perform the monitoring (CARDOSO, 2010). But, contrary to expectations that CCTV would bring about a panoptic watch over

cident, presence of police forces, day of the week, ongoing events, etc.), and use this to estimate the likelihood of having similar incidents in the future, given that similar conditions are met. And because it is a place-based system, these estimations are only interested in the events themselves (homicide, car crashes, robbery, car theft, etc.) rather than in the people involved in them. In what follows, I discuss this particular form of working with and detecting patterns in more detail, exploring what could perhaps be the utmost desire of security-oriented computation to be able not only to find connections between events, but fundamentally to make them somewhat knowable in advance.

3.4 Feeding forward

We are discussing the design of EagleView 2.0. It is a brainstorming session open to all TechLab's research staff. Because it was a long meeting, the topics varied. We went from revising the design of its visualization interface, to discussing the algorithm and database, and also revisited efficiency indicators of the project and its overall objectives. There was a point in this long meeting that – either due to exhaustion or to the complexity of the discussions (or maybe both) – my interlocutors started mistaking the words 'future' and 'present', repeatedly. I found the confusion amusing, if not ironic. The interface at that stage showed a map with three temporal layers: "Now", "Past" and "Future". While the first would provide users with the real-time location and status of garrisons, the second would give then the history data, while the third would show the prediction. In the screen in front of us, the three of them were so entangled that the confusion seemed inevitable.

the city, the everyday practice of CCTV was – unsurprisingly – selective: first, there were technical limitations involved in both the decisions about where to place the cameras and the camera requirements themselves; second, there were logistics: how much could be spent in acquiring and maintaining the required equipment and human labour; lastly, there was the selectivity of policing practices itself, where certain bodies – because of the way they move, stand out, or even their skin color – are typically more targeted than others. The second way is by looking at how technology mediates social relations. Here technology becomes either media or mediation (a multiplying process), depending on where you may stand. Sometimes, it is both. This second mode of engagement looks specifically at how and by which means certain representations of the world are produced and what effects they have in our imaginaries and perception of reality. The literature sees representati-

The making of prediction playfully navigates through present, past and future. On the one hand, prediction derives its power from history data and from the regularities that the build-up of large historical databases afford detecting. In other words, it is a look into the past to search for regularities. Once found (detected, built, established, invented...), these regularities are then extrapolated into future events – not in a direct, causal relation, but based on the probability of an event to repeat itself in the future, given that similar conditions are met. This extrapolation is made with the help of algorithms that many call black boxes due to the difficulty in accompanying their thought-process. As if we ourselves could easily accompany our own thought-processes, some in the project would object.

In the map, the past seems to be always already contained in both present and future, silently and perhaps tautologically arranging present and future police action and understanding of events. The tautology makes up a recurrent criticism faced by predictive policing systems: that 'historical crime data' is less about crime itself and more about police enforcement, as it more accurately is the record of law enforcement response to particular crimes than the record of crimes themselves. As such, it becomes police action pre-structuring police action. EagleView 2.0 does not escape this. It, too, relies on data that records law enforcement response to crime, such as data from official, state government channels for reporting crimes. In order to attempt to reduce bias, auto-initiated occurrences – that is, those actively initiated by the police – are left out of the prediction.

ons as attempts to subsume a reality, an object or an entity, to a specific mode of seeing and imagining the world or to someone who will speak on their behalf. The cartographic practice is perhaps illustrative of this debate. As Lobo-Guerrero (2018) shows, map-making remains an useful practice, especially for digital technologies. Everyday, a number of digital maps is created or fed with data provided by sensors and user feedback. Like the cartographic projections of the past, these maps are a form of reason and framing of thought that propose to disrupt hegemonic representations of space as much as colonize our imagination through geopolitics. They do not break with the struggles to establish and achieve spatial order that we see in non-digital maps. Lobo-Guerrero (2018) observes that among the promises of digitisation of mapping is the democratizing promise of having users to use portable devices to generate content more accurately and objectively. This aspiration, however, stumbles across the infrastructures of ownership and control of the digital. Operators of widely accessed ser-

Many would agree that EagleView 2.0, like most predictive policing, has a prospective attitude towards the future: it is about analyzing tendencies and projecting past events into the future. In this prospective mode, possibilities are, in principle, still open and manifold. At the same time, the system embodies a desire to anticipate events yet to happen, probable events, possible events. This anticipation is not the fruit of any sorts of divination or magic, but precisely of the regularities observed in the data. Being a pre-condition for action, not anticipating appears as a failure of planning, decision-making. Here, the attitude is also respective: it brings the future into the present (the never realizable present).

The discussions that they suggested many possibilities. The team could add heat maps for auto-initiated responses, priority crimes and enforcement, all based on historical data. They could also include the algorithm's predictions, points of interest and the indexes of fragility of a particular place. In the 'Now' layer, they could change the color of the icon according to the duration of a garrison's stay in a particular place. But it would make sense if it featured exactly the same things that the 'Future' layer would feature.

The apparently trivial confusion between present and future that day incurred in the general consensus that the separation between the 'Now' and the 'Future' layers should not even exist. In its place, perhaps, they could simply have filters that would shot the real-time data on the location and activity status of garrisons, equipment, and others. History data would still be

vices available for free, like the Global Positioning System (GPS), can selectively deny or degrade access to the service to its users. "Denied or degraded access to GPS", he notes, "can annul or restrict the location capabilities of the platforms on which digital maps operate. The idea that maps become democratic inasmuch as all users can contribute to their development is a mediated promise dependent on access and the correct operation of systems and the platforms that employ them" (LOBO-GUERRERO, 2018, p.35). In getting entangled in wider, commercial/militarized infrastructures of sensors and platforms, these power dynamics remain concealed from our immediate perception (CHUN, 2008). Maps are also important components for many apps, since they often translate data into a more user-friendly and visually enticing form. These apps, whether intending to subvert, dispute or reinforce official, top-down and/or institutional representations

there. Future data, in the form of the predictions, would still be there. But the present, it seems, would be nowhere to be found. What had happened to it?

In the space of EagleView 2.0's maps, the past is continuously fed-forward, while the future keeps being anticipated again and again, at each new iteration. Both these moves seem to engulf the present, in the insisting attempts at projecting the past into it, while in working to anticipate future events and happenings, leaving the present in a sort of state of in-between, as that layer in the map where you have no color-customized hexagons with neither historical data, nor prediction.

Automated systems, like most criminal analysis, detect patterns in historical data. Suppose that you have a 2-year history of crime in a given municipality. You take this data, identify the places where occurrences happen more frequently and you follow the displacement of crime in time and space. You notice, for example, that at 4:00 a.m. there are more occurrences in a particular neighborhood. Then, you add probabilistic calculations to this. You try to see if the rain, police presence or sports events influence the occurrence of crime. You add more and more variables to the system and let it do the math to detect these patterns. Here, patterns help determine the likelihood of a crime to occur given that the similar conditions from the past repeat. Suppose that it was cold and raining last Sunday night. Neighborhood X has a history of crimes on sunny weekends, but the number drops if it is raining. The tendency, the system tells you, is that you have less crime in the future on rainy Sunday nights than what you have in sunny Saturday mornings. This degree of granularity in data is what the programmers called 'refining'.

of space, rely on similar cartographic infrastructures, from embedded GPS sensors to georeferenced databases and maps. The representations these maps effect are regarded with suspicion by feminist scholars like Haraway (1992), who see representation as an operation of (dis-)appropriation of speech that renders nonhumans permanently speechless and in need of a ventriloquist to represent their interests. The representations effected by computers are somewhat different. Because computers simulate doing things in the world, they do not seek to speak for someone or something, but rather produce different versions of this someone/something. In multiplying the world by translating it to many different symbols, units and icons, while subsuming it to various forms of manipulation and modeling, computation both reduces and proliferates multiplicity, creating very effective simulations that make less and less important to speak of what is actually going (GALLOWAY, 2012). The translations effected through computation

Detecting patterns has a triple role in predictive policing. First, it makes possible to simplify what is otherwise perceived as a complex entanglement of events, people and phenomena by identifying 'hidden' regularities in datasets about criminal and other kinds of occurrences. Second, detecting patterns also allows system developers and operators to present their outcomes more objectively (some would say: without the apparent subjectivity that we see in less automated forms of crime analysis). Third, the epistemic authority of patterns contributes to building the overall system's authoritativeness. Patterns and the regularities they represent lay the epistemic foundations for data-driven crime analysis, the 'evidence-based' character that distinguishes it from merely 'intuitive' policing. This is the case of a meeting where someone suggested that officers in charge of operational planning could use its outputs to justify how they allocate their force to their superiors.

It is thanks to pattern detection that the unique desire of prediction, the desire of feeding forward the past to anticipate the future, can be fulfilled. Patterns involve a particular mode of arranging and interpreting data and participate in the simplification of the world by both allowing for the identification of new tendencies, helping (re)arranging and/or consolidating new knowledge practices. And they are always connected to a history of events. This does not apply *only* in policing, it is in fact the case for all the three apps. Or, to better put it, it is them that give sense to having a history of events in the first place, by making it possible to combine and re-combine multiple regularities into coherent threads of events.

are at guilt here. It is through these translations – "the action (human or otherwise) of compiling/ interpreting and executing" (CHUN, 2008, p.307) – that the source code becomes executable, and also through them that a gunshot a few kilometers away pops up as a notification on your screen. But in making "two things that are not the same, equivalent" (LAW, 1999, p.8), translations, like the simulations they entail, raise suspicion. They raise suspicion because the risk of translation is also the risk of oversimplification, of losing complexity. As indicated before, translation implies a similarity, the making of an equivalence. The betrayal comes not far behind. It implies a difference, perhaps an excess (CADENA, 2015). It is for this reason that some are fond of translations: because it is through them that things travel and change. This ambivalent approach underlines the famous quotation by Law (1999, p.1): 'to translate is also to betray'. In this regard, Lobo-Guerrero (2018) recalls that mapping practices change alongside practices of navigation. The mapping practices of Portuguese and Castilian sailors

EagleView 2.0 is a crime mapping tool that depends on both digitizing information about criminal occurrences and on centralizing temporal and spatial data on a single interface. This interface is mainly staged by a map made of several layers of information: auto-initiated responses, priority crimes and enforcement, the algorithm's predictions, points of interest, the positions of police garrisons, among others. Each layer adds depth to the analysis by bringing more variables in. The goal is simple: to make it easier for the police to do what they already do, which is to define priority spaces and areas for action. The logic of predictive policing is, in a certain sense, symbolic: it avoids a directly combat of crime or its 'root causes', rather opting for a strategy of prevention based on a curious and opaque chess game, which goal is to the (re-)affirm police presence.

The work of detecting patterns begins way before the algorithm performs its magic. What machine learning does, according to my interlocutors, is simply to automate the process. But of course, it is never that simple. To infer rules – either in automated or manual ways – is to make generalizations about how things work and to produce possibilities for action based on such generalizations. It is the to feed forward past events in order to design present and future action: if conditions X, Y and Z had been present in the last 100 occurrences, they might probably repeat in the next 100. Notably, the problem with this is that, in policing practice, this governing by patterning may end up resulting in the over-policing or, alternatively, in the more violent or racialized policing of particular areas. Interest in machine learning comes precisely because of the possibility of having this sort of rule of decision to emerge without the direct participation of a human being in the process. This

in the 16th and 17th centuries depended on factors such as variations in sea currents, wind systems, magnetic deviations, and ways of knowing latitude and longitude to determine location. It is based on some of these practices that modern geolocation systems operate, including the part where you get to know your location in terms of your latitude and longitude – the basic step for any app which services depend on having the location of the user today. Practices of mapping underpinning the work of these apps are "constantly in motion" while also "seeking to appear ontologically secure" (KITCHIN; DODGE, 2007, p.335). Like 16th century maps, apps reflect and (attempt to) assimilate the differences they encounter, but the excesses they try to accommodate overflow, creating a sort of ontological patchwork, whereby it is not one, but several coherent realities that are being performed at once. This may leave open the question of whether the operation that simplifi-

raises the concerns with accountability and transparency that today protagonize debates on algorithmic governance: when biased policing – which is, according to an interlocutor, 'an occult data within data' (Fieldnotes, July 2019) – makes into the system, it becomes a biased input which, by consequence, generates a biased prediction.

Machine learning algorithms then project these patterns as conditional future occurrences. To do this – so I was told – it must assume that the world is 'stationary': that, if everything remains as it is, you can project what is going to happen next (DIEGO, 2019, personal interview). The limit of this simplification, as most people working with predictive policing openly recognize, is that it makes it impossible to predict what is not systematically counted, which includes 'black swans,' or events that fall entirely outside the scope of what is 'predictable' since there are no statistically significant precedents for them.

That particular month witnesses a black swan in city C1, where I had once accompanied EagleView's team in a fieldtrip. A big bank robbery disrupts its peaceful routine. The act involves the robbers crashing a heavy vehicle against a police battalion and engaging in a shootout with a patrol. When they finally reach the bank agency, they take employees as hostages. Locals report hearing the sounds of bombs, which were used to open the bank's vault. The entire operation takes only a few hours, with robbers leaving a trail of money behind as they escaped. My natural curiosity, as I hear about the event, is to text one

Sticky monsters

cation performs is a reduction or a multiplication. In 1981, Jean Baudrillard started a debate about the logic of representation of maps, mapmaking and map use in critical geographic thought by affirming that "the territory no longer precedes the map, nor does it survive it. It is nevertheless the map that precedes the territory" (BAUDRILLARD, 1995, p.1). As a consequence of this claim has been to see maps and the like as no longer things that merely represent, but fundamentally as things that (re)produce and engender territory and reality. Lobo-Guerrero (2018) recalls the actuality of the problem of location in contemporary mapping practices. Web search, apps, navigation systems, all resort to GPS technologies in the expectation of providing real-time, precise location. But when you take a careful look into how these things work, you will notice that 'location' is entangled in a more complicated web of governance. A georeferenced Web search, for example, uses algorithmic technology to attach location to rele-

interlocutor at TechLab. "How does this event affect the pilot," I ask, a little bit eager for information. "Not much", they reply. "It doesn't affect EagleView directly. it was too much of an outlier event. It is the kind of thing that you cannot solve with street patrolling, which is the focus of EagleView" (Patrick, 2020, personal communication).

The idea of an outlier both complements and sidelines our pattern-detecting practices. Outliers are events that escape statistical regularity, that cannot be predicted or guessed in advance because they introduce variables that are entirely new to the equation. No matter what is fed-forward, an outlier is never there because it has not been captured in advance. Outliers like this robbery are not contained neither in the past, nor in the future – they seem to only exist in the present, at the moment of their happening. As such, they become excesses in both prediction and in computation, more generally. As excesses, they seem to not get in the way of the work of the 'webs of conditioning' that make the future, because they allegedly have no precedent.

3.5 Ghostly variables

This section is *not* about outliers, but it maybe addresses a question that is pertinent for them as well: the question of computing ghostly presences. Always present, these ghosts are part of computing practices, however, the imperative of simplification, of temporarily but effectively reducing the many into the one, precludes them from appearing. Let us see the anecdote below.

vance, the latter which is "determined by elements such as proximity, market habits, interests, identity, and is driven by market elements such as sponsorship and political filters such as content management" (LOBO-GUERRERO, 2018, p.34). This information later becomes 'intelligence', market or otherwise. However, Lobo-Guerrero notes that "[t]he location these systems provide... is not unrestricted", and is shaped by access to and operation of these systems, by the kinds of control established around them, and by the platforms which operate them (LOBO-GUERRERO, op. cit., p.34). The case of map-making is relevant in its resemblance and profound entanglement with the practice of computation. Contemporary computation attaches itself so smoothly to the fabric of reality that it may raise the question of whether the terms 'representation' and 'simulation' continue to be suitable. The real-time maps we see in predictive policing systems or in apps that build on crowdsourcing quietly reinforce in us the sense that what the

This is how it works: you call the emergency number and report the occurrence to the civilian agent on the other side. They will ask you all the questions they need to create an event ID: the approximate address or point in the map where the event occurred, the type of event. Then this is transmitted to the officer in charge of dispatching, who identifies in the map the closer active garrison and dispatch it via app or radio. The whole occurrence is then managed through the local police app: changes in status, whether it is necessary to go to a police station, the occurrence report, until the incident is officially closed.

The procedure above is commonly adopted by police departments across the globe to register and respond to incidents under their jurisdiction. It is also the procedure that underpins *how* EagleView's crime/incident history data is produced. At early stages of its design, one thing was sure to those interlocutors of mine who where already familiarized with the work of the police: 'police [forces] are always complicated. They *will* discriminate'. To make the data stick to this procedure, rather than include data of events initiated by police officers, was how the team has tried to circumvent at least one of the ways in which this discrimination is produced.

Computer simulations are compelling examples of the simplification of reality. This simplification depends not only on the data that is collected, but on established data collection procedures, and the questions of *what* they want to compute and from *whose* perspective. The register of criminal incidents universalized as the procedure from our anecdote circulates across police departments conveys an attempt at simplifying 'from above' and from

map shows corresponds to the interesting things happening on the ground. It is not necessary for them to represent every detail flawlessly, only for them to be accurate and relevant – with accuracy and relevance never being defined *a priori*, but conditional to a range of different elements, like those listed above. For James C. Scott (1998), simplification is part of a process of 'narrowing' of vision that enables a sharper focus on certain aspects of an otherwise more complex reality. This narrowing is not intended to successfully represent the activity it attempts to depict, but to offer the 'slice' of it that is of interest to the observer. It is this wee see at play in pattern-detection. A pattern, by definition, what comes in a regular, intelligible form (KAUFMANN; EGBERT; LEESE, 2018). For Kaufmann, Ergbert and Leese, "this intelligibility refers to coherent interrelations between certain variables and their corresponding classification" within a data set (KAUFMANN; EGBERT; LEESE, 2018, p. 677) They note, however, that what

a particular system of knowledge first developed in the US and that would spread like wildfire across police departments worldwide. This system of knowledge ties together a sort of conservative criminology, which focus is on dissuading criminal behavior, the widespread adoption of criminal statistics by police departments, and the development of cartographic visualizations. These simulations are, therefore, always partial.

EagleView 2.0 does not escape the fate of other predictive policing systems in the market: it also makes endure a managerial tradition of policing-through-results that emerged in the US, with the neoliberalization of policing there. In their website, TechLab argues that evidence gathered from research indicate that certain kinds of crime – for example, violent crimes and crimes against property – tends to concentrate in *hotspots*, that is, in particular places and locations, and in certain periods of the day. In other words, crime is concentrated in specific neighborhoods. Using some percentages, they argue that understanding the territory is an important step in preventing crime, and reducing both fatalities and emergency response times.

It is not up to this manuscript to evaluate whether this form of policing-through-results is good or bad. I want to call the attention to the fact that what this form of policing represents is only *one* form of producing knowledge on crime and violence, a partial and situated form which origins, like the origins of our sticky infrastructures, lie in the universalization of security practices imagined and designed in/for the Global North.

What gets into the database as crime, or relevant incident, what is registered as a 'threat' (seldom, if ever, the abuse of police power, police dis-

passes as coherent, what counts as variables and how these are categorized vary depending on the software model and the programming and categorizing choices involved. "Equally, patterns vary according to the data they are based upon, as well as the analytical approaches applied to data collection and pattern identification". We know from the literature on security that pattern identification accompanies the advance of algorithms and big data analytics in security practices (BELLANOVA; GOEDE, 2020; PERON; ALVAREZ, 2019; ARADAU; BLANKE, 2018; AMOORE, 2017; WILCOX, 2016). Patterns are how an algorithm can 'know' that something is a threat, insecurity or crime (KAUFMANN; EGBERT; LEESE, 2018) or, conversely, find what security analysts refer to as 'needles in the haystack' – the deviations or anomalies that potentially indicate a security threat (ARADAU; BLANKE, 2017, p.373). The literature considers that security practices based on big data and predictive analysis are oriented towards the fu-

crimination and the like), and what is actually responded depend on the priorities established by the commanders of police forces. The practical implications are, of course, to have what my interlocutors at TechLab were well aware of: a system that can only act upon a limited universe of data, in which priority is defined based on the needs of the customers. Likewise, what counts as efficiency has little to do with providing the right conditions (income and social equality, economic stability, access to public services, etc.) for people not to engage in criminal behavior, but, generally, the ability of police forces to respond to these incidents with the resources available to them.

More recently, the trope of the *smart* became an integral part of the thrust towards prediction. Be it in the form of the 'smart' city or 'smart policing', *smartness* directs us to the introduction of digital technologies to security practices. EagleView 2.0 itself is part of TechLab's 'Smart and Secure City' area, which focus is on help cities to design solutions to improve public security and justice, including by building data visualization platforms, new applications and hardware, such as body cameras. The general belief is that these new technologies can improve the oversight and accountability of police and increase security in regions affected by crime and general mistrust in these institutions.

Notably, emerging economies present unique possibilities for these 'smart technologies.' This view is communicated in the excerpt below, retrieved from an opinion piece written for the World Economic Forum:

> ture (ARADAU; BLANKE, 2017), towards the governing of unknowns (AMOORE, 2017; AMOORE, 2011), and mobilized by a "complex amalgam of human and machine elements" (AMOORE, 2017, p.7). This literature has demonstrated concern with the materialization of technocratic, rationalist and transparent forms of governing security at distance. This mode of government, it is argued, promises security through anticipation of the 'next terrorist attack' or apprehending potential criminals before they can act (ARADAU; BLANKE, 2017, p.374). Amoore and Raley (2016, p.6) suggest that, in this case, the representation of data as real-time imagines "a horizon of security in which the detection of new events can reject traditional statistical risk criteria and embrace emergent futures". Here, it is machine learning algorithms who have the say in what or whom should surface for the attention of security analysts, establish patterns of good and bad, as well as new thresholds of normality and abnormality, against which actions are modelled (AMOORE, 2020), subordinating the world to

> [I]n low-income cities, policing is often less reliable. The rich pay private security companies, while the poor pay local self-defense groups and even street gangs for protection in informal settlements. New approaches that use technology to provide physical safety would likely be readily adopted, and easily transferred. There is already an explosion of so-called 'civitech' in crime-affected cities of the global south. Because they are low-cost, secure and easy to deploy, many solutions... have real potential in both upper and lower-income cities. (MUGGAH; AGGARWALA; HILL, 2018, n/p).

But despite EagleView's 2.0 predictive policing being heavily inspired by the version developed in the North, it would be foolish and reductive to say that it is the same system replicating elsewhere like a virus. There are subtle, yet important differences. Its designers were concerned with making something that could be replicated across all this heterogeneity. When you look at the app's two initial test sites, you can easily think that you are dealing with a Global North and a Global South contexts, when both are in fact in the 'South'.

The task of simplifying these contexts computationally involves (trying to) reduce the many into a 'one', so it can be properly computed.

The question of *whose* perspective is evidently not a prerogative of systems developed to improve the efficiency of policing. Systems of knowledge like those communicated via the smart city/result-oriented policing above exist everywhere, sometimes resembling each other, sometimes differing completely.

its "impersonal logic and to the reign of calculability and instrumental rationality" (WILCOX, 2016, p.16). But do patterns offer us something like a 'slice' of reality, something that we can cut apart from the whole, as if it was the slice of a birthday cake? Predictably, they do not. To accept this is to accept the existence of a reality entirely independent of our own practices of knowing. Pattern identification emerges from successive negotiations about what counts as reality. In predictive policing, patterns "serve as a base for the extrapolation of possible criminal futures and to render those futures actionable for prevention programmes" (KAUFMANN; EGBERT; LEESE, 2018, p.674). They indicate that perhaps the 'narrowing' of our attention and concerns on technocracy, rationalism, transparency and governance at distance misses an important point: that apps, like "security/military matters are... working through an organic within, not that of a tree but that of affective capitalism. And just as the power, their

These systems are systematically part in every attempt at computing, which is, recognizably, always *from* somewhere, always *from* some perspective and always embedded in some infrastructure, whether it is policing, the architecture of the Web, or something else.

If we shift our attention towards any of the other two apps, we will see similar operations at play. Notably, however, here is where simplification becomes misleading, for no matter how much it attempts to subsume difference, it may end up engendering multiplicity. Let us first look to this anecdote from UN SanctionsApp:

"[Sanctions] databases are UN-centric. EU-centric. US-centric." Biersteker tells me as we talk through Skype. He answers to my question about how he saw the "Global South" in the context of the app. I was in Geneva at that time, but the Covid-19 restrictions in place were just starting to be lifted. "The target does not differentiate between senders, they look at sanctions." Posing questions from the perspective of the targets of sanctions, he acknowledges throughout the chat, is a blind spot in the field.

In fact, that day, Biersteker guided my through two different problematics involving the Global South. The first is the one I tell in the anecdote, namely, the problematic of the 'blind spot' where the literature (and therefore the app's team, and the app itself) reproduces the 'standpoint' of the senders of sanctions. This is to say, the app has been designed and developed with reference to the practices of these senders, not the other way around. "That question itself – effectiveness of sanctions – is a sender's question, not a target's

spread (therefore) becomes 'sticky'" (LEANDER, 2019a, p.322-323). It is not that the technical, strategic calculation plays no role in it. It is rather, that simplification goes beyond narrowing our vision and that involves, following Leander (2019a), an effective play with our senses. Patterns, alongside the meanings and interpretations we extract from them, affect our perceptions about violence, how widespread it is and what part of it deserves our attention. In predictive policing, they are the pre-conditions for action and also what pre-structure police work (KAUFMANN; EGBERT; LEESE, 2018). They also keep us enrolled in their own (re)production: crime data needs the individual citizen report, gunshots need the local dweller's, and the same is true of data on sanctions regimes, which requires the engagement of experts (in the field or abroad) to stay up-to-date. Ansorge (2016) uses the term "technics of politics" to refer to the power of technological devices and their use

question" he explains, reflecting that this first problematic could be related to the difficulties in doing this kind of research empirically – getting access to relevant actors, places and data, for example.

"I would of course accept the criticism that the app is oriented toward information that is usable by those who are designing sanctions rather than from the bottom-up, so it is not like the app on shootings in Rio" (BIESTEKER, 2021, personal interview). The 'app on shootings in Rio' that Biersteker refers to is Fogo Cruzado. While he knows that Fogo Cruzado is another app that I had been studying, the fact is that he had been familiar with the initiative since at least 2017, when both he and Olliveira presented their apps in the Tech4Peace event organized by Swissnex.

The second problematic – the problematic of data collection itself – has, in the words I have in my fieldnotes, "a sort of a nature of a mining of information" (BIERSTEKER, 2021, personal interview). He says that probably with two of the app's data sources in mind: ICG reports and reports by the panel of experts, both which are field-based, that go on 'missions' (and, in his answer, he ponders about the coloniality of this arrangement) and meet with conflict parties and the civilian population.

The 'mining' to which Biersteker refers is possibly the 'extraction' of data and information from the contexts of the targets of sanctions. His remarks take us back to an economy of knowledge that was never actually gone, but that has maybe acquired new contours with digitality: the division between producers

in governing populations by knowing and seeing. Through a series of objects like towers, archives and databases, he argues that to simplify – to produce data – is historically a condition (for the sovereign) to govern. In his account, governance would be an outcome of both knowledge and sight. Let us add a third ingredient to his formula: sticky monsters. These are rarely recognized as such. We barely realize how intimately they are embedded in our governance practices they are. Their proficiency in negotiating otherwise contradictory differences is to account for their success. Their silent, almost banal work of negotiating differences being, is where the magic of simplification lies.

Simplification and the 'magic' of computation

As argued in chapter 2, prevailing accounts of governance in IR tend to lay emphasis on intentional action from a 'holder' of authority, rather than on governing processes themselves. I have then suggested that in looking at 'governance' as something far more nuanced, multiple and politically problematic (and perhaps not readily 'international,' according

and objects of knowledge, manufacture and raw material, a division which the introduction to the app of a map showing the sanctions regimes implemented by the UN since the 1990s may give a more blunt visual (see figure 3.3). Biersteker described the map as 'almost pedagogical', exactly in the sense that it would allow one to more easily raise the question of why it is always Africa that is targeted by UN Sanctions. "If you want to stay off of the sanctions list, get a partner" (BIERSTEKER, 2021, personal interview). Alliances with countries from the P5 list, especially the US, China and Russia, may be determinant to keep a country off the UN sanctions list.

If we take the mining analogy to the heart, in the division operated through sanctions databases, the 'South' is the object to be known, the raw material, the 'place' where missions from different sorts of research, non-governmental, and governmental groups go, while those who get to 'know' it work from afar, from their offices in New York. But notably it would be a mistake to accept that the role of the 'South' is purely the role of the passive object. As I discuss in chapter 4, as constitutive components of these databases, the contexts and particularities of the 'South' are always already inflected in the work of the UN SanctionsApp. Their presence changes and reorients effectiveness evaluations, decisions which define what is a case and what is an episode, and, more recently, have even prompted new partnerships with actors in the humanitarian sector (BIERSTEKER, 2021, personal interview).

to the disciplinary molds), we could make some room for the question of how artifacts arrange and are arranged (AMICELLE; ARADAU; JEANDESBOZ, 2015) in Global South security politics. That our devices are so enticing and sticky should not be self-evident. These are both important components of the magic of computation, which trick is to appear as a single, universal system of knowledge, which, imagined and designed in the so-called 'centers of power', disguise itself in what Mignolo (2012) calls 'global' design. I have previously discussed the 'how come' of this art of disguise when addressing the making of computational interfaces and some of its common components. Perhaps even more fundamentally, the work of interfaces is engendered by what the design literature calls *affordance*. The concept of affordance points to how specific properties of digital interfaces – the disposition of the menu, the forms and colors of the visualization dashboard, the way data is structured, the algorithmic arrangement of information, etc. – enable or constrain action. The concept comes from the field of psychology, where it was initially mobilized to reject the representational persp-

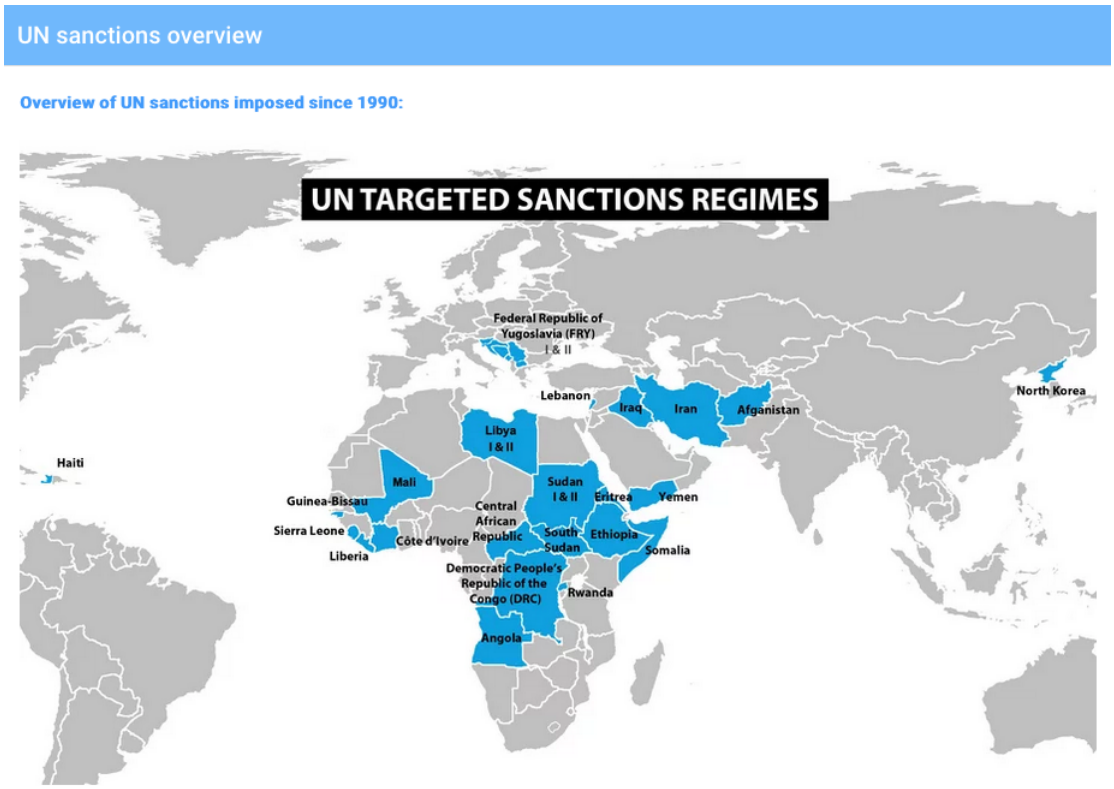


Figure 3.3: Map of sanctions regimes imposed since 1990
Source: UN SanctionsApp

Meanwhile, the app helps spreading these partial databases farther than they could ever travel, while allowing them to change more dynamically, and

ective over perception, namely, the idea that perception equals a subject, an object and a mediated representation, e.g., "a person [subject] sees a tree [object] via a representational image on the retina [mediator]" (DAVIS, 2020, p.27) – in favor of direct perception, in other words, of a dispositional relation between object and subject. But, as Latour (1994, p.29) reminds us, "no unmediated action is possible once we enter the realm of engineers and craftsmen". To acknowledge the mediation of artifacts, however, is not to openly embrace a deterministic conditioning of behavior. Rather, it is an understanding that, without a particular object in the equation, our actions could be otherwise. For example, the introduction of wheeled carts to grocery shopping enabled customers to add more goods to their grocery lists, while also dispensing with the work of clerks, previously hired to assist customers with shopping (DAVIS, 2020). Likewise, the introduction of algorithmic timelines to social media has made it difficult for us to follow the most recent activities of part of our friends, while allowing platforms to show us

to have new variables more frequently and continuously coded into them. This is possible only because it is embedded into a different power infrastructure than the UN Security Council, namely, digital infrastructures and platforms like app stores, which have come to shape what we experience as 'the Internet'. As discussed in chapter 1, these infrastructures help shape the circulation of the app and the knowledge it conveys, modulating its distribution and becoming obligatory passage points between the service provided and the user. As Biersteker noted, when I asked him why they had decided to go back on the decision to have a web app. His answer was more or less like this: 'The web app is cheaper. But people are used to download from app stores. We wanted to go back to a regular phone app, downloadable'.

We are once again faced with simplification's thrust towards unicity, or to better say it, towards hiding the many heterogeneous systems of knowledge that make the practice computation. To be clear, simplification is not about doing away with this heterogeneity in a definitive manner, it is more pointedly a form of glossing over it, of apparently flawless, but flawed simulations.

In terms of referential, Fogo Cruzado, the 'app on shootings in Rio', is perhaps the only among the three which purpose is not to directly adopt the standpoint of domestic and global power arrangements. The systems of knowledge it mimics are 'grassroots' and 'organic', to the extent that the app navigates through how people interact and communicate with each other and with the community through digital infrastructures like social media. As one

personalized content and marketing based on our assumed preferences and frequent interactions (BUCHER, 2018). Davis (2020) develops a framework for affordances based on *mechanisms* and *conditions*, where mechanisms of affordances refers to the 'how' of human-technology relations, and their conditions specify their circumstances of use. While *mechanisms* point to how technologies request, demand, encourage, discourage, refuse and allow action, *conditions* refer to the contexts in which these mechanisms operate (for example, how people perceive the functions/constraints presented by technological objects, their skills in operating them and how cultural norms and institutional regulations distinctly support engaging with a technology). Acceptance of the wheeled cart (or of algorithmic timeline) was not automatic. Women wanted shopping to feel like a break from childcare and saw the activity of a pushing cart resemble too much of a baby buggy, while men saw the act as too feminine. This resistance led to public relations campaigns to change the customers' views. Similarly, Facebook had to bring the chronological timeline back for a while (but it was not

analyst, Pamela, told me, the app's data collection methodology was modelled based on the capillarity engendered through social media – with the creation of local neighborhood groups in Facebook and WhatsApp, for example, to do its job (PAMELA, 2021, personal interview). Even so these systems of knowledge continue to be situated. Recall stories like those from Recife, where the capillarity of social networks mimicked by Fogo Cruzado does not result in collecting reports.

To digitally trace and quantify shootouts also makes a gunshot real to beyond its immediacies. From looking at the screen of your smartphone, a new layer of reality and sensory experience is produced, one that does not supplant or replace the felt and the heard, but maybe complements them. Somehow, even if temporarily, the notification that you receive seems to 'merge' with and 'become' the 'real' event. The simulation engenders reality, at the same time that it is engendered by it. This sense of reality is a composition of user engagement, data mining techniques, push notifications and digital infrastructures, distinctly from more traditional ways of counting which typically rely on extracting this information from crime (homicide, robbery) reports presented to the police. This composition also contributes to feed the sense of 'real-time' reporting that we see as data analysts work in shifts to continuously mine for keywords.

Simplification both reduces and multiplies; it engenders simulations that do not seem simulated, while enabling the proliferation of many different knowledge systems – production of sanctions expertise, policing, organic, per-

by default and needed to be manually configured at new every access to the platform). The capacity to afford is fundamental to the magic of computation, where a significant part of the work carried out by apps is concealed from our immediate perception, giving the impression that apps have a life of their own. In different ways, scholars have emphasized the usual tricks include hiding away their becoming, being in constant tension with our bodies (by augmenting them, competing with them, subsuming them or replacing them), negotiating and reconciling contradictory objects and processes, and subsuming heterogeneous knowledge systems under the dream of a unity (HUI, 2020; FINN, 2017; SHAH, 2019; GALLOWAY, 2012; CHUN, 2008). For the anthropologist Alfred Gell (1994), the technical processes underlying the making of technical objects cast over us a spell, one which makes us see the 'real' world in an enchanted form. This sense of enchantment is directly connected to a mismatch between, on the one hand, our notion of the technical process(es) behind the making of an object and, on the

sonal interactions in social media – under the label of computation. At the same time, it tries to obfuscate this multiplicity by making it appear as one. Simplification is also a necessary part of the operation of these apps. I say that it is a necessary part because, unless they could find a way to act politically while being completely detached from the kinds of power infrastructures that sustain digital media, these apps will somehow always find themselves part of this move towards (simulated) unicity. We can understand this unicity both in terms of the interfaces liaising the user to the computational work, and in therms of a mode of quantifying and translating events, things, people and life into the binary codes that computers are able to comprehend.

Ghostly variables are always somehow presences and excesses in computing practices. They are not *daemons* or hidden processes, nor are they reducible to 'hidden patterns' in data (although some of these hidden patterns may prove to be quite eerie). We get closer to *un*-ghosting them by looking at the kinds of partial and situated knowledge practices and affordances that end up making what we experience as computation: the techniques, the expertise, but also the features, algorithms, databases, icons, interfaces and the like that inhabit beyond the surface of our screens. They may be the subtle variations in armed violence that forced Fogo Cruzado to adapt its methodology and create categories that are unique to Recife, or the sanctions in Sudan that pushed UN SanctionsApp's team to revisit their criteria for categorizing cases and episo-

other hand, the actual work of the artist (or programmer). The sense of magic of digital artifacts, like the magic of an object of art, lies in its becoming, not its being; that is, it lies in the way such artifacts are made: Magic is "the negative contour of work" (GELL, 1994, p.59), where work amounts to the subjective cost of putting techniques into action and our magical attitude towards it stems from the fact that we do not exactly know how a particular object has come into being. The case of digital technologies, however, is slightly distinct from that art objects precisely because of the capacity to afford, or what Chun has referred to as 'daemon', which she defines as "a process that runs in the background without intervention by the user" (CHUN, 2008, p.319). In conveying tropes like interface economy, platform economy or surveillance capitalism, media scholars speak of the particular ways in which unseen technology daemons work to organize economic, work and social relations. These invisible processes are also what gives computation the appearance of a 'universal'. Interfaces are dynamic. They embody negotiations and interactions where digital objects establish priorities and undergo continuous change. The magic

des. They may also be the differently heteromatic computing strategies used to capture these particularities. And they may be the many processes in-between, ultimately responsible for translating events, patterns, occurrences and things into our interfaces. The reason why these ghosts are hard to capture is because, as we disentangle the apparently infinite layers and knots that make up computation, we come to realize that they have long become hard to trace, having long seemed to merge with our hyperlinks, filters, and predictions.

Some say that a translation should never call attention to itself. Because its intention is to be so 'transparent', so reflective of the original goods, that the translation itself disappears. Yet, full transparency is seldom possible. There is always an excess to translation, a subtler meaning or cosmological entity that cannot be quite captured or that changes, when being made equivalent in another language. In the end, this excess ends up changing the translated goods. Like the case of linguistic translations, contradictions between transparency/opacity, appearance/disappearance, and the always insurmountable excesses of making things equivalent to another are also part of an app's everyday work. The trick that they do involves reconciling these contradictions. Simplification cannot resolve these contradictions; but it can at least negotiate their presence and conceal them when necessary.

Once released in the 'wild', apps appear to be alive, unstoppable. They

is in how we experiment them and from how proficiently they conceal the different systems of knowledge required to make and operate technology, which is lure us into believing that what we see is what we get (SHAH, 2019; SUCHMAN, 2007). Simplicity can be misleading (LAW, 1999; STRATHERN, 1997; STRATHERN, 2004). It gives space to a form of 'easy' power, which is more palatable and easy to accept. It is 'easy' because it tends to get away with the reductive operation of the many into the one that it performs, the concealment of the 'improvisations' and knowledge practices involved in the actual making of computation, the adaptations that even the most sophisticated systems need to properly work, and the situated versions of computational forms that apps engender. Adopting this processual view allows us to understand this governance work and how this 'technodiversity' is reconciled within digital devices (HUI, 2020). When simulating insecurities, apps also end up enacting them, alongside the possible courses of action to deal with them. While we should remember that "[e]very culture machine we build to interface with the embodied world of human materiality also reconfigures that embodied space" Finn (2017, p.49), we cannot forget that this same space also ends up reconfiguring these machines.

constantly require more data, more updates, more expansion, while leaving us with their unique sense of real time, a sense that is contingent and contextual to the 'movements', either in the form of hyperlinking or crowdsourcing, that they afford. These movements simulate, or to better state it, mimic practices of reasoning and association found beyond the digital realm, entailing translations to the digital in all its materiality, translations which betray themselves in their attempts at unifying.

It is said that a magician never reveals their secrets. But the secrets of computation could not be more exposed – even when apparently protected by proprietary contracts and opaque practices. The trick is to make it look like as if it worked seamlessly, even when it obviously does not. The sense of simplicity is produced by heterogeneous components, most of them entangled (of course, to different degrees) with each other in ways that are hard to discern. It makes complete sense for Fogo Cruzado analysts to undergo the painful work of translating their platform to an entirely distinct context, where armed violence is lived and felt differently from what initially pushed it into existence. Because the infrastructure on which the app relies cannot bend by itself, it must be made bend. It is not that this infrastructure is inflexible, on the contrary: it is remarkably flexible, otherwise it would have broken already.

4
Formalism

> If the world were totally regular and homogeneous, there would be no forces, and no forms. Everything would be amorphous. But an irregular world tries to compensate for its own irregularities by fitting itself to them, and thereby takes on form.
>
> - Christopher Alexander *apud* Hui (2016, p.61).

Computation is fundamentally about doing things by means of fitting the world into pre-established sets of rules. Most of us never see these rules, never hear of them, only knowing them as they are instantiated through algorithms. Computer scientists call these rules formalisms.

Formalisms are part of roughly everything we do with computers. They are what shape how a computer, well, computes. As a computational logic, they determine how a computer is set to interpret symbols and language without even being able to understand the semantic meaning of content. Because computers are unable to understand semantic meaning, if a computer is programmed to read "0" as zero and "O" as the letter <o>, exchanging a "0" for an "O" will likely result in a mistake of, as computer scientists would say, a formal nature. Put in another way, and in more computational terms, in principle, rules need to be true in order to work. Because computation is thus rigid, in the sense of allowing no exceptions to the pre-established rules that guide it, defining linguistic filters can become tricky,especially in the case of homonyms.

My interlocutor, let's call them Nadia, begins by describing the work of a data analyst at Fogo Cruzado as 'ant' work. It is the first and only time we chat and all the conversation takes place through a videoconferencing platform. This is not simply because the talk is taking place in the middle of the Covid-19 pandemic, but also because Fogo Cruzado's data analysts already regularly resorted to this form of communication when working from home. Their routine consists of actively searching for individual gunshot reports and filtering the false reports from true ones. "Why do I call this 'ant' work?" They ask, rather rhetorically "Because we have these filters in Twitter's advanced search and then we add frequently used expressions. In Recife we use 'tiro' [gunshots], 'tiroteio' [shootout], 'baleado' [shot], and 'pipoco', because, in Recife, they also use this expression. So this was something we needed to learn by doing. We use keywords in Rio that are not suitable to Recife. Then we do the search."

I have mentioned in previous chapters that Fogo Cruzado crowdsources its data from reports to its web platform, app, social media and the press. A significant part of this collection is performed by data analysts with the help of linguistic filters on Tweetdeck. These filters allow analysts to detect people talking about armed violence occurrences in real time without needing them to proactively present a report on the app. Nadia's remarks give us some insight into the practical routine of conforming to computer formalisms. The filtering mechanism made available through Twitter/Tweetdeck scans through thousands of tweets that match the keywords fed by analysts. Not all of them however, provide the match that analysts expect.

In themselves, these filters could not care less about what the typed words mean, what are the contexts to which they are connected, or their semiotics. They mostly draw correlations: if the tweet contains words that match the key terms, then it must be true. This makes the search very effective, to the extent that it can give back a relevant percentage of accurate results in a short period of time. With time, this percentage gets fine tuned, either analogically, with analysts tuning search parameters, or automatically, with machine learning algorithms learning about which correlations work best.

The inability of computers to differentiate between meanings may equally result tin amusing misunderstandings. In figure 4.1, an user recurs to the slang 'tiro' to express their excitement with an Academy Award announcement. In this specific usage, typical from Rio de Janeiro's popular culture, the word is

Making things 'fit

I would like this chapter to give the reader an insight into how the Global South meddles into the governance work performed by computer formalisms. There are at least two different senses in which I engage with the notion of form. The first is through computer formalisms, which Hui (2016) also names 'ontologies', in plural and with lower case "o". In this definition, formalisms are what makes a digital object an object, rather than merely data, because they help unify the manifold elements of data in such a way that data become a unity. In this first sense, ontologies work as organizing principles of computation, as universalizing rules instantiated by an algorithmic reading of the world. The second sense is in terms of a framing. Here, form operates a work that is similar of that of contouring, drawing the lines over which digital politics is enacted. In both senses, form performs exactly that what the quotation that opens this chapter diagnoses: the work of compensating for the world's irregularities by making things fit and fit-

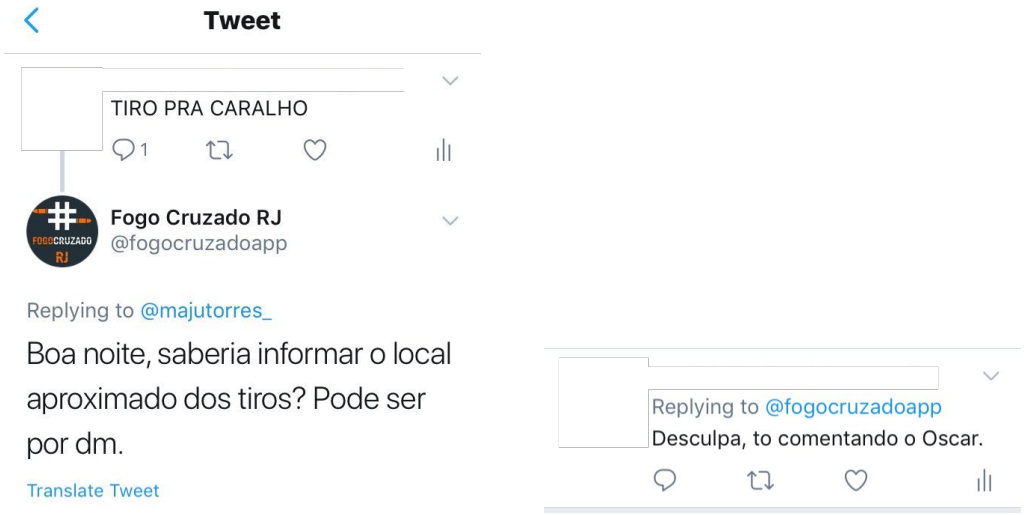


Figure 4.1: Reproduction of Twitter interaction between Fogo Cruzado's account and one user

used as part of a popular expression meant to convey how impacting a particular event is. However, as we have already seen, in Brazilian Portuguese, the word 'tiro' is also the word for 'gunshot.' (A similar ambiguity applies to Recife's slang pipoco which, in this particular usage, is equivalent to 'pop' as in an unexpected, explosive sound). In the case depicted in figure 4.1, the linguistic filters used by analysts were unable to capture such perfect homonymity, which generated the almost automatic response that users typically receive when talking about an actual occurrence.

ting itself to things. An example of the generative work performed by computational forms in security politics is discussed in Aradau and Blanke (2017; 2018), who argue that, through the creation of abstract 'feature spaces' where geometrical representations of data become available to algorithmic processing, data and their relation is abstracted out and calculated so anomalies, that is, variations or divergences in patterned data, can be 'detected' and events resulting from predictions managed. The feature spaces discussed in these authors' works evidences the role that computation and its abstractions play in the framing of insecurity, to the extent that what comes out as an 'insecurity' issue depends on the relations established through these abstract operations (the distance between two points, what data these points represent, how data is collected, etc.). Similar to Hui's emphasis that digital objects only become objects through computer ontologies, these formalisms are equally part of the process of turning into

While this event can be dismissed for its apparent harmlessness and comical outcome, it in fact leaks relevant information about how Fogo Cruzado couples with the global Internet infrastructure to trace gunshots, while working around it to accommodate the cultural systems in which it operates. An infrastructure like Twitter expects people to talk about anything and everything, so it can return them more personalized 'trend*ing*' topics (emphasis on the unstopping actualizations entailed by the suffix 'ing') . In other words, it creates incentives for users to talk about things that include their encounters with everyday violence. Fogo Cruzado piggybacks on this infrastructure to do its job, slightly working it around. The fact that this task falls in the hands of analysts, is, according to the app's creator, because they are less prone to creating unnecessary panic or noisy information than automated algorithms and their manifold yet mindless correlations.

All in all, while it indeed might suggest particular modes of framing the world (for example, through direct correlation of symbol and rule rather than meaning), the incapacity of linguistic filters to capture such nuances is not necessarily indicative of the inherent limits of computation, but more likely of how it works in collaboration with interpreters – their human counterparts – to filter what's relevant in, and what's irrelevant out. As Nadia remarked: "Filters are us."

4.1 Making the rules

It is curious, but our three apps take us back to the familiar trope of rule-based governance. Yet, the practice of it could not be stranger, because

computable units of the dots and data featured in such spaces. The whole idea of making things 'fit' the computational space is well-aligned with the architectural project of the Internet. Like the Internet, the construction of such space, depends on a number of abstract operations, among which is the separation of form from content. As Hui (2016) notes, this separation underpins the way in which machines create objects by understanding their semantic meaning through structures attributed to metadata (for example: labels) and which enables simple computational procedures, such as keyword search and filtering.

In the feature space, these operations involve techniques of filtering and sorting large amounts of data in a way not to produce good or truthful information, but actionable information. These techniques produce "normality as similarity" by calculating the 'between-ness' (the distance/space between) of the shortest path between data points, tracing

rules of decision may emerge from many processes at once: human ingenuity, algorithmic correlations, both at the same time, and the many misunderstandings in-between.

The making of rules is a fundamental to the processual understanding of governance proposed in this manuscript. Not simply because of its dynamism (computers and humans are continuously coming up with new rules of decision, meshing existing and new rules, discarding old ones, etc.), or because this form of rule emergence raises unique questions around accountability, but especially because it helps stabilizing the terms of the (in)security debate: what/who should be governed and how, what is an anomaly, and what to do about it.

Throughout my research, I could briefly accompany how these rules emerged in the three apps. In fact, the topic was not yet clear on my radar when I approached my interlocutors. It was more explicitly brought in one conversation with Thomas Biersteker. Below is an excerpt from an interview we held at his office, at the Graduate Institute, Geneva.

> The core team that works on the app has always been a fairly small group and this is interesting for purposes of coding and intercoder reliability issues. In theory, of course, if we have more people independently looking at each case, we might say we have more independence. On the other hand, I know from looking at the results of large-end projects which have ten, fifteen, twenty, even a hundred different coders, that the problem is getting inter-coder understanding of common definitions and interpretations. And so,

sequences and establishing connections between nodes. In these operations, 'deviant' points become anomalies and their 'content' becomes less relevant than the relations that can be established among them (ARADAU; BLANKE, 2017).

Form and content

Computer formalisms and computability require universal forms to which everything else must, in principle, fit, or that, conversely, are capable to adjust themselves to eventual wrinkles and account for potentially incomputable extra spaces (PARISI, 2013). Because they operate based on form, rather than content, computers are typically described as "syntactic" machines. This means that computers 'interpret' commands not from meaning, but from formal rules of logic and symbols. This separability of form and content is in tandem with the modern idea that there can be a formal, abstract universal accessible to humanity which, as Silva notes, still corresponds to a "mode of knowing...

> oftentimes, the results are biased by the lack of knowledge of the coders (BIERSTEKER, 2019, personal interview).

The problem of inter-coder reliability has little to do with machines, but much to do with computation. The coding of which Biersteker speaks is a rule-making procedure that allows for the uniformization of non-numeric data. For academic experts, this uniformization is an important step for quantifying and replicating data. It took me a while to realize that what Biersteker referred to coding was unlike coding in the sense of *programming*, or using computer language to do things – despite the fact that it is still a fundamental step for computers (humans or otherwise) to act on large datasets.

For example, coding in UN SanctionsApp is about establishing common rules of interpretation for their data. The quantitative database available for download when this manuscript was being written was divided into 64 observations (that is, sanctions regimes) and 296 variables. These variables were divided into different topics: general background (9 variables), objectives (13 variables), sanctions regimes details (9 variables), political will (16 variables), purpose and target (43 variables), norm signaling (11 variables), type of sanction (49 variables), other actors involved (32 variables), other sanctions (11 variables), other policy instruments (12 variables), implementation and enforcement (27 variables), impact assessment (12 variables), evasion/coping strategies (17 variables), unintended consequences (20 variables) and effectiveness (15 variables).

that grounds an image of the world as that which needs to be conquered (occupied, dominated, seized)" (SILVA, 2018, n/p).

Nowadays, this mode of knowing is said to have been updated, combining old and new forms of predatory extractive practices with the abstract quantification methods of computing and centering on the production, extraction and processing of data (COULDRY; MEJIAS, 2019). Here, verbs like "framed", "discovered" and "segmented" team up with "occupied", "dominated" and "seized", thus becoming relevant for both knowing and affirming power. Language, it is worth noting, provides a special case in the relationship between humans and technology because of its ontological role in constructing the world as we perceive it. As Finn notes, "all symbolic systems, all languages, contain a particular logic of possibility, a horizon of imagination that depends on the nature of representation and semantic relationships." (FINN, 2017, p.55). The separability of form from content, syntax from semantics, however, enabled expanding the horizons of effective compu-

Since the intention is to turn non-numerical into numerical data, standard coding comprehends binary yes/no answers (depicted as "1" and "0", respectively), missing or non-applicable data (depicted "-99" and "."), respectively), a 1 to 9 coding corresponding to the 9 different objectives of a sanctions regime, a 1 to 5 coding corresponding to each of the 5 permanent members of the UN Security Council, as well as temporal data (either the exact date, in the case of start and end dates, or time in months), among others, with "open field" variables allowing for non-numerical, explanatory data.

The attribution of these values to each case was done by humans. Biersteker's view acknowledges the impossibility of doing away with that. Two fundamental aspects of coding are that, one, it is about language, and, two, that, at least in principle, it dreams of providing a complete and unambiguous vocabulary about a particular dataset universe. However, as he pointedly notes, no matter the aspiration for completeness and unambiguity subjacent to coding practices, there will be always a gap in interpretation, since it is impossible to do away with interpretative judgement.

In another moment of the interview, Biersteker explained that the quantitative database was constructed from qualitative research conducted by the Targeted Sanctions Consortium around 2009-2013. To him, the granularity of the quantitative dabatase was connected to the qualitative data gathered:

> What's distinctive about our dataset, if you compare to other sanctions datasets, is not the number of cases we have, but, in fact, the number of variables we have. We have many, many more

tability by allowing for the construction of complex 'vocabularies' or rules, and the representations by means of which computers were intended to act. The emphasis on form compensates for the inability of machines to grasp the semantic meaning of content (HUI, 2016). Moreover, it also helps foregrounding the construction of computational representations: the representations that computational ontologies produce are also part of a process of translation, whereby portions of a city become color-coded hexagons or the context behind a gunshot leaving a gun chamber becomes a push notification. This is what the separability of form from content achieves. At the same time, this separability exposes a contradiction between determination and indetermination, whereby computational processes are both molded and sped-up regardless of the 'singularity of matters,' while also, through the rigid rules with which they replace situational discourses and contexts, they further constitute "various forms of life" (HUI, 2016, p.61).

> qualitative, fine grained details about each case, and these variables can be combined in different ways. (BIERSTEKER, 2019, personal interview).

These fine grained details are not only relevant academically: they give substance to the narratives built around sanctions cases in the app, help reconfiguring – most of the time, sustaining – sticky representations of the places targeted by the sanctions, in addition to informing the evaluations around each regime's effectiveness. What we have is a scenario where rules of decision emerge from a unique combination of computational formalisms, namely, the filtering mechanisms, which draw directly from the quantitative database that grounds the hyperlinked architecture of the app; and expert – be it those behind UN SanctionsApp or the experts that will be using it – arranging and interpretation of this data.

Both this case and Fogo Cruzado's anecdote opening the chapter show that this pre-definition of common vocabularies, including via associative rules between language and symbols, is a fundamental aspect of computation. They leave us with a unique system of knowledge with fairly universal ambitions, but which is much more situated than it may seem.

The pre-definition of common vocabularies and the associations established between language and symbols pave the way for the emergence of tacit, explicit and even automated rules of decision. An example of an explicit rule of decision may be a sanction regime that is deemed ineffective because it did

Universal rules

It is a widely accepted axiom that rules harbor the idea of exceptions. Legal rules are designed always in a sort of elastic and provisional manner, in such a way that they can be adjusted to the possibility of unforeseen or yet-to-be-realized particulars. Computer formalisms and their algorithms are none of the sorts. As the conventional tale on cybernetics goes, these are rules that harbor no exceptions. It is a kind of rule that, in the words of Daston, "is so certain of its universality, so confident in its foresight, that its enforcement excludes the possibility of adjustment to particular cases." (DASTON, 2019, n/p). Such ideal of rigid rule has become especially associated to the working of bureaucracies and machines. Think of how difficult it is to fill tax forms and how, many times, these forms fail to conform to us (or we fail to conform to them). Oftentimes, we find hard to fit our particular cases in the categories they list. Whether it is our gender identities or a particular expense, these forms require that particulars either already fit their pre-establi-

not contribute to coerce change in the target's behavior. This conclusion is reached by combining both UN SanctionsApp's databases with the coding scheme devised to interpret them. In the evaluation of a sanctions regime, the value 2 is attributed to when the sanctions regime contributes to change the behavior of the target; 1 is attributed when there is no contribution, and 0 when the contribution is negative (namely, it may have made the target even more recalcitrant). Both the criteria and the decision concerning what value to attribute to the effectiveness of the sanction regime were established and reviewed by app creators and coded in the app's database codebook.

Similar rules of decision also emerge in the everyday work of Fogo Cruzado's data analysts. The decision to include the word 'pipoco' in the keywords list emerged when they realized how people resorted to different vocabularies to speak about armed violence. Another example is the inclusion of the term 'former inmate.' According to the public documentation of the app's API, the inclusion of this category and the fact that it only applies to data from Recife have to do with both with its widespread usage by the local press and with the recurrent occurrence of shootouts inside prisons there. These rules are far more tacit to the extent that it comes with the everyday usage of certain linguistic expressions.

In all the examples above, the rules emerge from human, rather than automated, decision-making, even if they are assisted by social media or other kinds of filters. It is analysts, developers and creators who decide how data will be coded, which category will be counted and which expressions will be

shed categories or disappear – "square pegs that won't fit into round holes don't exist anymore" (DASTON, 2019, n/p). This is the first characteristic of 'mechanical' rules, of which algorithms are only the latest iterations.

The early history of computation, back when computing was mostly performed by women, show that these rules were pursued and designed as attempts to circumscribe and preclude judgement (ABBATE, 2012; CERUZZI, 2000). For this reason, their approximation with algorithmic calculations is pejoratively associated with adjectives such as slavish and routinized – despite the unwavering concentration that the act of calculation actually requires from human computers (DASTON, 2018). Yet, these rules also embody an ideal of order, being envisaged as procedures for taming chaos and, to a certain extent, quite proficiently harboring an "imperial vision of a rule so perfect in its foresight, of a world so orderly in its undeviating predictability, that no intelligence, no ingenuity is needed to fit the universal rule to the particular case" (DASTON, 2019, n/p).

filtered in/out, not alone, but in conjunction with the many affordances an app assembles. In the following sections, I will expand on how app makers work to creatively adapt, combine and re-combine the available computational methods to the realities they encounter 'on the ground'. Before that, however, I still owe the reader a few words on the question of what happens when the rules I have been talking above start to emerge 'automatically'.

4.2 Automating the rules

Automation is a tricky word. It is, of course, not new. For a while, it has been used to refer to the diminishing human intervention on a number of tasks, technologies and systems. In its place, predetermined (and predetermining) decision criteria, sub-process relationships and actions are embodied into our machines. To a certain degree, it would not be absurd to say that I have been speaking of automation all along: parts of our decision-making processes are shared and embodied by our apps. It is the case of Fogo Cruzado's crowdsourcing that is later used to inform users about ongoing incidents, and also of UN SanctionsApp's mimicking of analogical reasoning, linking the app's up-to-date narratives about latest developments in those places targeted by UN sanctions, facts, charts, statistics and evaluations surrounding their effectiveness.

But in these two cases, no rule of decision emerges independently from human intervention. Even if we delegate part of the decision-making process to machines (for example, through filtering mechanisms), decision-making criteria – e.g., the choice about going or not going some place, or the criteria for evalu-

Computationalism

Computation is moved by its own universalist aspirations. In its early days, programming languages were usually tied to a particular system, machine or computer laboratory, and changed alongside the machine, its operational system or the laboratory in question. Their 'disembodiment' and the move towards more universal programming languages, tied not to a particular machine anymore, but existing as free-standing notations, was only possible as machines and their manufactures multiplied (NOFRE; PRIEST; ALBERTS, 2014). At the same time, programming languages moved from their early, more mathematical manifestations, towards the contemporary *mélange* of symbols and numbers, with the aid of formal linguistics, to which the study of pure forms can be separated from their use, context, and social meaning (GOLUMBIA, 2009). This required

ating how effective a particular sanction is – are mainly established by app-makers, experts, users, diplomats, and the like. With EagleView 2.0 things are slightly different.

A day-long workshop is held to discuss EagleView's design, and the length of my notes on that occasion would cost me a new notebook. The workshop gathered together people who would be or have been involved with the project, to discuss long-term planning, ethics, accountability, and the technicalities of programming of the predictive algorithm, a topic which would extend during the whole afternoon. Close to the end, the discussion becomes about whether or not they could further automate the algorithm's modelling. Benjamin was concerned with how this affected accountability, thinking that further automation could compromise the transparency of the process. The consultant, let us call him Diego, stood for its cost and time-efficiency: 'Preparing and modelling data takes time. In this system, it becomes a line of code.'

As Diego's intervention shows, automation tends to work as a close synonym of efficiency. It saves time, saves money, and saves labor force (in the case of complex activities such as aviation, it even makes it more secure). Moreover, it does not have the same faults we, humans, do. Its own faults are only marginal compared with its benefits – and they are also probably our fault.

The 'automatic' emergence of rules of decisions is characteristic of machi-

regarding complex systems and events (like language, living beings, social life, nature, etc.) as computable or at least imbued with computational features, an operation which Golumbia (2009) defines as "computationalism." Thanks to the pre-established set of rules binding computation to a given set of commands and outputs, computers supposedly give us fairly predictable operations. This is an island of certainty in the ocean of contemporary paradigms of uncertainty. In these wild dreams, computation becomes a wannabe universal basis for problem-solving, promising a unified system of knowledge and understanding against rampant imprecision and ambiguity.

In its more humble, everyday reality, computation may be closer to an 'obligatory passage point' for most governing efforts (CALLON, 1984) than to a unified attempt at making sense of the world. The passage point forces convergence, a pacification of the sorts, mediating security politics here and there, local and global. It does not offer such univer-

ne learning systems that seek to improve the cost-efficiency of human activities. As Diego noted in an interview held a few months after that meeting: "[m]achine learning means that we are making statistical modeling of a particular process so we can deliver predictions about what's happening in the future. The computer simply precludes humans from creating these rules [of decision]." (DIEGO, 2019, personal interview).

In these systems, it is the associations established by algorithms that indicate what is included and what is filtered out. Granted, in most cases where machine learning is involved, these rules emerge not in an automatic, but rather in a "heteromatic" fashion: they require humans to set and calibrate the parameters according to which these rules will emerge. This is supervised machine learning. In supervised ML, the counterweight to the arbitrariness of automation comes with the programmer, who is supposed to balance emerging rules of decision. The strings placed on an app like EagleView 2.0, full of little and big automations, while allowing it to strive for further automation, sometimes make it unwise to do it in a way that it becomes too excessive, unsupervised even.

In the anecdote below, we have Olliveira reacting to my question about whether there were plans to automate the work of Fogo Cruzado:

I am having a double interview with Cecilia and Bel in a Starbucks cafe in Cinelândia, Rio de Janeiro. I had met Bel in late 2018 for an improvised in-

sality, this promise always already hampered by the need to halt before keeping moving, to stop and negotiate what and how will get computed, by what or who, and to define how many will take part in these assemblage. Still, this halting allows for the 'problem space' of computation to stretch without necessarily expanding the available finite computational solutions, (FINN, 2017). In more practical terms, and to invoke an image that may be recurrent in this thesis, computation spreads its tentacles towards many different directions at once, but unable to grab a hold of everything, gives some room to struggle.

Rituals of (in)determination

Anthropologists have tended to pay attention to rituals as instruments of creation and maintenance of a certain order. Rituals may be defined as "distinct performative practices" that generate "tacit connections between thinking and acting for its participants" (MäLKSOO, 2021, p.59). They are more than mere symbolic acts, having concrete performative effects. Mälksoo (2021)

terview at PUC's campus, when she gave me a perspective of her work with Fogo Cruzado. After laying out the interview's basics – disclaimer, brief presentation of the research, permission to record – I ask to be told the story of the app, this time, from the standpoint of its creator. Between answers, both check their phones for incoming reports waiting to be verified. "We don't use any kind of [machine learning] algorithm" Olliveira notes, mirroring Bel's response to the same question in our first encounter. "Our work, despite having this extremely technological aspect, is very manual, because we really must have people there all the time waiting for the notification to arrive in order to check the information. And since it is extremely sensitive information, it is very complicated for you to automate the process. You can really create panic, it can create many problems. So we prioritize human work. There is no way for it to be 100% automated." (COUTO; OLLIVEIRA, 2019, personal interview).

The trouble that Cecilia's response leaves hanging in the air is that you do not know exactly how a machine arrives at a particular decision and this may be hard to scrutinize, even internally. You can more of less have a clue, perhaps by knowing the methods used for prediction (to the extent that proprietary agreements allow), or which data sets are used. These are all somehow heteromatic pre-determinations. But the pre-determinations emerging through the work of the machine would remain somehow hazy.

> My job was to clean [the data]. Many times, we went to the map to try to find the *actual* place, you know? In the app we cannot make this sort of change, the data was always cleaned in a different spre-

notes that, like speech acts, rituals constitute the very objects they pay respect to. Likewise, authors like Chun (2008) and Finn (2017) have shown how computational rituals – such as creating programming languages, programming in these languages, preparing data to be interpretable by computers, and even using computers - may end up constructing computation as sacred and bewitching. These same rituals also produce the conditions under which computation becomes a desirable means of governance, notably, its predictability and rule-boundedness. The rule-bound character of computation means that most of the outcomes of process are always already foreseeable, within a predictable range of possibilities. You give an order to the machine, it does not – it cannot – deviate from it. If the technical conditions are met (e.g., no errors of formal nature), it will execute the command to perfection. In practice, however, this 'ideal of perfect order' is imbued with con-

> adsheet that was not that of the website. It was a spreadsheet that was shared with the team. We copy-paste the system lines and complete them. Then there is a space for corrections. When we did the statistics, we did not use the information that was automatically generated [through the app], but rather the corrected ones that had already underwent revision. When we compared the data, they were not the same, did not correspond. Sometimes, the same address had different locations in the 'automatic' part (CRIS, 2019, personal Interview).

Every time I asked about 'algorithms' to the people of Fogo Cruzado, I would receive quite similar answers. No automation, because automation is too problematic; it can create panic; the data which Fogo Cruzando handles makes it impossible to automate the job. The quote above, however, suggests that Fogo Cruzado *does* 'automate' some of its functions with algorithms – just not the sorts we usually think about when speaking the word.

Hazy machinic pre-determinations were more evident with EagleView 2.0, but they were seen as less troubling by some. During the time I was doing my research on this app, the team discussed the use of different datasets for predictions, most of which are old acquaintances of place-based predictions: data on occurrences reported to the official hotline, socioeconomic indicators, patrols' and garrisons' location data, in addition to data from sensors, such as

tradiction. Whereas algorithms indeed belong in a complex history of mechanical rules and their quest for rationality and order, as Daston (2019) pointedly notes, this history is marked by a tension between, on the one hand, the idea of the algorithms as a rigid, effective and unambiguous procedure, devised to produce an answer to a problem in a predictable length of time, and, on the other hand, its function a a perpetual computational process (FINN, 2017). Said otherwise, this is a tension between an algorithm's determinate character, namely, its existence as a finite process dependent on a pre-defined vocabulary or set of rules, and its indetermination, or the potential for novelty that emerges from within its operation (PARISI, 2013).

Algorithmic processes (machinic or otherwise) are somewhat ritualistic. Or, more precisely, they take part in strategies of ritualization. This implies that algorithms do more than merely automatically reproduce and replicate commands, since they, quite effectively, participate in the "construction of a limited and limiting power relationship" (BELL, 2009, p.8). Strategies of ritualization organize our movements around spa-

cameras, gunshot detectors, among others. Depending on the dataset chosen, the data should be curated and debiased according to the app's ethical standards – although those more skeptical about the limitations of project to different degrees were very aware that to 'debiase' persistently discriminatory policing practices was probably an oxymoron.

The more optimistic thought that machine learning systems could be less black-boxed than what is typically assumed, and could help scrutinize police work – especially in those places where this work feels highly arbitrary, violent and discriminatory. In these settings, they would argue, individual decision-making could be more inscrutable than a well-documented system and its clearly established procedures. Under these lenses, the project could become a uniform, structured and accountable model of decision-making: '[Y]ou never know what logic an officer adopted to make his own prediction... before [EagleView's pilot], each [police] battalion decided in a specific way, according to the commander or sub-commander's style' (BENJAMIN, 2019, personal interview).

4.2.1
An Interlude on perfect forms

In predictive policing, defining the space of calculation is a practical imperative on which the quality of the prediction depends. This interlude is a superficial dive into the making of this space.

ce, help us experience as real the constructed features of an environment, and with this, end up reproducing "the symbolic authority at stake in the categorisations on which ritual draws" (COULDRY, 2005, p.29). Catherine Bell, the one responsible for the term 'ritualization' used in this manuscript, notes that the power relationships inflected with ritualization are relationships not of absolute control, but that simultaneously involve "consent and resistance, misunderstanding and appropriation" (BELL, 2009, p.8). This understanding of ritualization enables us to see rituals as both practice and process, as not merely reproduction, but as ambivalently comprising a potential for both ordering and disordering (AALBERTS et al., 2020). The repetitive and meaningful practices surrounding ritual practice do more than to affirm a given state of affairs and (re)produce power: they reconfigure them, sometimes beyond our immediate perception.

Apps oftentimes work in tandem with, and perhaps *as*, strategies of ritualization in the molds portrayed by Couldry (2005). First, with the help of embedded GPS sensors and real-time location services, they or-

The most basic feature of predictive systems is to have crime forecasts represented as geometrical forms on a map: circles, squares, hexagons, triangles, grids, etc., are used to segment and create spaces for calculation. EagleView, like many other predictive policing systems, at some point has possibly made use of Kernel Density Estimations (KDE) to generate predictions. KDE functions generate risk surfaces based on past concentration of crime and its calculations, like the calculations performed by other modelling techniques, can be directly affected by the forms employed to represent and segment this extra space of computation. This function requires the creation of bi-dimensional grid-surfaces over the areas where incidents have been reported and this segmentation serves to measure the distance between the central point in each grid cell and reported criminal incidents within that cell, a process that is then weighted through a mathematical function called 'kernel.'

In EagleView 2.0, the KDE function could define where a grid would be generated, in order to avoid generating grids to areas where there is no concentration of crime incidents. The work of KDE would then be to 'filter out' these areas and define where predictive cells will be generated.

Crime predictions and hotspots are generally produced as geometrical forms on a map. When I say produced, I mean both calculated and represented. Very basic predictive techniques, such as KDE or Self-Exciting Point Processes (SEPP) divide the space of calculation into grids, which are nothing but side-by-side squares. Sometimes, events are depicted as small circles, sometimes as amorphous spots, where different color codes or color hues may correspond to

ganize our movements in space. We learn to make decisions based on what live maps tell us, for example, about traffic conditions, the conditions of the weather, criminal activities or urban violence. Second, they help make us feel as if the constructed features of these environments were very real. This is the case of the sense that things are happening 'in real' time when they are not (CHUN, 2008), the very idea that an anomaly exists and should warrant attention (ARADAU; BLANKE, 2018), and even the unique sense of space produced through dashboards made of complex maps with many 'multiples': cells, pixels, icons and units and "their arrangements into sets, arrays, grids" (GALLOWAY, 2021, p.4). And, third, they contribute to reproduce the authority of computational rituals by making themselves obligatory passage points for governing. You may not need an app to know the route from A to B because you are already quite familiar with it, but you may end up using it anyway (you know, to check the traffic conditions).

a different risk gradation or indicate distinct degrees of event concentration (e.g.: red can suggest more concentration, while green indicates more sparsity; or darkest shades of purple can indicate more concentration in contrast to lighter shades). Most times, color codes are combined with other geometrical forms. The previously public version of EagleView color-coded squares, where the color gray indicated that no predictive calculation was made for that particular place. This is possibly because the data for performing prediction was either insufficient, inadequate or nonexistent.

Squares and other geometrical forms help delimit spaces of calculation. In KDE functions, this depends on segmenting the space to calculate the radius between the center of a grid cell. But whereas the radius is a property best fit to circular shapes, circles are not commonly the best option to communicate prediction, one reason being that generating predictions within circles may likely lead them to superpose each other, which creates a problem of overprocessing. Thus, the square shapes of EagleView's first version.

But since the radius corresponds to the distance between the center and the edge of a curve, resorting to squares may leave designers with the problem of losing space for calculation. EagleView 2.0 designers tried to circumvent this problem by moving from squares to hexagons. They saw as an advantage of hexagons the fact that it could cover more 'area' than triangles or squares while simultaneously getting closer to the circular form and thereby reducing the aforementioned loss. It would also have an advantage in relation to circles since it does not generate superposition or gaps between neighboring hexagons

Incomputables

Parisi (2013) calls *incomputable extra-spaces* the qualitative aspects of data that automated methods and quantification practices are often unable to grasp. She is more specifically referring to the work of computer algorithms, especially those able to make inferences without too much human supervision. Algorithms used to 'predict' by making inferences from large datasets, algorithms used to 'make suggestions', subtle, never in a command-like tone, but rather in that tone that convinces us that the decision was ours to start (CHUN, 2008). Her incomputable extra-spaces are the tiny but meaningful contextual and other aspects, nuances and subtleties left untold in and by data, but that still make a difference in computation. They exist in the cracks and excesses of data, in interference and contingency, and may incur into errors, crashes and malfunctioning. At the same time, they push computation towards incorporating the

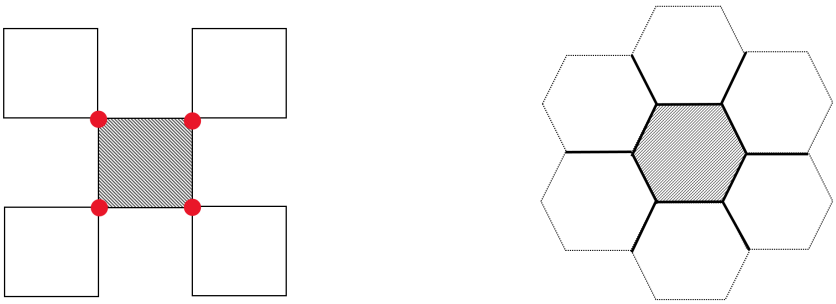


Figure 4.2: Variation in contact surfaces in squares and hexagons.

and allow for a vaster contact surface between neighboring cells (which allows understanding how a “neighbors” affect each other). Figure 4.2 highlights these differences. Calculation space appears hatched in the center of each image, while contact surfaces are represented as red circles and bold lines, respectively.

Besides its mathematical advantage in relation to other geometrical forms – they capture space better and can help generate more accurate predictions –, hexagons have an aesthetic appeal: they ‘fit’ perfectly together, forming a sort of honeycomb, which are regarded as masterpieces of engineering, to the extent that their hexagonal building blocks are most ‘cost-effective’, therefore enabling bees to ‘save’ wax. But perhaps the most important political work that predictive hexagons make is to ‘fit’ themselves to the irregularities of the extra space of computation they want to compute (Fieldnotes, July 2019). Square-grid cells are said to fail to capture the irregularities of space, being

indiscernible and the indeterminate within its remits. As Galloway puts it, the problem is not that some symbols pose a threat to computability because they are hard to grasp. Rather, it is that "part of the history of computation is the history of the uncomputable being colonized by the computable" (GALLOWAY, 2021, p.3). He reminds us that attempts to embrace indeterminacy are essentially messy, chimerical even, but they are the essence of contemporary computation much more than predictable, determinate symbols. The computable and the incomputable are deeply intertwined. Hui (2019) sees the potential for indetermination as stemming from the continual recursivity of algorithmic systems. Technically speaking, in computation, recursive functions are functions that keep calling themselves until a halting state is reached – either due to having reached their goal or to having exhausted the computational resources (processing memory, for example) at their dispo-

most 'fit' for urban perimeters organized around regular street networks, or large portions of un-built environments (sea, lakes, forests, etc.) – which, not coincidentally, matches with the geospatial organization of many of the U.S cities (Chicago, Los Angeles, New York) where early predictive policing was initially developed.

4.3
Inflecting the rules, phagocyting incomputables

Pre-determined or not, rules of decision emerge amidst insurmountable heterogeneity. Their trick is to make it look like as if there is none – to, in the most Actor-Network Theory-like way, complicate and stabilize, to make it look like as if there was one single system of knowledge and interpretation able to phagocyte all the rest. In human biology, our white blood cells phagocyte – that is, they 'eat' foreign bodies invading our organism so that these bodies no longer pose a threat to us. In computation, to phagocyte would be the equivalent to an act of framing, an attempt of computation at representing the world in its own language.

I have started the chapter with a story on how Fogo Cruzado's analysts had to adapt the vocabulary used in their filtering to the local slangs surrounding armed violence. This may sound obvious, trivial even. It is not. It is rather telling of the ways in which rules of decision get shaped and inflected with context. Allow me to further the story. I have met Cris and another data analyst who used to work for Fogo Cruzado entirely by chance, in the back of a conference room. But thanks to chance, I could interview them and learn about the contrasts left untold in my conversations with the Rio's team at that

sal. Hui, however, sees recursivity as not merely mechanical repetition, but rather as a "looping movement of returning to itself to determine itself" (HUI, 2019, p.27), whereby the magic resides in the fact that every movement is already open to contingency, carrying within it a potential for novelty. It is by means of this spiraling, repetitive movement that difference may eventually make a difference (PARISI, 2013; FINN, 2017). More practically, this could mean two things. First, and because it is virtually impossible to separate between security practices and the materials and techniques embodying them, this spiraling, repetitive movement from which indeterminacy emerges, begs us to give a careful look inwards, to have a clearer perception of how the ritualization of security politics via apps gives place to unique systems of knowledge and practice that resemble one another, but are not quite the same. Because computer formalisms are rigid yet flexible, that

stage. One of the most telling perhaps was the frictions that Recife had initially created for the app's crowdsourcing:

When Nino, Fogo Cruzado's programmer, referred to the app as a 'Waze of bullets', the underlying assumption was to have users report incidents, either to the platform, or at least in social media, so the information could be crowded into their database. But as I chatted with Cris, I would be continuously reminded that, in Recife, engagement with the platform was barely existing. "I don't expect someone from the inland to download the app and wait for something to happen once a week next to where they live." They noted, matter-of-factly. "There is certainly some adherence [to the app] when media outlets talk about it, but later it wanes." (CRIS, 2019, personal interview).

The little adherence of the user base would later prompt changes in the how the app worked. In an informal interview with Bel, in early 2021, I asked what had motivated them to change the operations from the academic NEPS to GAJOP, a civil society collective of journalists and activists. Her answer was more or less this: the change had to do with the need to be closer to local collectives. With this, the rhythm of work also changed: the academic rhythm was far slower and analytic. What Fogo Cruzado needed, in contrast, was real-time analysis and data structuring, groups that would be 'closer' to the 'reality' of the street, who would have the sense of urgency typical of civil society work, and could liaise with other collectives, and who could communicate through digital media (BEL, 2021, personal interview). These changes, it seems, would create conditions for user engagement.

is, because they are profoundly intertwined with what is incomputable, always coming up with new arrangements to capture them, they make up for excellent strategies of ritualization, efficient rituals in which indetermination keeps feeding back in the form of new and ambivalent computing strategies. Our apps tie the knot even tighter: they find ways to make computable the incomputable, even if by this they must improvise unlikely arrangements of human and machinic automatisms. As assemblages, apps make room for heterogeneity and contingency, while also creating ideological frames and arguments about reality, both in their normative ambitions and through the many components they bring together. The feeling that they leave is that any problem a computer must solve can be solved simply by following a set of pre-determined steps. Yet, as I argue in chapter 3, this feeling works to hide away from view the complicated work of putting apps together

This leaves us with an example of how the platform itself was shaped by Recife's context. In addition to shifting the outreach strategy of the app, there would also be aesthetic changes of a different nature to the platform, with icons that identified the origins of the report being taken out to prevent the risk of identifying those in Recife who reported events.

Rules of decision are equally inflected with these contexts. Even if we do not see them, contextual considerations are continuously inscribed into existing variables, calculations and judgement criteria, helping shift them towards different directions: "we have added several variables [to Fogo Cruzado's database] that Rio didn't have. I don't know whether they still use them, but for us it was fundamental to have these additional variables there" (CRIS, 2019, personal interview). The presence of the categories of 'former inmate' and 'shootouts in prisons' show that a space was carved out in the database for these more contextual variables.

The situatedness of computation is not meant to be a prerogative of the 'South', the 'rest', or whoever and whatever does not meet established standards of universality, but to reflect back on those who set these standards. Even the hyperlinked architecture of UN SanctionsApp is inflected with context, although some may find it harder to see it. I have emphasized that this architecture is assembled in such a way that it mimics the style of decision-making traditionally adopted by diplomats, drawing from a mode of decision-making that happens to be quite hierarchical and asymmetric (namely, that of the UNSC), while also diffracting it. To borrow Tourinho's words, they did not need to follow UNSC's and could have had their own terminology. Still, and as Biersteker noted during an informal interview, the story told by the app is undeniably the story of those who design and implement sanctions, not

and keeping them operational, the many steps and infrastructures required and mobilized for this purpose, and the many implicit and explicit arguments that come to inform decision-making.

There is a very interesting metaphor by Lupton (2016) on our relationship with data that I think it is worth retrieving in this manuscript. She speaks of human-data assemblages through the metaphor of 'eating' and conceptualized the human subject as 'data-ingesting' and 'data-emitting', "in an endless cycle of generating data, bringing the data into the self, generating yet more data" (LUPTON, 2016, p.4). This cycle is continuously fed by what she notes to be our companion devices: the smartphones we regularly touch, fiddle with and look at during the day. These companions and their ever expanding computational

the other way around (BIERSTEKER, 2021, personal interview). As the main raw material in this assemblage, however, these assessments provided by the app are continuously inflected with the stories of sanctions' recipients, including evaluations as to whether regime's is effective or not.

'We will have to think about our evaluation of effectiveness in policy change.' Biersteker ponders after reading the edited document for the sanctions on Sudan. The meeting is the third of a series of five I have attended in July 2020, in which the team sits together to assess each other's work surrounding the update of the app. He notes that, since the case of Sudan shifts from complete intransigence to comply with international norms towards regime change and a framework agreement with the new government, it raises the question of how they should evaluate policy change. Should it be done on the basis of 'recent developments' or on the basis of more long term developments?

These reflections were actually very quickly resolved after they were voiced. I only bring them back because they provide an interesting glimpse onto how country cases force the team to revisit the criteria they establish to evaluate a regime's effectiveness. The makers of UN SanctionsApp strive to keep cases up-to-date with information from recent UN reports and related documents from people 'in the field'. Having people 'in the field' has been typically a source of authoritativeness in the field of peace and conflict resolution, to the extent that it indicates that there is proximity – often physical/geographical, sometimes cultural – with local contexts. The design and implementation of the rules of decision of the app are shaped by the events these documents describe, alongside the work of subsuming them under

boundaries stretch the surface of computability and its accommodating of incomputables, affording new means with which to combine 'typically human', automated or reflexive, forms of reasoning with the machinic, formalist ones. We can maybe say that this accommodating of incomputables is a performance that requires semi-permeable, data-eating/emitting subjects alongside semi-permeable data-eating/emitting companions, together with their ambivalent attempts at regulating the flow of data, while leaking some of it outwards to computing cloud servers. Aalberts et al. (2020) notes, however, that to the extent that any performance, including international political order, finds itself in a continuous process of becoming, it is always already prone to being performed differently, and, hence, being disrupted or becoming itself disruptive.

a pre-established coding scheme, but the heterogeneity that comes with having so many contexts has a hard time fitting this scheme. This creates frictions and certainly moments of undecidability when it comes to categorizing events and recent developments within a particular case, , for example, by not knowing whether it should fit the case of Iraq, or the case of the ISIL, or whether the development in question would be related to sanctions or simply a matter of domestic affairs. Especially because, as app-makers know, these are contexts that are much too complex to start.

Computation, said to be so rigid, may end up becoming surprisingly flexible – flexible both in the sense of being bent to different purposes and in the sense of 'phagocyting' distinct kinds of events, irregularities, and randomness – in other words, fitting (to) them. As a consequence, in every move towards framing and making things 'fit', there will be a hard to compute yet constitutive excess, something that cannot properly adjust to the intended framing mechanism, but that nevertheless is adjusted to it. This act of eating may be as much contextual as it is powerful. It comprises computational attempts to spread while compensating for the irregularities of the world, as much as the modes with which these irregularities inflect and shape computation in different directions – the ambivalent place of algorithms as both products of global capitalism and as embodying creative and political possibilities.

5
Objectivity

> "Though both are bound in the spiral dance, I would rather be a cyborg than a goddess."
>
> - Donna Haraway, *A Cyborg Manifesto* (1991)

See the anecdote below. It follows-up from an excerpt of interview that I bring in chapter 4, where I quote Thomas Biersteker for his view on the work of coding in the UN SanctionsApp. In that interview, he stressed that the reduced size of the team helped with doing away with some of the issues caused by too much variation in interpretive judgement.

It was only after participating in UN SanctionsApp's update meeting that I would finally have a sense of what Biersteker meant with this. The meeting, held online due to the Covid-19 pandemic, consisted on having the team to discuss the content of the update for each sanction case. The three participants are delegated a fixed number of cases and must dig for news in sources as diverse as UN and ICG reports, specialized websites, and news media, about recent events since the last update. New information is added to a google docs document in track changes. The team then gathers together to deliberate about the new additions and effectiveness assessments. A consensus is needed for changes to be accepted and generally this step may end up involving many backs-and-forths, clarifications and modifications. Some cases are resolved in a matter of a few minutes, while others end up requiring more than one encounter for a consensus to be reached.

The topic of the coding of the UN SanctionsApp database emerged rather spontaneously that interview. Despite being homonyms, coding, in the sense he discusses above, is *not* the act of instructing a computer do to things that we know as programming. Rather, it is the act of establish numerical and textual proxies to data to make it more uniform, more easily quantifiable and replicable. The problem of having a large number of people doing the coding is that it makes it more difficult to arrive at common understandings and interpretations with no gaps or holes. The presence of these gaps lies in the fact that coding is fundamentally about language. And, to the extent that language is infected with our own subjectivity (our own, sometimes shared, understandings and interpretations of things, that vary from

the understandings and interpretation of other people or groups of people), it makes it impossible to do away with interpretive judgement.

I retrieve this episode because the problem that having a small team partially 'solves' is important to the pursuit of objectivity. Typically, to acknowledge something as 'objective' involves a belief that one or more undesired aspects of subjectivity, like human values and biases, can be abstracted out from a given act of knowledge production, thereby making it possible to arrive at more or less ideal forms of representation. In the case above, while reaching common understandings does not necessarily equate to obliterating subjectivity, it does suggest the making of a complicated hide-and-seek game, whereby *some* subjectivity remains concealed from view.

Here enter our apps. The work of coding (both as programming and not), along with the work of collecting data, and the work of simplifying everything through a neat interface, are more than magical. Through them, objectivity and subjectivity 'collide' and merge into one through a series of gestures, techniques, materials, processes and habits. What I will argue in the chapter is that this 'merging' makes knowledge of Global South contexts hold steady, taking part of the contingent narratives of security communicated through these interfaces.

In the UN SanctionsApp whether it is in interpreting an image or interpreting which events matter in the overall narrative, interpretation is key. The dictionary definition of interpretation gives us at least two indications of

Computational objectivity

This chapter looks into how apps tie together knowledge in/of the Global South in/security and how this knowledge becomes objective. Media scholars and philosophers of science and technology have long known that the objectivity of computation rests, among other things, in its formal rules and vocabularies and on standardized and (in principle) undeviating modes of interpreting them. The rigidity of these rules, their repetitive character and their refusal to bend to the exceptional or the unexpected has gifted them the qualifier 'mechanical' (DASTON, 2019). In Historians of Science Lorraine Daston's and Peter Gallison's widely cited book Objectivity (2010), 'mechanical' is also a qualifier to objectivity, and mechanical objectivity is one of the three approaches to objectivity they advanced, alongside 'Truth-to-nature' and 'trained judgement'. What distinguishes, but also ties together these three approaches, is that each presupposes cultivating an

what is involved in this act. First, interpretation is an explanation or an opinion on the meaning of a thing. Second, interpretation is a particular way of performing, artistically, a piece of music, art, a part in a play, etc. Either as explanation or performance, interpretation is a subjective and, at times, evaluative, intervention. The objectivity of expertise lies in its attachment to trained judgement, or a series of techniques of self- and peer-discipline intended to keep the expert's own biases and personal preferences at check. Note-taking, tying the analysis back to authoritative sources of information, collective/consensus-based deliberation, adjusting language: all of these techniques take part into the training of an expert's judgement.

In the meetings that I have attended, even editorial modifications could be subjected to collective deliberation. As I understood it, the need for a consensus served at least two purposes. First, it worked as a check on any eventual arbitrariness that could come from individual judgement: misleading or erroneous evaluations, biased or inaccurate interpretation of events, incomplete or contested conclusions and even styles of writing and grammar errors. Second, and precisely because every interpretation and subjective judgement of events is subsumed to the scrutiny of the expert's peers, collective deliberation served as validation for the expert analysis provided.

But what gets 'interpreted' by UN SanctionsApp experts? We have already seem that the app's foundations lies in both its quantitative and qualitative databases. Both arrange the TSC knowledge of UN sanctions regimes into rows and columns, provide qualitative descriptions of cases and coding schemes that make it easier for this knowledge to circulate and be ana-

aspect of the self at the expense of others: whether it is following rigid rules (mechanical objectivity), discerning patterns (trained judgement) or types/idealized universal forms (Truth-to-nature), they intend to overcome the fragility intrinsic of a subjective self which is presupposed in each performance. In this understanding, computational objectivity becomes an exercise in portraiture (DASTON; GALISON, 2010, p.381), whereby something that already *is* is re-enacted – perhaps in a more purified, perfected and smoother fashion than the original goods, but rarely, if ever, seeking to re-create the whole cloth. The common goal is to produce a representation of nature, one that needs not necessarily to be true or certain, precise or accurate. A "good enough" representation (SIQUEIRA, 2017).

In a different direction than Daston and Gallison, Manovich (2001) suggests that it is up to digital media, not exactly to scientists, to cultivate objectivity. Because interactive computer media 'externalizes' and objec-

lyzed for different purposes. The function of the app is to keep the events described in both databases up-to-date and to facilitate user access to this knowledge. It is here that expert judgement and interpretation become necessary, to make sure that the app communicates the latest developments in the cases it covers and offers reliable evaluations of how these developments affect the sanctions in place.

But while in UN SanctionsApp expert knowledge and interpretation are both desirable, arbitrariness is not. This is why it is necessary to ground every narrative, assessment and report in the facts narrated by secondary sources and documents, most of them from the UN system and from reputed expert networks specialized in monitoring international crises and conflicts. This 'web' of expertise gets thicker as it refers back to knowledge from policy experts, practitioners and people in the field. While there is room for subjectivity and expert judgement in the UN SanctionsApp, this subjectivity is 'peer reviewed'.

Databases distribute and disseminate expert knowledge on sanctions. Their structure and apparent detachment help confer an air of 'factness' to them. Perhaps more than that, the app itself is an "embodiment of expertise on UN targeted sanctions" (BIERSTEKER, 2018, p.162), an externalization of this expertise into the database. As an assemblage, the app extends and amplifies the reach of experts' research and of the team's analytical assessments of sanctions regimes, allowing these to circulate its knowledge of the 'perspective of the sender of sanctions' even farther.

tifies the operations of the mind. For example, through hyperlinking, "we are asked to follow preprogrammed, objectively existing associations" (MANOVICH, 2001, p.61). In mimicking the process of association present in human thinking, hyperlinking conducts us through these externally defined associations, which we feel as if they were ours. And slowly, through processes like this, we see computers build themselves as legitimate interlocutors with which we delegate, share, and negotiate action and decision-making. Similarly to Manovich, many in the literature see that algorithms, big data, and digital images have their parcel of 'objectivity'. What makes them objective varies: in the case of algorithms, it may be their procedurality and rigidity (DASTON, 2019), in the case of big data, their 'factness' (DAY, 2014), and in the case of digital images, the belief that a 'true' and 'neutral' image can be achieved with the help of computational processes (GATES, 2013). Computational objectivity, like scientific objectivity, is not a finished state of affairs or a goal to be achieved, but

5.1 Interpreting the database

Interpretation is a key-component of databases, not only of UN SanctionsApp's databases. In fact, databases are core to the work of probably any app ever, whether it is third-parties' databases or the app's own. Databases are core infrastructural affordances of apps of different kinds, arranging, organizing, and parsing knowledge, creating relational juxtapositions in data and making data replicable and readable by computers.

The origin story of Fogo Cruzado can be traced back to an Excel spreadsheet. I asked Olliveira about it during our chat at Starbucks cafe. She tells me that the database was created to register how often people talked about shootings in her Facebook feed and in the press. "I counted manually, like this, on a spreadsheet. Annotating whatever I could see". Some of her friends would even do the reporting in real time, perhaps from a car or bus stuck in traffic, amidst the crossfire. These numbers were not reflected in official public security statistics on gun violence (COUTO; OLLIVEIRA, 2019, personal interview).

The question of interpretive judgement, for Fogo Cruzado, would only emerge as it moved from an Excel spreadsheet to an app properly, and with the increase in the 'demand' for social media monitoring. I am not sure if this

a performance and a mode of knowing that are both situated and partial. The reason why having an intimate look at its gears matter is because of the role of computational objectivity in making security practices. While we must be careful not to misunderstand this objectivity as the opposite other of subjectivity, it is nevertheless relevant to stress that *discourses* around computational objectivity may pitch it against human subjectivity as a strategy of legitimization. In computational practice, however, both are profoundly entangled, be it in the making of an algorithm, the structuring of an app's database, or in the interpretation of its data. Computational objectivity is performed in the everyday work of coding, designing, brainstorming and updating our apps. It is enacted in both handwritten notes and notations in code, in systematic procedures established to collect and analyse data, and in the iterative operation of algorithms that automatize, sometimes with great velocity, the tasks that humans delegate to them (some which would be painfully lengthy for us alone to perform). And it is also performed through our digital maps, through the forms and crowds (of people and

question was ever 'explicit' to outsiders (or even to Fogo Cruzado's staff). Like the UN SanctionsApp, a methodology was established to consolidate the app as legitimate and authoritative – as in a sort of 'trained judgement', whereby some 'rituals' of passage would be established before the data could materialize in the database. Analysts are trained in the app's methodology, which comprises the monitoring as well as the verification of reports, and language (e.g., establishing keywords for filtering and a guideline to communicate the reports). The steps that Olliveira recounts in that conversation, once institutionalized, would also suffer important changes as the app expanded its operations.

I chat with two analysts I had just met in the back of the conference room. At that time, both worked for the Recife iteration of Fogo Cruzado. The three of us met by chance, while attending the same panel. We talk about language. Language is seen as a differential in the work of Fogo Cruzado for its attempts at avoiding the sensationalist vocabulary generally used to communicate gun violence. When posting reports on social media, the protocol was to avoid derogatory expressions that could stigmatize people and places. My interlocutors noted a problem with this 'neutral' language: it made their content repetitive, monotonous.

"If you look at our Twitter, you will see: a man was killed. Because that's the pattern in Recife – a man was killed"

data) that compose them. Like scientific objectivity, computer objectivity also requires training and daily repetition, embodied in our gestures, habits, techniques and temperament (our concentration or, at least, disposition to engage): "It is by performing certain actions over and over again – not only bodily manipulations but also spiritual exercises – that objectivity comes into being." (DASTON; GALISON, 2010, p. 52). In the Bourdieusian theory, this objectivity has two 'orders': it is first given by materials and artifacts and their distribution and, second, it takes symbolic, 'mental' forms – temperaments, judgements (BOURDIEU; WACQUANT, 1992). In Bourdieu's analysis of the symbolic power of the state, expanding control over legitimate knowledge in different areas has led state sanctioning to become a precondition for engaging in most activities. Our apps are not that powerful. At least not by themselves. But they do seek sanctioning in order to carry out their activities. Only that it is not from the state. Instead, they seek sanctioning from the commercial platforms that currently shape

"A black man was killed", the second analyst adds.

"What changes is the neighborhood, the city"

"And the time"

"They are trying to change that. Not to sensationalize, but to tell a story. To add a context. To try to escape this [neutral] approach. If you analyze the [Twitter] page, this is slowly changing. You now have the context, you add a quote from the victim's mother, you explain (CRIS; DOMINIQUE, 2019, personal interview)

Through its database, Fogo Cruzado advocates for a more evidence-based of making public security policy, one which assumes that, in giving thickness to gunshots as a statistical category and digitally produced object, a distinct understanding of security is produced – one that looks away from official discourses and towards lived, everyday insecurity. This database is currently searchable and publicly accessible through an API that enables the user to filter through keywords, quantitative and qualitative data on both the cases of Rio and Recife (Figure 5.1). The user may also request access to a larger portion of the database, not available in the filtering function due to restrictions in computing power.

Fogo Cruzado's database (Figure 5.2) has two important components. First: the categories related to each event that allow the app to specify the circumstances surrounding gun violence. In addition to information about the date and place of the event, this includes whether it occurred in the proximity

the Internet. Maybe, to say that apps seek sanctioning alone would not do. Because in having these platforms as 'obligatory passage points' (CALLON, 1984), they somehow also end up legitimating their power, both materially and symbolically. At the same time, that they materially and symbolically 'sanction' these platforms, they are 'sanctioned' by them – authorized to circulate and stay online, draw data from them, host data on them, etc. This also ends up shaping *how* we take these infrastructures to produce knowledge, alongside *what* we take as knowledge from them.

Unlike scientific objectivity, computer objectivity depends on the execution of mechanical tasks with little to no room for judgement. Maybe hesitation would be the correct word, to the extent that, when executing a repetitive task, hesitation precedes judgement. Ideally, then, computer objectivity thrives in the circumscription of the space for hesitation. But it is not always easy to see this circumscription, especially considering that computation, as a practice, is shared between humans and machines. In her discus-

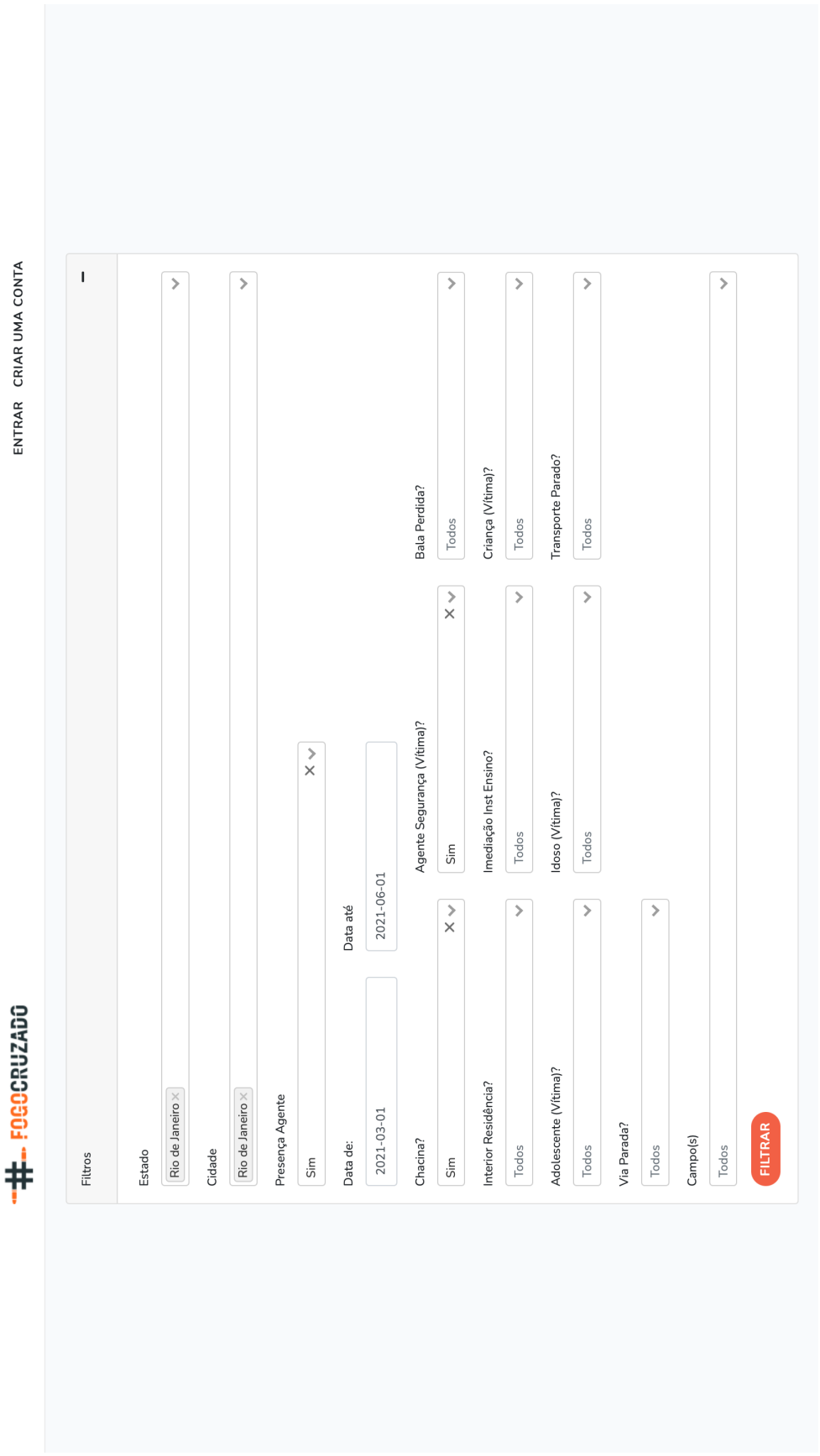


Figure 5.1: Fogo Cruzado's API (interface - public search)
Source: Fogo Cruzado

IDv1	IDv2	LOCAL	Cidade	Estado	Bairro	GEO	DATA	OPERAÇÃO/AÇÃO	MORTOS	FERIDOS	MORTOS CIVIS	MORTOS POLICIAIS	FERIDOS CIVIS	FERIDOS POLICIAIS	TITULO	TEXTO	FONTE	CAD	MODERADO	PUBLICADA
	23155	R. Carbonita - Bráz De Pina, Rio de Janeiro - RJ, 21	Rio de Janeiro	RJ	Braz De Pina	-22.8341317000, -43.2921627000	01/01/2019 00:04:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 00:06:17	Sim	Sim
	23157	Pavão-Pavãozinho, Copacabana, Rio de Janeiro - F	Rio de Janeiro	RJ	Copacabana	-22.9816912000, -43.1962577000	01/01/2019 03:00:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 06:35:11	Sim	Sim
	23158	R. Miguel Cervantes - Cachambi, Rio de Janeiro - R	Rio de Janeiro	RJ	Cachambi	-22.8920364000, -43.2679000000	01/01/2019 06:09:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 06:35:46	Sim	Sim
	23159	Senador Camará, Rio de Janeiro - RJ, Brasil	Rio de Janeiro	RJ	Senador Camará	-22.8968333000, -43.4877927000	01/01/2019 00:02:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 06:42:24	Sim	Sim
	23162	R. Mario Behring - Vila Rosário, Duque de Caxias - I	Duque de Caxias	RJ	Pantanal	-22.7412119000, -43.3125125000	01/01/2019 12:00:00	Não	2	0	0	0	0	0			Imprensa	01/01/2019 14:11:12	Sim	Sim
	23163	R. Miguel Cervantes - Cachambi, Rio de Janeiro - R	Rio de Janeiro	RJ	Cachambi	-22.8920364000, -43.2679000000	01/01/2019 10:00:00	Sim	1	0	0	0	0	0			Imprensa	01/01/2019 15:23:43	Sim	Sim
	23169	Copacabana - Copacabana, Rio de Janeiro - RJ, 22	Rio de Janeiro	RJ	Copacabana	-22.9699151000, -43.1790000000	01/01/2019 02:00:00	Não	0	0	0	0	2	0			Imprensa	01/01/2019 16:36:04	Sim	Sim
	23170	Manguerinha, Penquitos, Duque de Caxias - RJ, 23	Duque de Caxias	RJ	Penquitos	-22.7783400000, -43.3229510000	01/01/2019 19:33:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 19:44:35	Sim	Sim
	23171	Itaúna, São Gonçalo - RJ, 24474-060, Brasil	São Gonçalo	RJ	Itaúna	-22.7933688000, -43.0311911000	01/01/2019 21:00:00	Não	0	0	0	0	0	0	Tiroteio		Usuário	01/01/2019 21:28:38	Sim	Sim
	23172	Tijuca, Rio de Janeiro - RJ, Brasil	Rio de Janeiro	RJ	Tijuca	-22.9325728000, -43.2410248000	01/01/2019 20:08:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 22:16:29	Sim	Sim
	23173	São João de Meriti, RJ, Brasil	São João de Meriti	RJ	Jardim Meriti	-22.7907664000, -43.3699364000	01/01/2019 21:47:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 23:00:45	Sim	Sim
	23174	Nova Iguaçu, RJ, Brasil	Nova Iguaçu	RJ	Centro	-22.7561319000, -43.4607419000	01/01/2019 22:10:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 23:01:23	Sim	Sim
	23175	Vila Rosali, São João de Meriti - RJ, Brasil	São João de Meriti	RJ	Vila Rosali	-22.7912820000, -43.3741094000	01/01/2019 23:26:00	Não	0	0	0	0	0	0			Usuário	01/01/2019 23:33:02	Sim	Sim
	23176	Belford Roxo, RJ, Brasil	Belford Roxo	RJ	Belford Roxo	-22.7645391000, -43.3996264000	01/01/2019 23:56:00	Não	0	0	0	0	0	0			Usuário	02/01/2019 00:01:23	Sim	Sim
	23177	Morro do São João - Engenho Novo, Rio de Janeiro	Rio de Janeiro	RJ	Engenho Novo	-22.9079866000, -43.2660959000	01/01/2019 00:00:00	Sim	0	0	0	0	0	0			Imprensa	02/01/2019 06:44:53	Sim	Sim
	23178	R. Peri-Mirim - Sancho, Recife - PE, 50940-200, Bra	Recife	PE	Pernambuco	Sancho	-8.0842545000, -34.9663579000	01/01/2019 00:00:00	Não	1	0	1	0	0	Um homem foi morto a tiro	Um homem foi morto a tiro	Imprensa	02/01/2019 07:59:05	Sim	Sim
	23179	Praia do Janga - Janga, PE, Brasil	Paulista	PE	Pernambuco	Janga	-7.9508247000, -34.8267131000	01/01/2019 08:40:00	Não	1	0	0	0	1	Um adolescente foi morto a	Um adolescente foi morto a	Imprensa	02/01/2019 08:00:53	Sim	Sim
	23180	Av. Ver. Otacílio Azevedo, 723 - Vasco da Gama, Re	Recife	PE	Pernambuco	Vasco da Gama	-8.0068740000, -34.9127180000	01/01/2019 00:00:00	Não	1	0	0	0	0	Um homem foi morto a tiro	Um homem foi morto a tiro	Imprensa	02/01/2019 08:10:11	Sim	Sim
	23181	R. Maria Firmino - Camela, Ipojuca - PE, 55590-000	Ipojuca	PE	Pernambuco	Camela	-8.5149996000, -35.1259274000	01/01/2019 00:00:00	Não	1	0	0	0	0	Um homem foi morto a tiro	Um homem foi morto a tiro	Imprensa	02/01/2019 08:12:32	Sim	Sim
	23182	Centro, Igarassu - PE, Brasil	Igarassu	PE	Pernambuco	Centro	-7.8319878000, -34.9082128000	01/01/2019 00:00:00	Não	1	0	0	0	0	Um adolescente de 17 ano	Um adolescente de 17 ano	Imprensa	02/01/2019 08:16:54	Sim	Sim
	23183	R. Madrid, Paulista - PE, 53413-110, Brasil	Paulista	PE	Pernambuco		-7.9412996000, -34.8995068000	01/01/2019 00:00:00	Não	1	0	0	0	0	Um homem foi morto a tiro	Um homem foi morto a tiro	Imprensa	02/01/2019 08:20:38	Sim	Sim
	23184	R. Lemos Brito - Quintino Bocaiúva, Rio de Janeiro	Rio de Janeiro	RJ	Quintino Bocaiúva		-22.8941141000, -43.3226422000	02/01/2019 08:05:00	Não	0	0	0	0	0			Usuário	02/01/2019 10:14:13	Sim	Sim
	23185	Parque Sao Jose, Belford Roxo - RJ, 26193-090, Bra	Belford Roxo	RJ	Belford Roxo	Santa Teresa	-22.7402711000, -43.3450478000	02/01/2019 10:27:00	Não	0	0	0	0	0			Usuário	02/01/2019 10:37:57	Sim	Sim
	23186	Upp Morro do Adeus - Complexo do Alemão, Rio de	Rio de Janeiro	RJ	Complexo do Alemão		-22.8649615000, -43.2611910000	01/01/2019 00:00:00	Não	0	0	0	0	0			Usuário	02/01/2019 13:28:04	Sim	Sim
	23187	Jardim Primavera, Duque de Caxias - RJ, Brasil	Duque de Caxias	RJ	Jardim Primavera		-22.6903657000, -43.2666564000	02/01/2019 13:21:00	Não	0	0	0	0	0			Usuário	02/01/2019 13:37:02	Sim	Sim
	23188	Rua Clarimundo de Melo - Quintino Bocaiúva, Rio	Rio de Janeiro	RJ	Quintino Bocaiúva		-22.8942464000, -43.3211096000	02/01/2019 15:28:00	Não	0	0	0	0	0			Usuário	02/01/2019 15:30:46	Sim	Sim
	23189	R. Sardoal - Bonsucesso, São Gonçalo - RJ, 24467-035,	São Gonçalo	RJ	Boaçu		-22.8075170000, -43.0556899000	02/01/2019 12:30:00	Não	3	0	0	1	0			Imprensa	02/01/2019 18:27:06	Sim	Sim
	23190	Colônia, Jacarepaguá, Rio de Janeiro - RJ, Brasil	Rio de Janeiro	RJ	Jacarepaguá		-22.9347612000, -43.3933607000	02/01/2019 19:00:00	Não	0	0	0	0	0			Usuário	02/01/2019 19:54:59	Sim	Sim
	23192	Morro Jorge Turco - Colégio, Rio de Janeiro - RJ, 2	Rio de Janeiro	RJ	Colégio		-22.8386252000, -43.3445066000	02/01/2019 20:33:00	Sim	1	0	0	0	0			Imprensa	02/01/2019 22:00:52	Sim	Sim
	23193	Padre Miguel, Rio de Janeiro - RJ, Brasil	Rio de Janeiro	RJ	Padre Miguel		-22.8780979000, -43.4483194000	02/01/2019 21:10:00	Não	0	0	0	0	0			Usuário	02/01/2019 22:01:11	Sim	Sim
	23194	São Gonçalo, RJ, Brasil	São Gonçalo	RJ	Camarão		-22.8072883000, -43.0637646000	02/01/2019 21:19:00	Não	0	0	0	0	0			Usuário	02/01/2019 22:01:31	Sim	Sim
	23195	Cacuia, Nova Iguaçu - RJ, Brasil	Nova Iguaçu	RJ	Cacuia		-22.7346943000, -43.4957704000	02/01/2019 22:16:00	Não	0	0	0	0	0			Usuário	02/01/2019 22:20:32	Sim	Sim
	23197	Jardim Gramacho, Duque de Caxias - RJ, Brasil	Duque de Caxias	RJ	Vila Sarapuí		-22.7538823000, -43.2763246000	03/01/2019 00:47:00	Não	0	0	0	0	0			Usuário	03/01/2019 00:47:31	Sim	Sim
	23198	Santa Cruz, Rio de Janeiro - RJ, Brasil	Rio de Janeiro	RJ	Santa Cruz		-22.9196515000, -43.6843877000	03/01/2019 02:05:00	Não	0	0	0	0	0			Usuário	03/01/2019 05:50:48	Sim	Sim
	23199	Rio Comprido, Rio de Janeiro - RJ, Brasil	Rio de Janeiro	RJ	Rio Comprido		-22.9252336000, -43.2053404000	03/01/2019 00:45:00	Não	0	0	0	0	0			Usuário	03/01/2019 05:57:57	Sim	Sim
	23200	Tijuca, Rio de Janeiro - RJ, Brasil	Rio de Janeiro	RJ	Tijuca		-22.9325728000, -43.2410248000	03/01/2019 00:46:00	Não	0	0	0	0	0			Usuário	03/01/2019 05:58:29	Sim	Sim
	23201	Favela Rodrigues Alves - Imbariê, Duque de Caxias	Duque de Caxias	RJ	Rio Imbariê		-22.6412520000, -43.2163240000	02/01/2019 16:00:00	Sim	0	0	0	0	0			Imprensa	03/01/2019 06:19:30	Sim	Sim
	23202	Via Light, Mesquita - RJ, 26570-442, Brasil	Mesquita	RJ	Jacutinga		-22.7803951000, -43.4200661000	02/01/2019 21:00:00	Sim	0	1	0	1	0			Imprensa	03/01/2019 06:46:13	Sim	Sim
	23203	Morro do Palácio, Ingá, Niterói - RJ, 24210-286, Bra	Niterói	RJ	Ingá		-22.9062633000, -43.1282499000	01/01/2019 03:00:00	Não	1	0	0	0	0			Imprensa	03/01/2019 06:54:44	Sim	Sim
	23204	Morro Dona Marta - Botafogo, Rio de Janeiro - RJ,	Rio de Janeiro	RJ	Botafogo		-22.9478344000, -43.1940703000	03/01/2019 06:50:00	Não	0	0	0	0	0			Usuário	03/01/2019 07:42:09	Sim	Sim
	23205	Favela do Dique - Vigário Geral, Rio de Janeiro - RJ	Rio de Janeiro	RJ	Vigário Geral		-22.8018010000, -43.3185535000	03/01/2019 06:00:00	Sim	0	0	0	1	0			Polícia	03/01/2019 08:59:22	Sim	Sim
	23206	Estrada Francisco da Cruz Nunes, Largo do Batalhe	Niterói	RJ	Itaipu		-22.9081121000, -43.0645933000	02/01/2019 22:00:00	Sim	0	0	0	0	0			Imprensa	03/01/2019 09:22:59	Sim	Sim
	23207	Leão, Vila Kennedy, Rio de Janeiro - RJ, 21852-010	Rio de Janeiro	RJ	Bangu		-22.8567700000, -43.4899020000	03/01/2019 11:20:00	Não	0	0	0	0	0			Usuário	03/01/2019 11:47:07	Sim	Sim
	23208	Engenho de Dentro, Rio de Janeiro - RJ, Brasil	Rio de Janeiro	RJ	Engenho de Dentro		-22.8953320000, -43.2957776000	03/01/2019 12:00:00	Não	0	0	0	0	0			Usuário	03/01/2019 12:41:43	Sim	Sim
	23209	Rua Coronel Silva Barros - Jardim Primavera, Duqu	Duque de Caxias	RJ	Saracuruna		-22.6804122000, -43.2672628000	02/01/2019 19:00:00	Sim	1	0	0	3	0			Imprensa	03/01/2019 14:04:30	Sim	Sim
	23210	R. das Camélias - Parque Guandu, Japeri - RJ, Braz	Japeri	RJ	Parque Guandu		-22.6880731000, -43.6311107000	03/01/2019 09:00:00	Sim	1	0	0	0	0			Imprensa	03/01/2019 14:22:52	Sim	Sim
	23211	Anaia Grande, São Gonçalo - RJ, Brasil	São Gonçalo	RJ	Sacramento		-22.8493829000, -42.9659919000	03/01/2019 14:23:00	Não	0	0	0	0	0			Usuário	03/01/2019 14:26:07	Sim	Sim
	23212	Morro do Castelar Castelar - Piam, Belford Roxo - I	Belford Roxo	RJ	Piam		-22.7509510000, -43.4036670000	03/01/2019 14:30:00	Sim	0	0	0	2	0			Polícia	03/01/2019 18:27:34	Sim	Sim

Figure 5.2: Screenshot from Fogo Cruzado's database (April 2019)
Source: Fogo Cruzado

of a school; whether a security agent was present; whether there were victims (and, if yes, whether, among the victims there were police officers, elderly, teenagers, or children); whether gunshots were heard inside of a residence; or whether it resulted in interrupted circulation in the city (closed roads/streets, traffic stopped), etc. In addition to these details, other qualitative attributes that take part in the database are, for example, the motives of gunshots, and whether they are outcomes of police operations, attacks against security forces, (attempted) robbery, (attempted) homicide, suicide, executions, etc. A quick look on the API documentation shows that in at least one case – the case of the category 'former inmate' – a category is used only for Recife, due to the fact that only there it is used in press coverage of urban violence.

The other component is the counting itself. The 'quantitative' categories in the database account for the number of reported gunshots/shootouts and of their victims, who are segmented into age, gender and professional groups: women, men, children, teenagers, elderly, security agents, military, civilians. Aggregated data on both gunshot events and victimization is used for varied purposes: in weekly and monthly reports, to disseminate stories from the faces 'behind the numbers' and raise awareness about affected populations, to inform press coverage of gun violence, in academic studies, among others.

Numbers are performative in important ways: they help establishing sociocultural categories through which we apprehend and act in the world, they make a phenomenon 'real' and they play an important role in re-configuring

sion of surveillance cameras and video evidence, Gates (2013) notes that the images produced by regular CCTV cameras are seldom evidence in themselves. It is not always the case that images are high quality (sometimes, they are grainy, low resolution), nor that they capture events "live". Often, a significant amount of work of frame selection, time stamping, and establishing a coherent narrative to contextualize the image is required in order to make these images usable. This requires translating of certain aspects of trained judgment into computational systems, which depends on the combined labor of humans – in selecting, establishing the narrative, etc. – and non-humans.

What apps do is to accommodate contradictory demands: on the one hand, the discourse of desire, where computation is set free from hesitation and subjectivity. On the other hand, the inescapable, entangled and situated reality of its objectivity. Daston (2018), Daston e Galison (2010) and Porter (1996), among others, have shown that the construction of knowledge as objective is not ethereal and independent from the cultural practices surrounding them, be these practices bureaucra-

the distances between events and their target audiences. Fogo Cruzado's numbers can be used to contest or complement other numbers, and to give visibility to certain aspects of urban violence that would otherwise be left unaccounted for. The app's patchwork methodology, unexpectedly ANT-*ish*, follows the actant: it works as a contemporary form of mapping that traces the trajectory of bullets out of crowdsourced reports. In doing this, it diffracts, rather than reflects, reality, producing a multiplying effect whereby insecurity is, all at once, reality transformed into official numbers, reality transformed into push notifications and non-official counting and the stray bullets that are felt, heard and experienced by dwellers of the the regions affected.

This quantification of gun violence enacts the gunshot differently from the gunshot that leaves the gun chamber. This difference has not only to do with material mediation, but also with site-specific variations in gun violence and in how it can be quantified. These variations are not trivial; they affect the very constitution of the gunshot as a digital object. As I show in different moments of this dissertation, Fogo Cruzado was initially designed to respond to a particular manifestation of gun violence, one specific to Rio de Janeiro, which is 'public' and widely heard. So, when it was decided that they should expand it to Recife, local analysts found it difficult to employ exactly the same assumptions from Rio to collect data in Recife, first, because, in Recife, people were not used to reporting gun violence in the same way they did in Rio (e.g., in local WhatsApp groups or on Twitter) and, second, because gun violence did manifest differently there.

tic, scientific or otherwise. Likewise, and perhaps incomprehensibly to those who desire computation to set free from the shackles of subjectivity, computer objectivity sits over layers and layers of political hierarchies and negotiations. The assembling of a database goes well beyond filling empty columns and rows on a spreadsheet. The definition of variables, the attribution of a numerical identity to 'qualitative' data, the availability of the database, and the interpretations given to them, all have embedded in them considerations of what is an object of knowledge and from whose standpoint, namely, what must be known and governed. To different degrees, these apps are created and used to mobilize computational power for the production of 'evidence', namely, the definition of 'facts', against mere suppositions. In the age of datafication, factual claims for knowledge are often based on data structured by means of computational processes. The appeal to the *factness* of data, on the one hand, offers an unrivalled alternative to subjective opinions. However, we can rarely see the threads tying it to technologies,

> Pernambuco [n/a: the state of which Recife is capital] does not have so many shootings, nor this situation of open confrontation, but it has a lot of homicides and 'commissioned' crimes. If you look at it, our categories are different for Rio and Recife. In Rio, stray bullet makes an elevated number of victims. In Recife, this is not the case. We will have many more shootings inside residences than in Rio. If I am not mistaken, we do not even use this category for Rio. Of course there is stray bullet, and it hits people inside their homes (PAMELA, 2021, personal interview).

These variations in how armed violence manifests result not only in the creation of new categories to account for Recife-specific phenomena, but also in creative improvisations with data collection. As the analysts with who I talked recount, one of the main sources of information for Recife's analysts is not people crowdsourced together through a platform, not people tweeting about their routines, nor even data collected automatically from sensors, but, rather unexpectedly, a *radio show* that, everyday, around 6 a.m., offers a comprehensible account of violent events from the past day and night. "Most events take place during the night", the three of them have pointed. "They" – the radio show's production – "also have journalists on duty in Recife's biggest hospital that report when people who have been shot arrive in need of medical care", Pamela explains.

techniques, methods, concepts and theories that are political from the start, that only give us one particular mode of visualizing and knowing the world (FLYVERBOM; MURRAY, 2018; BEER, 2016; DAY, 2014). Suddenly, it appears that this data has always been 'cooked' (GITELMAN, 2013), the apparently abstract entities it originates tied to politics to the bone. One of the most prominent actants in contemporary computation, "*big* data and its mining and visualizations gives us a macroscopic view to see the world anew" (DAY, 2014, p.134). But big data, like raw data, is an oxymoron (GITELMAN, 2013). It is not big, nor does it give us a macroscopic view of the world, of our past, present and future. It is rather tiny, segmented data, taken to mean something more general about the world. The thrust to depict it otherwise coming from a desperate attempt at hiding the many knowledge systems that concur to make 'computation' as such. It is, therefore, not coincidental that none of the apps studied in this manuscript claim to use 'big data': neither are data 'big', nor do they give us an abstract view

This is maybe contradictory with what we typically assume to be the production of computational data. But what we imagine to be the production of computational data is probably, most of the time, an ideology. Of course, most services today depend on the automation of data collection and processing, on the incantations performed by the analysis of bulks of data, and to some degree on the algorithms directing our preferences to make sure that they had our preferences right from the start. But behind the magic, the trick is that computation remains a bastard process, drawing as much as it can from our online behaviors, as it does with our behaviors 'offline'; as much as it can from 'automated' data collection, processing and analysis, as it can from other kinds of creative (and less automated, or maybe bastard) methods. It is only that this process is not always automated, not always carried out by 'cold' algorithms, which does not mean that it is not embedded in the infrastructures who embrace the desire to extent the tentacles of computation far and wide in the first place. Notably and perhaps quite interestingly, the story of Fogo Cruzado's birth and expansion shows us another side of the work of these infrastructures, in fact, the ways in which apps concoct unique strategies to mobilize them, not entirely bending to their desires.

Also, my encounter with the two analysts operating in Recife called my attention to the symbiosis between these seemingly objective forms and narrative, an entanglement that, very early, UN SanctionsApp creators also seemed to have in mind. Numbers and databases seldom act alone.

of security affairs. The 'eagle eye vision they offer us depends on which direction the eagle's head is turned, in the first place.

Affective quantification

The creation of statistical categories or classifications draws heterogeneous groups of people and things together: LGBTQ+ groups, middle income class, victims of stray bullets, targets of police operations, criminals, developing countries, among others. Quantitative measures are required to simplify, classify, compare and evaluate, while they also work to define who or what will be made visible/invisible. Sticky quantification, that is, quantitative measures that become so deeply embedded in networks among objects and humans that they are no longer disputed or easily disassembled, may likely become coextensive with reality: it is real only what can be measured (ESPELAND; STEVENS, 2008; LATOUR, 1986). Walking hand-in-hand witn quantification are classification practices. In Bowker's and Star's (2000, p.10) definition, "classification is a spatial, temporal, or spatio-temporal segmentation of the

It is through narrative that the 'content' of numbers or the relational juxtapositions a database constructs can be interpreted and explained. Olliveira notes, answering negatively to my question about whether her app resorted to automated analysis, that "there is no pattern. You need to understand what is happening case by case" (COUTO; OLLIVEIRA, 2019, personal interview). When she says that there is 'no pattern', what I understood is that there is no place, in the work of the app, to have a machine to act on the data, to detect patterns in it. Because, while pattern detection seems indeed to be performed (by the analysts, in Twitter posts, in their monthly and weekly reports), what they actually need is the (human) interpretation to make sense of these patterns.

Narrative also gives direction and meaning to the very existence of the database. Whether it is Fogo Cruzado or UN SanctionsApp, the existence of the apps and their databases is part of a broader narrative of empowerment – of citizens or diplomats from non-P5 countries – through the information they convey and by making it accessible. The databases, in their turn, ground these narratives in 'objective' numbers and facts, conferring them authenticity and authoritativeness.

If you access Fogo Cruzado Recife's social media pages today, the content is, indeed, considerably more diversified: among gunshots reports that are simultaneously published in their social media and apps, there are short stories and contextualization these events whenever a victim is involved. In some cases, the stories of these victims are mobilized in more forceful ways, such as when

world. A 'classification system' is a set of boxes (metaphorical or literal) into which things can be put to then do some kind of work." The literature situates computational objectivity at the intersection of two convergent sociotechnical practices: quantification and classification. Let us begin with quantification, the attribution of numbers to individuals, things, events, sensations, or groups of those (WERNIMONT, 2018). Widely varied, these practices can take the shape of accounting (PORTER, 1996), indicators (MERRY, 2011), statistics (HACKING, 1990; BOWKER; STAR, 2000), and, of course, big data (HANSEN; PORTER, 2017). Whatever the use, quantification relies on the authoritativeness of numbers, which Espeland and Stevens (2008) situate as two different yet complementary moves: first, the fact that numbers are taken as both real and true and make things hold together. Here, the representations of the world that they make – crime, poverty, nation, etc. – are vested with sense of accuracy and validity (DESROSIèRES, 2002). Second, numbers become authoritative follo-

it was used to ground a judicial case in the Supreme Court against Rio de Janeiro's security forces operations in favelas. It is not rare for these operations to end with civilian deaths, including a significant number of children. The stories of children victimized by gun violence, in particular, helps sensitizing the public to the fact that these bullets make no distinction of age, gender, or criminal status, but do affect poor, black dwellers in a disproportionate way.

In a sense, telling these stories makes the counting seem less 'cold', more 'affected' by the faces 'behind' the numbers and more infected by the contexts that forced these changes to take place. I am not saying that this contradicts the ambitious infrastructures on which our apps hinge. Most likely, it is already somehow engulfed by them.

5.2 Externalizing thought

The anecdotes from UN SanctionsApp and Fogo Cruzado from the previous sections show that human interpretation plays an important role in cultivating objectivity. They also suggest that apps may sometimes mess with the desires and ambitions held by their infrastructures, specifically by combining their features and affordances, like filtering mechanisms, app stores, hyperlinking, etc., with bastard forms of working over data. These forms are bastard because they disrupt our expectations about how the app should ideally work. Most of what takes place computationally brings back to earth the desires envisaged by the operators of these infrastructures for the governing of insecurity.

wing their practical use in problem-solving (SIQUEIRA, 2017), and in communicating messages across vast distances, be them social, geographical or political (PORTER, 1996). In re-configuring distances, numbers render some groups and phenomena accessible and knowable to those who govern (ANSORGE, 2016; SCOTT, 1998), create affinity and connect people and things (LATOUR, 1986). However, they also inescapably prioritize some point of view while silencing another (BOWKER; STAR, 2000).

Whether it is in an app's technical operation or in the assembling of its database (automated or human-made), quantification and classification have become the bedrock of the computational making of the world. An app's quantitative database necessarily involve operations of represent events, people and their habits through numeric symbols, whereas a qualitative one will likely include classification schemes to order data. As Onohua (2017, n/p) reminds us, 'to classify is human, and increasingly classification is algorithmic'. Si-

> [W]ith an app, we had to think in non-linear ways. The presentation of information is not composed by an introduction, substance (question posed, literature review, methods, results), and conclusion. Rather, everything had to be linked (or hyper-linked) to everything else, and there had to be multiple ways to enter and arrive at the different kinds of information contained in the App. As designers of an App, we not only made our choices about categories of content, assembling or expert knowledge about UN targeted sanctions in a particular way, but we also had to try to anticipate how our potential users (. . .) would think about and potentially make use of the instrument. We also had to select potential entry points for our users and design the opening menu of options in logical terms for the standard, non-expert users (BIERSTEKER, 2018, p.159).

What we have above is a citation taken from a chapter that Biersteker has published on the UN SanctionsApp. The citation leaves us with the rationale informing design and development of the UN SanctionsApp. The reader will promptly identify some expert agency there – in the form of app designers' choices and attempts at anticipating how their future users would use the app. I discuss the effort involved in making UN SanctionsApp interactive in chapter

milarly to the quantitative measures above, these algorithmic classifications are perceived as truer than the human's, regardless of the fact that arbitrariness is part of both. Onohua's sculpture 'Classification.01' shows two neon brackets that light up when more than one viewer approaches it, if the nearby camera connected to the brackets classify both viewers as 'similar'. In it, the brackets never real to the viewers the rationale for classification and leaves open the question of why they have been grouped – "a lingering reminder no matter how much our machines classify, ultimately classification is also a human process" (ONOHUA, 2017, n/p). In a never-ending dance, whereby some measures and categories struggle to become stable, while others reconfigure existing modes of enframing the world, enumerating and categorizing significantly (re)make and (re)order it (WERNIMONT, 2021). Hyperlink and hypertext create categories that reflect judgements about two or more objects (e.g., whether they are the same/alike, functionally linked, linked as parts of an unfolding series, etc.) (BOWKER; STAR, 2000, p.7), while activist apps look for alternative measures of violence, both to complement and dispute 'official' numbers and/or to cast the govern-

3, when presenting its hyper-linked architecture and the way in which it concurs to the construction of the app's own enactment of 'real-timeness.'

It is through (hyper)linking its content that UN SanctionsApp becomes interactive. Interactivity means engaging, affecting and enticing the user so as to ensure that there is continuous engagement with the app. We have seen this in our Fogo Cruzado's analysts dialogue in the previous section, where interactivity required different strategies to communicate events, for example, by telling stories, so as to making its social media more attractive to a potential audience, in other words, to entice the reader/user to keep tagging along with their publications. We see that also in the app's API search, where the user can filter through the app's 5 years' worth of data on gunshots.

Interactive media like computers are made interactive thanks to a range of different features that appear to instigate, almost beg for, an action on the side of the user. However, what appears to be a succession of actions, triggered by a click on a link, on an image, on a button in an interactive map, is most likely a sequence of pre-programmed steps that leaves us with an universe of apparently infinite, but in fact fairly limited, possibilities. In computation, the building of interactivity depends on a series of mimetic processes. The Greek concept of *mimesis* alludes to the acts of imitating, representing. As an example, the filtering function of UN SanctionsApp was conceived as an attempt to replicate, re-produce, computationally, the mental processes involved in diplomats'

ing gaze back to the state by surveilling state authorities. In both cases, numbers do not do things in themselves. Their affective and narrative potentialities also matter (CROOKS; CURRIE, 2021). In more 'agonistic' forms of engagement, enabling people to connect with and "feel" the pain of others and giving 'a face' to otherwise 'distant' numbers. The literature reminds us that numbers and categories, yes, are instruments of power, but can always be assigned otherwise (WERNIMONT, 2021). While the modern quest for objectivity has hinged on an alleged neutrality of numbers and on the correspondence between representation and the thing being represented, numbers and categories also engender sticky relationships between bodies (human or otherwise) and the world (CIFOR, 2021).

Narrative and databases

Events, habits and behaviors gain very particular meanings once they are associated to symbols or become part of a category: they become both

decision-making on sanctions. This mimetic movement, of course, is not innocent. To recall Biersteker's self-reflections already discussed, the question of effectiveness of sanctions itself is a sender's – not a target's – question (BIERSTEKER, 2021, personal interview). Starting from the sender of the sanction's vantage point, the hyperlinks tying together the app's content and taking the user towards a finite universe of pre-defined paths through its databases, help objectifying the associations that we assume diplomats to make. Mental processes of different sorts, from making analogies to reflecting and associating, are externalized through our movements of hitting a link, then another one, then another...

The construction of interactivity through hyperlinking provide us with one way with which computers objectify thought (and other kinds of) processes, in other words, one way in which they mimic these processes through pre-programmed sets of action. Once part of computation, these processes are recursively replicated by the architecture in which they are embedded, so much that they – alongside most of the human interpretation and standpoint that it takes to set them in motion – seem to disappear.

5.3 Automating judgement

Interactivity, of course, is not the only way through which computers objectify thought processes. Having a computer system that learns from our actions and experiences, rather than simply conducing us through their envisaged pathways, can be useful in (attempting at) doing away with the fun-

aggregates and qualifiers, in the form of crimes that concentrate on late afternoon in weekends, accumulated weekly accumulated shootouts, or measures of effectiveness. These practices also establish parameters that make possible to compare, combine, individuate, assess, evaluate, match, rank, etc. Numbers and categories are neither hot, nor cold, but both at the same time: they may desensitize us as much as they can serve as a call for action, taking part in dynamic webs of meaning that vary across contexts and time.

These numbers and categories, and their meaning-making capacities, are also what help structuring the databases that will serve as bedrocks for much of the computing, algorithmic or otherwise, presupposed in the work of apps. In the literature, considerable focus has been given to the power of databases in ordering knowledge and managing visibilities (FLYVERBOM; MURRAY, 2018; ANSORGE, 2016). Often understood as infrastructures themselves (or as taking part in them), databases hold a significant power:

damental friction that comes from relying exclusively on human thinking: information loss.

This occasion, like most that involved TechLab's staff, has as its stage the Lab's former building – a cozy, three-floor house in a central neighborhood. My interlocutor and I seat around a small, round table, in one of the tiny rooms that were sometimes improvised as meeting rooms. The person I am interviewing is Ariel, EagleView's project manager, and an experienced individual with a private sector background. Part of the conversation centers around their version of the story of EagleView 2.0, both its initial and current iterations. Another part follows their expertise on management, giving the conversation quite technical contours. We discuss EagleView's place in the police's operational routine and technological infrastructure and the relevance of such a system for the police and its internal governance. "[T]here is no doubt that he [the commander of the battalion] is the person who will know it [the territory] better than any system. But it takes a while. When you change command, you have to learn it all again. So, if you have a system that can interact with him and learn from him while storing [the data], the impacts of these changes in command, you can mitigate the impact of these changes a little." (ARIEL, 2019, personal interview).

The problem that systems like EagleView 2.0 see with humans is not that they are incompetent or unable to think and do things for themselves. It is,

> through them, data is arranged in ways that it either makes it meaningful or possible to establish meanings across its disparate elements. The ways in which data are structured significantly shape what emerges as seeable and knowable (FLYVERBOM; MURRAY, 2018), without necessarily being subsumed to public scrutiny at early stages of its structuring (JOHNS, 2017). In her discussion on data mining and global governance, Johns (2017) suggests that the relevance of data-mining in contemporary global politics is immediately connected to the scope of the decisions and policies it comes to inform – from decisions about how to distribute international aid, to decisions about how to allocate and assess humanitarian needs in emergencies. When this is the case, and unlike more conventional governance techniques, response to concerns with these techniques are usually postponed to a later stage, only after it is possible to assess its results. Flyverbom and Murray (2018) call this form of social action, mediated by infrastructural and algorithmic modes of knowledge production, *datastructuring*. This is

more likely, that they are too slow, too fickle, too unable to account for the vastness of information out there in a reasonable amount of time. It is as if our processing capacity was just not enough. And, as such, many things can be lost because of that: valuable information, maybe even the chance to be 'more transparent' about what the police is doing. The question implied there is not primarily about how to predict crime, but how to make the whole process of policing more efficient.

At the same time, and perhaps even contradicting this vision, these systems *need* the input and experience of whoever is capable of teaching them how to police. Not that it cares about the nuances of this *how*; notably, what we have is a circular logic of feedback in which the system learns from previous policing patterns only to give this back to the police in the form of quick assessments, recommendations and hotspots. None of this knowledge could be said to be previously unavailable to police officers. As I would hear often at TechLab, in places like city C1, the police already did this 'manually'. But maybe it is the case that it was unavailable as an integrated interface, 'objectively' communicating the continuously emergent and very provisional results of so many calculations while paring officers from this strenuous work. Such promises of integrating information, of 'eagle eye' visions, are commonplace in systems designed for security authorities. Whether they are developed by TechLab or by a private company, they reflect the promises of oversight held by big data analysis, even when no 'big' data is involved.

when the 'magic' of databases takes place and that new relationalities can be imagined, inferred, and emerge as authoritative (AMOORE, 2020; BELLANOVA; FUSTER, 2019; ANSORGE, 2016; GATES, 2013). These relationalities are initially established internally in the database, by means of parsing the data into tables partitioned into rows and columns, with the latter indicating some attribute or aspect of the table's main object or topic (HAYLES, 2012), and later get extrapolated into colonial, surveillant, securitized, agonistic, among other forms of narration (CROOKS; CURRIE, 2021; BELLANOVA; FUSTER, 2019; GATES, 2013). Writing on the relationship between narratives and dabatases, Hayles underlines that narrative is database's necessary other, investing their formal logics with human meanings and undecidability: "Narratives gesture toward the inexplicable, the unspeakable, the ineffable, whereas databases rely on enumeration, requiring explicit articulation of attributes and data values" (HAYLES, 2012, p.179). Embodying an ideal of objectivity in which the

Most of my conversations with EagleView's programmers took place during early efforts to develop its predictive algorithm, in mid-2019. Much of what we discussed had to do with the difficulties of developing such algorithm, alongside the ethical considerations it could raise. The slow, and, to me, almost imperceptible shift to optimization would only happen later that year, after some backs and forth with their interlocutors in cities C1 and C2.

Many still talk about the predictive power of big data and all the wonderful things it enables. This self-fulfilling prophecy promises great insight into insecurity from multiple sets of 'tiny' data about individuals and events. This promise, however cannot be sustained by itself. In places with low crime rates – like city C1, or some other place with Western-Europe-*like* Human Development Indexes – or where data has poor quality – like some low income nations, –, nothing can be really done. Prediction has been undeniably defining for EagleView 2.0 for a long time, but it cannot deliver the promise of an eagle-eye view. It only really works in ideal contexts, where data collection and policing practices match the managerial style set forth still in the 1990s, with the implementation of CompStat in New York.

While it remains an important selling feature of the current EagleView, crime prediction now integrates a wider assemblage of calculation, where what is at stake is how policing activities are arranged, programmed and feedback into the system. In what could be said to be the intensification of the smooth and, at times imperceptible sharing of our thinking processes with computers, objectivity can be cultivated by outsourcing judgement (or parts of it) to them.

world is arranged and parsed according to logical categories and symbols (and where indeterminate data is either represented through a null value or not represented at all), databases establish relations among their internal elements by means of set-theoretical operations and commands ("insert", "select", "delete", "join", etc.). Internally, databases order data, making them available to different kinds of queries. Oftentimes, narratives are portrayed as countermeasures to objectivity: they intend to provide a partial, situate account of what does it mean to exist in the world, typically accounting for what a database, in itself, cannot explain, or speak of. That databases are semantically limited and often require something else to help interpret and explain their elements, is no novelty. But their increasing popularity, favored by the ubiquity of digital media in many different spheres of life, has raised an interesting question regarding what is the relationship between databases and narrative. For Manovich (2001), in his early theorizations of these rela-

Through this 'outsourcing', a number of moments of judgement and interpretation are transferred to the system, among which we have the knowledge of the terrain, the analysis of past data and its projection into the future and at least part of the operational planning. In this case, and unlike in trained judgement, what is nurtured is the idea that at least part of human subjectivity and interpretation can be computed in by algorithms. It is not that the algorithm itself does something spectacular new. It is only that it proposes doing what humans do (and perhaps a little more), with more precision, velocity and efficiency and, very incidentally, to render the activities of the battalion or department in question more 'transparent' to their superiors (but not necessarily to the population).

At the time of my interview with its project manager, some of the core features of the current iteration of EagleView were already coming together: a more comprehensive crime analysis system, with a predictive component, and adjustable to the local technological infrastructure through an API. As I was told in that conversation, the concept of the API is supposed to be flexible: "The API will 'call' EagleView 2.0 whenever necessary, just like when a website calls a bank API. In fact, [the user] leaves his world, enters EagleView's, calls it, EagleView processes everything, and then will publish the layer of data that we will make available to him. Whoever works with an API, thinks of a way

tions, database and narrative were like competing imaginations, almost destined-to-be enemies. For, if databases were to represent the world as a list of items (but refuse to order this list), narratives would seek to create a cause-and-effect trajectory for them. Both would compete to make meaning out of the world, but if a status should be given to each of them, then it is that databases are the cultural forms that supports narrative (MANOVICH, 2001, p.201). I have some trouble seeing this relationship as one of competition. In Kelly Gates' (2013) account of surveillant video forensics, narrative and databases are complementary, contingent, entwined, with a set of techniques and narratives framing and helping contextualize the role as evidence of surveillance cameras footage in court trials. It is a symbiotic relationship, where databases need narrative to interpret and explain the relational juxtapositions it constructs, as much as narrative needs databases both to become authoritative and to validate its insights (HAYLES, 2012).

Narrative, Dourish and Cruz (2018)

of working that is like this: 'I do not want to know how you work, it does not interest me. I need to have this information, like this' – and this is how we are going to build [the API]" (ARIEL, 2019, personal interview).

To have a system to take the most trivial decisions while leaving the final say about whether to follow or not the recommendations of the algorithms to the decision-maker also depends on losing sight of the 'how' question: how the system does it? How did it arrive at this calculation? How does it work? So long as the system works and works smoothly and well, so long as the results are satisfactory, in a result-oriented police routine, to ask these questions would be pointless, a waste of time even. The presumed unity of the system must be sustained, otherwise the magic of its objectivity falls apart.

5.4 Arbitrary numbers

It would be misleading to affirm that the cultivation of objectivity as automated judgement involves any sort of desire for a truer, more accurate or realistic form of representation. The numbers with which predictive endeavors work are just good enough parameters of reality. Almost approximate, it suffices that they work, are 'accurate', match with the reality on the ground. They have this funny smell of arbitrariness, but are arbitrarily real.

The interview with Diego is full of witty analogies. Each of his explanations for complex concepts in algorithmic modelling is accompanied by examples from

emphasize, takes part in processes of sense-making in and around data, to the extent that data depend on having frames through from which to make sense: "the difference between a productive data analysis and a random-number generator is a narrative account of the meaningfulness of their outputs" (DOURISH; CRUZ, 2018, p.8). In paying attention to the distinct ways in which parolees and and parole officers make sense of the data generate by the system that monitors the location and movements of paroled sex offenders, they show the centrality of narrative to connect this data to their own experiences: "We see multiple actors engaged in narrative acts of different sorts: around the data, with the data, before and after data, in line with or in contradiction to data, and more. Further, these acts of narration tell different stories for different purposes in different moments. In some cases, it is only through narration that the data can speak; in others, narration extends the data's reach" (DOURISH; CRUZ, 2018, p.4). The expectation

the everyday, such as shopping for groceries. At one point, he leaves the witty, real-life examples to focus on the real-life difficulties of predicting an event as statistically rare as crime: "Since we are modelling every region from a given city without having never been there, we will have to find a methodology with some efficacy, considering that the number of crimes is statistically rarefied. The goal is to produce models that have a reasonable predictive power, that are correct. I like to use the number 70. So, that 70% of time that they are correct. [Any number] below that we cannot accept. It is a great challenge for you to get that when your data is rare and you are talking about places you do not know." I ask him why 70%. "It is an arbitrary number," he answers. "It could have been 80%. We know that 50% is bad. 50 is just the same as you throwing a dice. You do not know if it is right or wrong. 60 is too close to 50, so you want to have a distance. People work with 70%, 80%, but in our domain, to reach 80% will be very difficult, because of the rarefied data. It is necessary to accept something statistically superior to chance, to being completely random. The cost of error is great: you will have a robbery or something more important where you did not covered. We've put it in 70% after noticing that where we can get, and 70% seemed something attainable. It is our goal. We are not there yet." (DIEGO, 2019, personal interview).

that data "speak for themself" is a powerful narrative about data, framing it as self-evident and as requiring no further interpretation and narration. To make explicit this mutual dependency does not imply falsity by any means: in enframing data in ways that are context and culturally dependent, these symbiotic associations become stickier, and potentially more powerful.

The 'God trick'

When we take a look at the literature, objectivity seems to sit in the awkward position of being, at the same time, possible and impossible. On the one hand, to be objective becomes the rule of thumb of every technoscientific inquiry and object. It is only by being accepted as such that scientific research and technical innovations conquer authority. And in order to become objective, the conventional view goes on to show, one has to get rid or do the best to circumscribe one's own discretion and judgement (DASTON; GALISON, 2010), so as to avoid contaminating technoscientific inquiries and practices with their own subjective views and experiences. This poses objectivity in the realm of the possible, as something that can be effectively achieved, given that the requi-

The question of knowing how right or wrong a prediction is can be mathematically calculated through different metrics. In the case of EagleView 2.0, a few of these metrics have popped up here and there, in interviews and meetings: accuracy, F1, F2. Among these three, the metric that most stand out was not accuracy, but F2. When I asked Diego about measuring the model's predictive power, I made the mistake of referring to it as accuracy. He was quick to correct me. The basic distinction between accuracy and F2 metric is that the latter refers to the predictive power of the model, whereas the former corresponds to the ratio of correct predictions to the total number of input samples. By focusing on the measure of predictive power, rather than the percentage of correct predictions vis-à-vis the universe of the dataset, TechLab wanted to know how precise the model was, namely, how often it predicted that there would be a crime and there was none, and how often it predicted that there would not be a crime but there was. Of the two, the latter was of greater concern.

Ahead in the interview, Diego reacts to my question where I had confused predictive power with accuracy. "We do not want to have a false negative. For us, this cost is higher than a false positive. The system can send a patrol to a place and nothing can happen – that's a false positive –, or fail to send one to where effectively there is an event – that's a false negative. For TechLab, the cost of the false negative is much higher, because you will have failed to protect

red 'decontamination' is effected. The struggle to get rid of subjectivity has gifted objectivity with some interesting titles, among which 'view from no where' (HARDING, 1995) and 'God-trick' (HARAWAY, 1988) more effectively communicate what is at stake in that particular enactment: that attempt to conceal one's own position in the world while making this position seem universal. A similar move is implicated in the idea of colonial 'global designs', by Mignolo (2012), that intend to make themselves universally valid at the expense of other designs. Far from implying a disinterested, neutral and impartial mode of knowing and ordering the world, any claim to objectivity grounded on these designs works very much to de-contextualize and globalize the situated practices that help constituting objectivity in the first place. This version of objectivity is an ideological ground for power – military, commercial, male-dominant (HARAWAY, 1988), and its promises of detachment an impossibility in terms – an impossibility because objectivity is always already attached, partial, and contextualized (LEANDER, 2016; HARDING, 1995). I hope the reader understand my point: that this claim re-

someone. They are shifting the metrics to emphasize the quality of the positive, never failing to go to a place where there is a slight possibility [of an event]." When I once again ask him how then they would improve the predictive power of the model, he tells me that it is all about creating correct features: "feature engineering is an essential step in predictive modelling" (DIEGO, 2019, personal interview).

The idea of feature engineering is an uncanny one. The basic premise is to learn from practitioners and experts: how do they see the phenomenon they see the phenomenon they work with, they try to address? The creation of features stems from what is learned from their experiences: what events, elements and contexts do these experts and practitioners associate with the phenomenon in question? When you ask a police officer about how a crime will take place in a particular location and their answer to you involves a soccer game, the game in question becomes a feature for that particular location. And so it goes with time, day, and other conditions. The objective is to take from those who are familiar with the phenomenon as much information as possible, all of which will become features in the system. The more features, the better.

Having sufficient and detailed features, however, does not do away with the problem of the lack of quality in data. It was this issue that, in the end of the day, helped shifting the overall focus of EagleView 2.0 from crime prediction to police resource allocation and optimization. Recall that, at the time when

sonates with the practice of computation, to elucidate that this practice and its manifold enactments of objectivity are this: manifold, multiple, partial and evidently contradictory. The same apps that draw from the tentacular infrastructures may improvise with them, concurring to this multiplicity. The tension, it seems, is the continuous attempts of these infrastructures (embraced in some of the apps) to conceal the partial knowledges constitutive of them. To say that the God-trick-like version of objectivity is impossible to achieve is not to say that this is not attempted – *constantly*. The impossibility lies exactly in the fact that it takes all the 'running' one can do to enact this separation. With algorithms, big data and their databases, the detached view is made sticky, and computer processes are trusted as universal and detached, even when we know they are not exactly so (SANDVIG, 2015; BEER, 2016; BURRELL, 2016; NADIM, 2021). Perhaps this is because, as the French would say, these are machines/processes which are 'numérique', that is, based on numbers, quantifiable mea-

this research was conducted, the iteration of EagleView in question was being piloted in parallel in cities C1 and C2. Both are located in Global South countries, but there are important, if not crucial, differences between them – differences which have created complicated questions to EagleView's designers back then.

First, the app was, to an important extent, modelled after the work of police authorities in these two places. Having something that could be standardized and yet flexible enough to account for different policing environments was a must, given the intention to make it scalable – namely, replicable in more places. Notably, whereas the project's goal was to develop EagleView 2.0 in city C2, most of the meetings I have attended focused on the city C1 pilot, with only occasional references to the former.

The differences between both contexts has important practical implications. The urban landscape of city C2 segregates the poorer population and its majority of black people from the rich, mostly white, regions, and life in the higher-income, well-policed security 'bubble' contrasts starkly with life in the peripheries and slums. City C1, in contrast, has some of the lowest national homicide rates. It is wealthy and usually performs well in human development indexes, with lower rates of poverty and inequality than the national average. However, it has a very homogeneous demography, with more than 80% of its population being white and of European descent.

For TechLab, the model of policing in city C1 was one to be followed: very organized, managerial and computerized. EagleView 2.0 was only the latest addition in an environment composed of integrated crime analysis ecosystems

sures and mathematics (PORTER, 1996). Or it may be because the objectivity of algorithmic processes is typically a product of pitching the 'factness' of data against the fluctuating and dangerous presence of too much human decision-making. Or maybe both. Daston and Gallison (2010) show that to establish something as objective hardly depends on a single, stable criteria. In some cases, objectivity becomes a question of reflexivity, of cultivating oneself, or perhaps a process, in order to prevent or compensate for any possible infection with partiality. These concerns usually extend to machines, to the extent that it is (bad, problematic, discriminating) human practices (in collecting and sorting data, in teaching concepts to algorithms, among others) that is often seem to contaminate 'data', and, by consequence, computation, and thus necessitates all 'debiasing' it can have. This version of objectivity insists on disembodiment – whether it is through emotional detachment, quantification, automatic data collection procedures or a belief

and systematic data collection practices. Exemplary of this is how a police officer I have met proudly introduced me to city C1's app ecosystem after I mentioned that I did my research on security apps. This ecosystem also includes, for example, apps that allow citizens to directly report incidents to the police, an app that turned smartphones into police body cameras, and community policing groups on WhatsApp.

In providing an 'optimal' ecosystem from which EagleView 2.0 could be developed, city C1 seemed to offer a somewhat stable and un-noisy context for the initial development of the software. The data incoming from local apps, which could include crime data, crime/incident, as well as patrol geolocation data, details about incidents, as well as the data reported through the police hotline number and inserted into the police's dispatch system, would play a fundamental role in EagleView's model.

For example, the definition of filters by local police partners (e.g., traffic, priority crimes demanding immediate police response, or events when police presence could have a 'dissuasive' effect) could be used to train predictive algorithms and check for potential biases in data. The definition of these filters, on the one hand, could help with the decision to filter out occurrences initiated by the police – such as when the police decides to randomly stop someone deemed suspect for verification –, to the extent that it could introduce biases to the model. On the other hand, the introduction of filters risked reducing the model's accuracy because by disaggregating data, it would make them sparser (BENJAMIN, 2019, personal communication).

that there is an independent reality out there. In the case of computers, it also depends on what Nadim (2016) and others call 'data fictions' (DOURISH; CRUZ, 2018): the data feeding computational processes do not stand alone, but rather relationally through multiple entities, humans included. These fictions are also responsible for articulating, organizing, and troubling our imaginaries about how data is produced, processed and distributed, and make it possible to look at databases through their particularities and messiness, rather than in terms of any dream of universal expansion. If, on the one hand, some enactments of objectivity desire to erase the traces of the knower (DASTON; GALISON, 2010), on the other hand, even the most objective of computational processes may turn out to be indeterminate. Non-deterministic algorithms like machine learning, for example, challenge the very possibility of such an objectivity, because, when being programmed or operating over these data fictions, they make up room for these traces to be everywhere (PARISI, 2013; PARISI, 2016). Not

This is not to suggest that the infrastructure in city C2 was lacking. On the contrary, like city C1, city C2 has a robust computerized infrastructure for managing the city's emergency services (healthcare, traffic, etc.), connected to a local hotline and a well-trained technical staff. But while the governance process was perceived as robust, things were more complicated with crime data. On many occasions when city C2 became the topic of the discussion, the difficulty with sub-notifications was raised. An anthropologist working for the project explained to me that this was connected to a lack of trust on the local government and to the fact that the provision of security in the city was fragmented between different security providers, public and private, formal and informal. This included the police, but also private security agents, neighborhood watch patrols and even mob justice.

State authorities at most provided safety and security to the wealthiest portion of the city and to its main highways, seldom, if ever, getting to provide any sense of safety to local slums and peripheries. Since it was incomplete and full of gaps, crime data was unreliable. This unreliability, coupled with the varying priorities of local authorities, would re-orient the prediction from homicides and car thefts to incidents like illegal settlements, protests or mendicancy for example. "With the police in city C1 it was like a reconnaissance process. We already knew how data were produced. This is was not the case in city C2. It is another model of policing, another history,

only what gets counted as data is shaped by different practices of collection, but these practices themselves embedded societal values, structures and assumptions into computation. This has been exhaustively argued in the context of strongly discriminatory data collection/processing practices, such as predictive policing (FERGUSON, 2017), credit scoring (EUBANKS, 2017), and profiling (NAKAMURA, 2009), but it is also the case of many other computational practices. And it is the case independently of whether these data collection and processing practices are 'analogical' (that is, entirely or mostly done by humans) or automated. While these considerations may seem self-evident to most, they are not. These variations, nuances, values, standpoints, structures. etc., however constitutive of actual practices of computing, somehow end up becoming invisible presences or operators, which constitutes precisely by being made absent.

Invisible operators

To compute is to continuously account for these invisible presences which may take different shapes. Vilaça (2018), for example, speaks of how contact with white missionaries

another model of society" (ELI, 2019, personal interview).

Both city C1's and city C2's contexts are shaped by colonial differences. These differences play a fundamental role in shaping what a system like EagleView 2.0 can see and what it cannot see and take a part in technical considerations that is perhaps not so evident. Allow me to explain. Anglo-European criminological thought assumes crime to be a regular, not random, phenomenon. Recognition of crime's regularity has enabled the production of crime statistics and, later, of predictions built from those. Yet, at the same time, the designers of EagleView 2.0 were categorical when reminding me that crime was also statistically scarce. In other words, despite its non-randomness, the occurrence of crime was the exception; non-crime was the normal. The technical issue with this scarcity is that a model with long periods of non-events, for example, due to data being too disaggregated, would likely generate zero predictions, at worse stop working.

Generally, in the practice of policing, what counts as 'crime' or 'occurrence' is what the police counts as such. For a predictive system, in turn, what counts as crime or occurrence is the input data. In the case of city C1's pilot, this comprised data from citizen reports to which a police response was generated. "What does not generate response is possibly only noise", one programmer noted. The idea of noise here is self-referential: one gets first to define what data will serve as input in the system and, from this, it becomes easier

entailed partial translations of Wari' people's counting practices, especially of their concept of 'alone' to the ' number '1'. These translations were partial because they did not result in a perfect equivalence; the Wari' people kept using the term 'alone' alongside its moral weight. For them "[n]othing that is alone is good" (VILAçA, 2018, p.9), in contrast with the morality of Evangelical missionaries which was critical of duality. "[T]he Wari'do not employ "1"(um) in Portuguese but continue to use 'alone'. It would seem that they cannot escape the fact that the absence of the Other remains, for them, the most important characteristic of 1" (VILAçA, op. cit., p.15). Likewise, the computation we embed in our security practices, together with these practices, is haunted by these others. Even the binaries underpinning their work is premised on duality – both 1 and 0.

This reflection on duality, on the constitutive other, has been part of postcolonial and post-structuralist critique in IR, both as a system of knowledge and as a system of practice (cite). The duality self/other has in this critique also serve to unsettle the reputed universality of Western concepts and practices, which conti-

to sort useful data from data that will hinder calculations and bias the system towards unwanted performance metrics. By relying on citizen report to the police's response hotline, the system did not necessarily learn the 'true crime rate' but rather the rate of what was reported to the police. This solution avoided at least one problem: including biased data on police-initiated verification in the model, as well as false or incomplete reports.

When data is not good enough or incorrect, when important data is lacking, app designers needed to 'input' or complement them. Inputting data is usually required when data is ambiguous or missing. Diego's explanation was that one can calculate the mean of the data to make them more homogeneous, or maybe ask the model to predict what the missing data would be. Whatever the choice, information must become more homogeneous, since the model will discard missing or wrong information. It is homogeneity, not how close to reality the number is, that matters.

Also, EagleView 2.0 designers noticed that what mattered was not to predict crimes in themselves, but to do so in tandem with the local model of policing. Rather than crime itself, the referent had thus become police action. This realization was pushed, among other things, by the fact that the police themselves questioned the relevance of having a system telling them something that they already knew (where crime is more likely to concentrate), and also by anticipating the difficulty in mapping crime data and other relevant prediction

nues to shape international security practice (BILGIN, 2010; BILGIN, 2017; GROVOGUI, 2006; GROVOGUI, 2009; GROVOGUI, 2011; FIGUEIRA, 2007; HöNKE; MüLLER, 2012; TICKNER; BLANEY, 2012; WALKER, 1992).

The computational milieu not rarely entails a predisposition to search for homogenization. We may assume that the form of the app circulates only with a few necessary tweaks and adaptations to context, without stopping to consider that these tweaks and adaptations themselves may be situated forms of computing, or maybe borrow from these. In this regard, the idea of computing (or big data) *from* the Global South has been advanced to counter the alleged centrality of centers of power, focusing instead on an attention to context-specific power dynamics, on contests over knowledge, materials and desires spanning across multiple sites, and on the data practices and epistemology that emerge from the standpoint of what is different, underprivileged, alternative, the resistant, invisible, or subversive (AMRUTE; MURILLO, 2020; MILAN; TRERé, 2019). But the recognition of a plurality of systems of knowledge in computing sometimes may

data in cases where available data collection and management practices were poor or severely limited.

5.5 Objective, situated, entangled

Each of the apps studied in this manuscript have unique strategies of assembling computing infrastructures that depend on which aspect of in/security they intend to 'act' and where. This makes them situated systems of computational knowledge. Even EagleView 2.0, which we can read as a local actualization of predictive policing, had to find its way of navigating the heterogeneous contexts it was asked to compute. Their strategies of building their objects of knowledge sometimes resonate with each other, as in the need for human intervention and interpretation of their databases, but they are also sometimes estranged, especially in their mobilization of 'standpoints' as disparate as that of the individual (the standpoint of people who are affected by gun violence on a routine basis), the state (police departments' standpoint) and the international system (the senders of sanctions' standpoint), which has direct implications in how data is selected, prioritized, analyzed and used. For this reason, each app presents us with a situated attempt at computing insecurity that does not necessarily reflect the sticky imaginaries communicated through the commercial infrastructures on which they rely.

still overlook how computing becomes specially powerful when it is carried out *in* and *through* its 'doubles', namely, when knowledge in/of the South becomes necessary conditions for its legitimacy. The stories above should give the reader a hint on how this knot becomes harder and harder to disentangle, to the extent that we can no longer distinguish the hierarchies of knowledge that become constitutive of these apps once they are fully integrated with global computational infrastructures, running and operational. Each presuppose the South as an obligatory passage or maybe starting point, some more pragmatically, some more cynically, and some in a more activist fashion.

One could argue, then, that knowledge of the South is objectified in these apps' databases, that we are witness yet again the violence of these computational systems and their gluttony for even more data, even more evidence for mainstream security governance to be carried out by security infrastructures and institutions (CHANDLER, 2020). Well, in some cases, this may be indeed the case. But the kind of objectivity this manuscript addresses go beyond that. It requires making the double

But if, on the one hand, this makes computing heterogeneous, on the other hand, it carries important implications for its authority. The capacity of adjusting to many heterogeneous contexts becomes an integral and necessary aspect of the legitimacy of computer systems, although it is not exactly stamped in our apps' interfaces. In this regard, the predominance of the form of the app in contemporary security practices serves very well this need of constant adjustment.

At the same time that they provide us with situated forms of assembling computing infrastructures and knowledge for the governing of insecurity issues as diverse as urban violence, crime or international security, apps feed this data back into these infrastructures and render knowledge of the 'South' – of the 'intractable' contexts that animate the work of these apps – a necessary passage point in the movement of assembling. No wonder that the UN SanctionsApp needs the 'grounded' panel of experts and ICG reports, or that Fogo Cruzado felt it necessary to get to know gun violence dynamics of other places beyond Rio, or that EagleView 2.0 designers have planned to invite other cities to test the software.

These apps only offer us a situated zooming into the computational production of Global South security, but surely you would find equally situated practices in the Global North. There would be no work of computation without these contexts and certainly not without the development of situated forms of

part and parcel of computation, its power relying partly on the renewed promise of rendering the South knowable (ANSORGE, 2016), and partly on being able to mobilize its devices and infrastructures to claim flexibility to account for context specificity and ruminate heterogeneity to make it more docile, palatable. The pre-determined routines of assembling, cleaning, whether they are automatized or not, and analyzing data and of guiding the user through the app's interface, integrates the 'Global South' into the decisions enacted through technology and makes it knowable, accessible, and an object of study that can be developed, improved, and secured. But (SEAVER, 2014, n/p) observes that this form of "[t]echnological decision making is marbled with underdetermination. Potential paths cut every which way through the woods, and auxiliary motives, conscious or not, come into play at every step." The computational milieu itself is paved with auxiliary motives, other possible paths and with possibilities of datafying otherwise, from within. The social fabric with which the enactment of computational objectivity is entangled also diffracts it and may, sometimes, give our tentacular infrastructures of the digital a meal that is hard to swallow.

dealing with them. In a sense, the work of the different logics I have been exploring so far has been to send these passage points, as much as possible, to the background, to to make them seem as natural and necessary aspects of computing, to offer a negotiation ground for how the partiality and indetermination of these enactments will come out in each app's interface, and, of course, making these infrastructures stick.

Part III

The authority of apps

6
Authority

In July 2017, in the residential neighborhood of Glória, Rio de Janeiro, Swissnex Brazil, a cooperation branch of the Swiss government, in collaboration with the BRICS Policy Center, the Global South Unit for Mediation, and the Institute of International Relations at PUC-Rio, hosted an event to discuss the use of digital technologies in the creation and maintenance of peace [1] and security. The occasion brought together the creators of the UN SanctionsApps and Fogo Cruzado, in addition to experts studying the use of social media in peace mediation. At about the same time, in a surprisingly calm street in the midst of a trendy and central neighborhood in a major Global South metropolis, lay TechLab's headquarters, where EagleView 2.0 had only initiated its metamorphosis into a police-oriented platform.

It is hardly easy to formulate a coherent and convincing response to the question of what makes apps particularly appealing options to what are perhaps longstanding peace and security issues. More so when, purposefully or not, these issues are themselves treated as extremely acute, to the point of becoming intractable. 'Intractable' was the wording used during an interview to characterize the violent conflicts affecting most of the countries targeted by UN sanctions in the African continent. Most of the places where these apps operate occupy top positions as the world's most violent and/or crime ridden, according to specialists (see, e.g., ERIKSON, 2018; MUGGAH, 2020; CHAINEY; MUGGAH, 2020; MUGGAH; TOBÓN, 2019).

Back in 2017, when Swissnex Brazil event was taking place, there seemed to be a genuine enthusiasm with the potential of some technologies to provide security, especially mobile technologies, for their 'proximity' with end users, easy updating and ability to get or communicate data more nuancedly. This enthusiasm, for sure, has not waned. And if, in some cases, enthusiasm is too strong as a word, we could pitch the feeling as a genuine, at times pragmatic, belief in the 'algorithmic', or in the ability of these technologies to assist and facilitate our own understanding of such intractable issues and make more efficient and expand the reach of what we can do through them.

If this is the case, then, our question should not only be what makes apps appealing, but also what these algorithmic entities do to authority. The hint offered by this manuscript has to do with how they push authority towards

[1] The event was Tech4Peace. Event details remain online, at: https://www.swissnexbrazil.org/event/tech4peace/

more processual contours and collaborate to make some security practices more authoritative than others. It is not a coincidence that this is the same question with which I started this work, the meaning of it being that we should stop and wonder about the political significance of such characters beyond issues of technological liberation/domination and determination. There is a reason (or perhaps more than one) why the 'algorithmic' as a synonym of computation is so appealing and more so why it is perceived as a pathway to improving unfavorable social conditions, reasons that are only partially explainable by looking at the capitalist enframing of Global South security through a techno-developmental orthodoxy (GEORGE, 2017).

To ask the question of apps' authority vis-à-vis the security governance in/of the Global South is to pave the way for an understanding of the specific enactments of authority – and how apps feed into this – that go beyond these contexts. Rather than universal, these are partially connected questions that share some commonalities but which cannot be intimately known without proper and careful analysis of each case's power arrangements. Instead of highlighting some intrinsic difference between the authority vis-à-vis the North and/or the South, it is a question that helps us explore how these specific enactments also become relevant to think security governance elsewhere.

Strum and Latour (1987), as well as Callon and Latour (1981) and Latour (1994) elsewhere, say that what is specific about human societies is not their complexity, but their complication. In very basic terms, while the first type of society is characterized by the complexity of the skills required to hold it together, complicated societies are more durable for the simple fact that they make use of things beyond social skills: symbols, rituals, machines, bureaucratic procedures, spreadsheets, as well as a range of techniques and materials sought to perpetuate or re-arrange particular social arrangements. The employment of these "extra-social" means aims at simplifying, that is, reducing the complexity of social negotiations, in favor of more stability and, hence, durability of a particular social arrangement. To the authors, this is uniquely political, to the extent that it "allows many heterogeneous resources to be woven together into a social link that becomes increasingly harder and harder to break." (STRUM; LATOUR, 1987, p.797).

6.1 Material tentacles

The consequences of this way of thinking to the question of authority are quite straightforward. It becomes almost impossible to conceive of authority and authoritativeness as things that hinge solely on the quality of an individual

or in the power position they occupy. Instead, authority and the authoritative are distributed along a network of actors and actants, humans with their social skills but also more or less durable materials, rituals, procedures, legislation, in sum, the many heterogeneous materialities and related processes that make the social link harder to break (STRUM; LATOUR, 1987). Under such perspective, we accept that it is not only Biersteker's vast knowledge of UN sanctions, Olliveira's professional experience in the coverage of crime and violence in Rio de Janeiro, or a police commander's knowledge of 'their' territory, that will count – with the apps they use being a mere tool at the service of such skills –, but it is these elements together that negotiate with the many sociotechnical unfoldings and materialities that take part in our apps.

Such a conception of authority can, at times, find itself at odds with the specialized literature, particularly the strand which draws on the deeply influential debate of the U.S. Political Science circle of the 1970s, about the nature of power and authority. This debate has more or less set the grounds of authority in terms of a relation between an "A" and a "B", whereby B accepts the commands, actions, etc., of A as legitimate, subscribing to them without A having to every time recur to coercion to get what they want (DAHL, 1958; DAHL, 1968; BACHRACH; BARATZ, 1970; KEOHANE; NYE, 1987; KEOHANE; NYE, 1998; HURD, 1999; LAKE, 2010; ZüRN, 2018b). The specific means through which this happens may change – to Bacharach and Baratz's (1970) it may involve mobilizing bias and agenda-setting, while to Lukes (2005) it may involve shaping people's perceptions, cognition and preferences so that they accept their role in the order of things –, but more or less constant is the centrality of 'social skills', i.e., attempts to 'softly' influence, shape and direct behavior, vis-à-vis what this literature refers to as 'independent variables', that is, the resources used to explain how power and authority are exercised in a particular context.

Some may argue that in the paragraph above I am recklessly conflating power and authority. Part of this debate was indeed also dedicated to explore the differences between both, which the convention being more or less that authority amounts to the legitimate exercise of power, i.e., not sheer domination but acceptance and/or recognition of someone's rule or a particular order/arrangement as natural, necessary, etc. In more specific accounts, as in Flathman (1980), power and authority are both rooted in shared beliefs and values, with the basic distinction being that power lacking the distinction between an act done under proper authority and an act which requires legal authority but is carried out without it (e.g., legality and extra-legality).

However, establishing this distinction is less directly a concern of this

thesis than the attempts to understand what does it take for certain arrangements to hold. As evidenced in Strum and Latour's (1987) definition of politics and the political as many heterogeneous things woven together to reinforce a social link, the interesting questions whenever apps are concerned is why they stick and what do they glue together. It is by gluing things together and taking part as seemingly banal components of decision-making that we may get closer to the questions we are attempting to explore here, which, ultimately, are also questions of power and governing.

Now, it would be unfair to say that the authority literature entirely ignores the material stuff that glues society together. For example, Richard Flathman's *The Practice of Political Authority: Authority and the Authoritative* (1980), identifies two main accounts of authority: substantive-purposive (S-P) and formal-procedural (F-P). What differentiates the two, in very simple terms, is that the in the first case, some individual capacity or knowledge is recognized and accepted as legitimate, while, according to the second, authority stems from pre-established rules and procedures instating that something is or should work that way. Flathman, however, seems inclined to overcome both in favor of a conception of authority as practice rather than system, one which is based on shared values, intentions and beliefs. Under such conception, even if the rules emphasized by the F-P approach presuppose a heterogeneity of actions, such an heterogeneity is itself affected by the judgement (beliefs, intentions, values) of individual agents.

While Flathman's account of authority as presupposing belief is relevant to think the purchase of apps in security politics – especially with regards to the claim that they empower their users –, its attention to values and beliefs remains somehow more complex than complicated (to play with the Strumian/Latourian terminology), still more focused on the 'social skills' and 'ties' than properly in the composite of social and material stuff that actually constitutes authority, while, at the same time, invoking a (liberal) conceptualization of agency that privileges "self-actuated, intentional and rational conduct" (FLATHMAN, 1980, p.177). In other words, it does not delve deep into what it entails to conceive of authority and the authoritative as stemming also from the connections between individual body (human or otherwise) parts.

In being attentive to these situations, one readily notes that Marshall McLuhan's (1994) famous account of the technical milieu as 'extension of men' is only part of the story. While it is indeed the case that apps extend our capacity for action – think of how it would be almost impossible for the diplomats from non-permanent member states to have easy-at-hand, detailed

evaluations of ongoing targeted sanctions regimes, were not for the handy UN SanctionsApp – , it would be too self-centered to believe that we, through our actions, do not also do this for them. After all, us (humans) also do many little things that are necessary for the app to properly operate: (re)imagining their design, fixing bugs, calibrating algorithms, feeding them with data and many other things which include using them. It is a relationship where 'extending' goes two ways (it both allows extending ours and the app's actions) and make particular enframings of the world possible.

I borrow this idea of enframing from Heidegger, noting, much to the disappointment of some, that what I provide is more an instrumental than an insightful reading of his ideas. To Heidegger, Enframing consists of the way in which "the real reveals itself as standing-reserve" (HEIDEGGER, 1977, p.23). As standing-reserves, things approach us merely as resources: sources of energy or, at best, that which should be arranged, re-arranged, organized, and disposed of. Enframing, put differently, would involve a particular mode of ordering/arranging the world – which, to him, endangers men to think of themselves as lords of the earth (p.27). In yet other words, it is a question that concerns a technological thinking of the world and operates in our understanding of matters, as well as their presence. This form of thinking, he emphasizes, goes well beyond a particular technology or artifact.

I get closer to this Heideggerian notion of enframing in chapter 4, when associating formalisms with the act of 'framing', which I defined in terms of the lines that (through digitality) delineate security politics. When bearing in mind Heidegger's point that a technological reading of the world as arrangeable, organizable and disposable is seldom reducible to a particular technology, it is equally relevant to look at what these technologies also do, how and through which processes they en/frame a particular matter and what comes out as governable through this.

The empirical chapters each have addressed what I call 'logics' of computation: simplification, formalism and objectivity. It would be perhaps more accurate to call them processes through which computation comes into being and enframes Global South security. What is particularly interesting about them is their paradoxical universality and situatedness. On the side of universality, these logics are true for not only computation in/of the Global South, but for computation in general. However, the modes through which they come to be enacted by our apps, the needs of adjusting to contexts, of combining and re-combining different features and infrastructures accordingly, makes them actually quite situated – not unique, special or exclusive, only situated.

If computation (and this includes our apps) is to be authoritative in

Global South settings, it is not only because it provides for (allegedly) more efficient, practical and objective problem-solving, but also because it enables, at once, a formalized, objective, simplified and *situated* account of what is otherwise 'intractable' security issues, while also deciding what exactly are these issues and how they should become (even if partially) tractable.

And what is specific about the GS is that it is these issues are generally deemed 'intractable', hard to govern, but made governable nonetheless. And, as the STS literature shows, this governing entails complicated arrangements of both human and machinic processes, which delineate the rules and common understandings through which the world (supposedly) operates, while also making these rules and common understandings more easily accessible, if not to a wider audience, at least as readily available information for action. The previous chapters should have been able to show that this is true for each of the three apps which stories I explore, but also that each app enact these processes distinctly, affected by considerations of context, material limitations and design.

Through framing/enframing, it is as if computation extended its 'tentacles', so as to grasp events and phenomena in the world, combining and re-combining them and put them to use. The tentacle analogy could not be more fitting. Tentacles are part of a distributed nervous system, they do not require the brain to think for themselves, acting rather autonomously: Tentacular animals think partially through their tentacles. And, as if they were tentacles distributing thought (and of course, action), algorithms, our proxies for computation (not necessarily the imagination established around artificial intelligence and super sophisticated forms of computing), seem to want us to forget that they are always sensing, framing, grappling as they touch, already in operation even before decisions are made.

Whether these tentacles belong to a majestic kraken or a tiny squid, it should not matter much. Both big and tiny carry with them a potential for both reproduction ad transformation, groping, grabbing, and fumbling, very much in the spirit of 'modern' techniques, in order to make available, properly governed and arranged. In his reading of Heidegger's concept of *Gestell* (which here I translate to enframing), Lyra (2014) is even more precise: it is about a sort of orderly disposition of things, in such a way that sustains and makes available, that ensures and facilitates access. These tentacles, Lyra could maybe agree, are powerful precisely for their ability of making things (including our intractables) available to us 24/7.

6.2
Instantiating authority

A common thread tying together apps as distinct as UN SanctionsApp, EagleView 2.0 and Fogo Cruzado is their constant attempts at taking part in decision-making – whether it is 'international', as is the case of the UN Security Council; 'state policy', as we see in EagleView's attempt to blend with policing; or 'local', as in Fogo Cruzado's early attempts to serve as a 'waze of bullets.' (Of course, these roles are not fixed: we see many intercalations in Fogo Cruzado and their numbers attempting to influence public security policy from 'down below', in UN SanctionsApp's efforts to 'democratize' access to sanctions knowledge among UNSC members, or in the idea that EagleView 2.0 is not supposed to replace, but to complement a commander's decision-making process). Tracing this thread, the contention of this thesis is that computation through apps feeds into security governance by subtly blending into moments of (un)decidability, those same moments when a officer has yet to plan where to send a patrol, when when a worker would benefit from knowing whether they can return home without getting caught in a crossfire, or when a diplomat needs past or analogous information to assess the continuity of lifting of a sanctions regime.

Part of the appeal of computation is precisely that, in working like 'magic' – e.g., by easily providing us with variables that will help in these decisions or suggestions about how to decide – , apps become an uncontested part of our routines. These routines not only pertain to our daily activities (e.g., banking, working, relaxing, commuting, reading, chatting with friends, etc.), but, fundamentally, of our modes of making sense and 'accessing' the world, producing 'objective' categories of action, as well as informing and modulating behavior (on the latter, see YEUNG, 2016). For some, such features make computation a fundamental structure of contemporary society (MANOVICH, 2013; KITCHIN; DODGE, 2011).

Let us look more attentively at the part where I state that computation blends into our sense-making about the world. For this, I will sketch through Bernard Stiegler's (2016) discussion of retentions and protentions. To begin with, a few terminological clarifications: in Philosophy (and this is mostly owed to Husserl), retentions correspond to the process through which a perceptual act is retained in our consciousness, while protentions, to our anticipation of a next moment yet to be perceived. Taking the effects (and perhaps entanglements) of the technical milieu in both retentions and protentions, Stiegler then divides the first according to three types: primary, secondary and tertiary. In this division, primary and secondary retentions are psychic forms

of retention that belong – respectively – to the present time of perception and to the past time of memory, while tertiary retentions, like archives, recordings and technical reproductions, are different insofar they are technical. He further divides tertiary retentions into analogue and digital, which he discusses more pointedly in terms of television and digital technologies.

Both analogue and digital tertiary retentions are said to modify secondary retentions, which are also those retentions related to past time and memory. To put it more simply, an object can be experienced a multitude of times. It is not only remembered through primary retention (that is, the present time of perception), but also through its technical reproduction, which makes its repeatability possible. In different occasions in chapters 3, 4 and 5, I approximated this argument when talking about Fogo Cruzado's reproduction of gunshots, arguing that the bullet that leaves the gun's chamber is not the same bullet that arrives at someone's smartphone screen via push notifications. Stiegler acknowledges that it is not only that retention and protention helps us to account for different temporal understandings of past, present and future, but that it is fundamentally through technical forms, analogue or digital, that we are able to perceive past, present and future in the first place. It is perhaps this what he means when he says that digital technologies are intellectual technologies, belonging to the group of technologies that constitute the soul (STIEGLER, 2014). He exemplifies this with the case of the television, noting that analogue tertiary retentions both synchronize and homogenize secondary retentions – and, by consequence, our very anticipation of moments that are yet to be concretized:

> Viewers, who are synchronized with each other by repeatedly watching the same programmes as one another, tend thereby to find their secondary retentions homogenized. In this way, they tend to lose the singularity of the criteria by which they select the primary retentions that they see in the programmes that they interiorize, their protentions being transformed little by little into behavioural stereotypes concretely expressed in the form of purchasing behaviour (STIEGLER, 2016, p.22-23).

As for digital retentions, they could even eliminate individual and collective protentions, replacing them with "automatic protentions derived from the automatic analysis of the retentions self-produced by internet users, and decomposed through a process of the automated 'dividuation' of the digital traces produced by everyone" (STIEGLER, 2016, p.25). And it is precisely because individuals produce and express themselves on the web and platforms

– including what would amount to their primary and secondary retentions – that Stiegler notes that digital tertiary retentions appear participatory, collaborative and contributory.

It is very didactic when Stiegler says that these tertiary retentions give the appearance of being participatory, collaborative and contributory. What makes it didactic is precisely the act of giving the appearance, or, to resort to a terminology previously used in this thesis, of simulating (GALLOWAY, 2012). That it appears participatory is what matters, nevermind the processes sustaining the whole act that may call into question the nature of such participation. We must at all costs forget its simulated nature.

But the reason why I mobilize his discussion around retentions and protentions is to account for how apps embed ways of knowing and experiencing the world that reproduce it and affect how we perceive it. Once in an interview, Biersteker resorted to an anecdote that could have been deemed banal, if it was not illuminating of precisely this potential that technology has to shape our apprehension of the world. He talks about a meeting in which he participated, where a British representative and other academics involved with the Targeted Sanctions Consortium were present, and about how the former, when stating that they [the UK government branch he represented] used to differentiate between different [sanctions] purposes, had unconsciously resorted to a category that was coined by researchers at the Targeted Sanctions Consortium themselves. He talked about how, as soon as the UK representative said that, he immediately looked at his colleague right across the table, who, in return, leaned back and smiled – in Biersteker's interpretation, satisfied with the fact that the representative was using their categories. "They are using our categories and they did not even know it," he laughed, as he wrapped up the story. As he writes in his 2018 book chapter, the app:

> both packages and conveys knowledge. It is productive of expertise. We – both the developers of the App and the App itself – have become (...) the person (one might add also the person in combination with the material object) 'who could repackage conflict resolution science so that it became the expertise pertaining to the resolution of international conflicts' (...). Our authority has been enhanced and extended by the material device created to disseminate it (BIERSTEKER, 2018, p. 162).

But as we see with the unconscious adoption of research categories disseminated through the app, although it is supposed to embody and extend the authority of those who created it, sometimes an app travels farther away

from these experts' individual figures, to the point that this expertise, in order not to be crowded out, requires continuous re-enacting. I will come back to this ahead in the chapter. For now, what I want to make clear is that the blending and subtlety about which I talk in the initial paragraphs of this section is made possible to the extent that a certain automaticity is produced. As Stiegler (2014) notes, this is not particularly surprising, as every knowledge depends on a degree of automatism – from proficiently playing a musical instrument to driving a race car. Automatic reproduction routinizes a given practice, dispensing with the necessity or effort of reflecting about the conditions or requirements for its enactment (just to be clear: AI is a form of automatism but one that hardly dominates the discussion here proposed). It is when this routinizing superposes the need to interpret or reflect that apps may find their opportunity to more proficiently blend in decision-making moments: when their categories become part of the diplomatic vocabulary, when their recommendations are taken into account when police officers and commanders decide how to allocate resources, or that we must consider when deciding where to go and through which route.

Through my encounters with EagleView's team, the reader has seen that predictive models are completely dependent on previous, existing knowledge about crime and space – and this include how this knowledge is generated, which methods of data collection are used, which data are combined, through which criteria selection and combination occurs, what is considered priority, tacit knowledge of the terrain, the experience of police officers, etc. This was widely acknowledged among the team, by technical, field, and management people alike. As a consequence of such a dependence, prediction itself was often perceived as something that would hardly generate greater gain to the police's comprehension of crime (or response to it), unless you could identify or anticipate a potential suspect (this possibility was continuously dismissed both by TechLab and their city C1 partners). The fragility of prediction then required imagining of a new algorithm that could add up to prediction, providing recommendations for the allocation of available resources. "[It is necessary] to statistically see what police officers are doing, have an eagle eye view of the police routine. Identify the outliers, officers who are taking too long to lunch and other stuff. Officers that do not change the status [of the occurrence in the system] accordingly, that to not stick to what's scheduled," a former programmer notes (Fieldnotes, July 2019).

The 'eagle eye view' provided by the combination of prediction and optimization in EagleView 2.0 enacts the complicated dance of retentions and protentions that are so much Stiegler's focus, and which I also took up in this

section. “It is the formation of circuits between secondary retentions”, or the past time of memory, “via intensive computing, capable of treating gigabytes of data simultaneously, so as to extract statistical and entropic patterns that short-circuit all genuine circuits of transindividuation – where the latter would always be negentropic, that is, singular, and as such incalculable: intractable” (STIEGLER, 2016, p.51).

6.3 Governing intractables

> “Le numérique constitue un pharmakon, ça veut dire, un remède a tout type de problème” — Bernard Stiegler,

To govern a problem, one must come at terms with three questions: what the problem is; whether it needs governance or not; and, what kind of governance it would be. In simpler terms, it requires framing, an act which, to Callon (1998), is premised upon a disentangling the ties between something and the other objects and human beings previously connected to it. Happy coincidence or not, Callon, like Heidegger, also resorts to cars to make his argument. In Heidegger, technology affects the enframing of things by acting upon the elements that participate in their making and alters the very essence of this thing. He considers the case of steel and its use in the production of cars. Bearing in mind this process, Heidegger notes how the latter is affected by the coming into being of the former, being set-up as a commodity, raw material, something with a productive power. Almost as if intentionally complementing this idea, Callon then argues that a commercial transaction where a buyer acquires a car from a seller owes to the disassociating of agents from goods, merchandise and their conception, production, circulation and use. “To construct a market transaction, that is to say, to transform something into a commodity, and two agents into a seller and a consumer, it is necessary to cut the ties between the thing and the other objects or human beings one by one. It must be decontextualized, dissociated, detached” (CALLON, 1998, p.19). Long story short, the conditions under which to govern must first be created in order for governance to become possible.

‘[Chronic(ally)] violent’, ‘crime ridden’, ’endemic with the problem of crime’, ‘dangerous’, ‘intractable’. With some frequency, these terms seem to uncontestedly define the security contexts of many of the places that we now accept as part of the Global South. State failure, social exclusion, insufficient resources or the sheer incapacity to adequately respond to the exponential increase of their urban populations are some of the factors that help specialists to justify the attribution of such qualifiers (ADAMS, 2011;

MUGGAH, 2014; MUGGAH; CARVALHO, 2017; MUGGAH; GARZóN, 2017; MUGGAH; TOBóN, 2019; ERIKSON, 2018).

It is not that those in the North do not have to deal with the problematic of violence themselves. Crime, terrorism and a menu of different violences also haunt the developed world. In fact, many theories about crime and violence have been developed in and for the North and their almost automatic import and application to the realities of the South has been quite common. Technologies of social control easily circulate, Southwards or Northwards, leading to both a scenario of cross-pollination and to the creative adaptation of social and political struggles against local, exclusionary security practices. But there is a subtle, fundamental difference that we should consider when looking at the governance work that these technologies do, and it is that violence, in the North, is not supposed to be chronic, nor intractable.

It is not difficult to find, profoundly embedded in the political discourse and in people's minds, the expectation that technological solutions provide a path to higher or more advanced stages of development and security politics. This is implied in the notion of catching-up, already introduced in this thesis (see also IRANI, 2019). Such a belief goes by the name of techno-solutionism and is usually anchored on the ethereal idea that technology – 'sophisticated' technology – is (or should be) somehow able to resolve some of the most intractable issues of our time, such as poverty, deadly conflicts, and crime (GEORGE, 2017). In a sense and for a while, techno-solutionism has long paved the imaginaries of development and security at every "level" of global politics.

Yet, to insist on the more clear cut situations where this imaginary persists might leave little room for us to explore the question of an app's authoritativeness. Notably, none of the apps which I tell the story here adequately fit the label and I hope that the previous chapters gave you a glimpse on how their designers usually offer quite nuanced and sober understandings of the possibilities and limits of the technologies they have created. To be able to capture these nuances is, indeed, a great benefit of the ethnographic methods that anchor this thesis.

But despite not engaging or fully embracing a typical 'techno-solutionist' or 'techno-fix' approach to security, all the three apps seem to take digital technologies as a necessary part of this equation. Necessary for the identification and visibility of a particular security issue as (in?)security, as emphasized by Nino, Fogo Cruzado's programmer: "I think that the main benefit that this app brings is to provide information [on the question of violence] that comes from a source much more organic than the state" [I: organic in the sense of alive,

dynamic?] Nino: “No, organic in the sense that it comes from the people who are... affected by violence [who] can be the main source of information about armed violence in Rio de Janeiro. Organic in this sense, of being collaborative and open.” (NINO, 2019, personal interview). Necessary to ‘democratize’ its production, as Tourinho notes: “[the app’s] objective was very specific. It was to democratize knowledge in the Security Council, to optimize the quality of decision-making there.” (TOURINHO, 2019, personal interview). To decentralize security politics from the state: "It is a point of no return. People will use technology to search for solutions to any problem... Today, we look at governments and see how state bureaucracy stiffens things... Technology has come into this front so it can become a bridge to solve problems" (COUTO; OLLIVEIRA, 2019, personal interview). And necessary for better managing the provision of security (and, in theory, making it more accountable): "One hope is that by introducing such system designed to help improve public safety, increase accountability and improve efficiency, that has a function and functional purpose that can be useful for police, at the high level, at the medium level, that this could exert an influence on better reporting, better collection of data, better out this inequality [of information].” (TechLab director, 2019, personal interview).

The idea that a technology can do so much, that it can promote democratization, participation and efficiency, sometimes all at once, and, on top of that, that it can do this while being so ‘close’ to its target audience, simply by affording new practices (or reorienting existing ones), establishing new forms of measurement and externalizing our thinking processes in the form of hyperlinked menus, push notifications and computational filters and layers, is associated with the rise of a new consciousness, as well as new ways of being and doing things, and directly or indirectly, addressing asymmetries of varied sorts. It is not so much that technology will magically solve our problems, that would be too naive, too much of an industry discourse to increase sales. What is most interesting is rather how these apps operate under a flat hierarchy. This expression is bizarrely contradictory: it plays with both the flatness of networks, assemblages, compositions, etc., in the sense that they do not allow us to speak of vertical arrangements like before, and with how ridden with power they are.

EagleView 2.0, Fogo Cruzado and UN SanctionsApp operate and do many different things not necessarily from the same platform, but certainly under algorithmic infrastructures that resemble each other: social media, predictive algorithms, app stores, which are just adaptable enough, tentacular enough. ’Warehouses’, as Lyra (2014) puts it, that extract, transform, make available,

and distribute – that *while* exhausting the nuances of their birthplaces in the Global North, also feel it is necessary to expand their tentacles farther away. And these tentacles, while expanding, augment and extend the reach of our own grasp, promise to show us things that, previously, we could not properly see or, even in the case that it will show things we already knew, it will at least make the job infinitely easier, more easily traceable and thus accountable, working almost like the asphalt in the road to a better, more secure future.

It is a potential for bringing about (social) change in our modes of assessing and producing security politics that, even if this change is only discreet, steers countless investments (private, public, both at once) in the conception and creation of new technologies. In the early 2010s, as mobile apps skyrocketed as a mode of arranging, communicating, interacting with and producing online content, this potential became increasingly perceived as an opportunity for Global South countries. As I discuss in the introduction, these opportunities comprise both the possibility of having new (oftentimes, informal) socioeconomic arrangements and of boosting personal security against varied forms of violence (crime, conflicts, disasters, gender violence, etc.). They are also fundamentally connected with the capacity of contemporary software of assembling and re-assembling many different components of the infrastructures underpinning it.

In 2012, an report from the United Nations Development Programme (UNDP) highlighted that the fast-paced and expanded access to mobile technologies in such countries could be owed both to easy and affordable access to communication channels and to the saturation of these markets in the North (UNDP, 2012). In a sense, 'democratization' also extends to the production of apps, to the extent that not only these technologies became more easily co-developed 'outside' of the more strictly tech sector and its companies, by laypeople, but also that this would be tied to the more affordable costs of development (since most of the infrastructure or architecture needed for the operation of most apps – including app stores, clouds, API, geolocation services, among others – is provided by tech companies themselves or are of low technical complexity).

In preparation for international mega-events, and also as a result of public policies that sought to expand access to the Internet to low and middle income countries, an overflow of resources has been dedicated at creating incentives and expanding the development of mobile technologies (among others) in Global South countries. It was, in part, thanks to this flow of resources that technological projects such as Fogo Cruzado and EagleView 2.0 become possible, since it creates conditions for appropriate funding. Fogo

Cruzado, for example, initially received international funding from an NGO, while EagleView, initially a 'no-budget' 'experiment', later came to be funded by an investment fund with the explicit intention of being commercialized, preferentially, with other low and middle income countries (TechLab director, 2019, personal interview).

I have argued in early chapters of the thesis that the proliferation of security apps may be explained in terms of an enthusiasm with the potential of digital technologies to afford development and security, as well as to help managing intractable situations, whereby the problems of crime, violence, and even international power asymmetries etc., however insurmountable, can benefit from the help of technology and its affording of empowerment and accountability. I have also noted that none of the three apps fully embrace techno-solutionism (only modified versions of it), with their creators demonstrating quite an awareness of the limits and nuances of how far technology can go in security politics, but nevertheless they would not necessarily refute that 'the way is through' – through technology.

UN SanctionsApp, although coming from an entirely different background than Fogo Cruzado and EagleView 2.0, shares one thing in common with these two, and this commonality is their sources of funding: not immediately commercial, but coming from affluent government or philanthropic organizations based in the Global North – Fogo Cruzado's funding was initially from International Amnesty and has been later split among different funders, including the Oak Foundation, the Shuttleworth Foundation, the Ford Foundation and Heinrich Böll-Stiftung; [2] EagleView 2.0 is currently being funded by an international investment fund and UN SanctionsApp by both the Swiss and Canadian governments. [3] The information on funding is publicly available on the web and also appeared in some of the interviews as well.

Each of these apps gives visibility to unique objects of knowledge (gunshots, policing, UN sanctions), each way requiring a unique degree of negotiation between how much computation and how much explicit human work (what all the rest in-between) is acceptable in the process of making available; how much transparency will be allowed, both technically (open source/proprietary code, explanation of the work of the app, etc.) and institutionally; or how results are communicated (and with whom). Even the data collected and the method of collection make a difference in what can be known and how, what credibility is given to the information and how it is validated, etc. All these elements must then make sense in the broader purpose of the app. Take Fogo

[2] Available at https://www.institutoupdate.org.br/project/fogo-cruzado-pt/, accessed 06 August 2021, and at: http://fogocruzado.org.br/seja-um-doador/, accessed: 06 August 2021.

[3] Available at: https://unsanctionsapp.com/pages/about-us, accessed 06 August 2021.

Cruzado as example. Initially conceived to be a 'waze of bullets', it sought to provide a different technological product to those that were typically introduced to those affected by gun violence, which, according to Olliveira, were all ready-made initiatives that quite often dispensed community participation (COUTO; OLLIVEIRA, 2019, personal interview). And as we see in 3, this participation made possible through crowds: crowds posting on Twitter, crowds in WhatsApp groups, and crowds that would report the events directly to the platform, who help enact the gunshot that enters Fogo Cruzado's account.

The above mentioned UNDP report defines as 'm-governance' or 'mobile-governance', "the use of mobile technologies to support governance processes – within government, between the state and civil society, and within civil society" (UNDP, 2012, p.19). The expression itself is yet to stick in the expert vocabulary. But in looking back to the empirical chapters in this thesis, we see that the idea of mobile technologies as promoters of greater safety and security – through their low costs of access, operation and maintenance, the ease and pace with which they have expanded (especially in 'developing' countries), the apparent benefits that they entail for the inclusion of marginalized populations, the leveling of power relationships, the provision of public and private services, real-time access to information and the overall increase of participation in decision-making processes – is time and time again enacted and re-enacted through the architecture, design and everyday operation of UN SanctionsApp, EagleView 2.0 and Fogo Cruzado, with each enactment bringing about a unique configuration of what counts as insecurity, who/what is to be secured and how.

In sum, the complicated social webs which, to Latour (1994), separates humans from baboons, are strenghtened by an ever-increasing appeal to technology as means of treating intractables and extract what is tractable from them. Such appeal is reflected not only in the adoption and expansion of technology, but equally in the orientation of funding towards app development for safety and security. To recall TechLab director's observation, these are doubtlessly big areas of investment around app-based technologies.

6.4 Cutting the algorithm

I want now to turn to and expand on Marilyn Strathern's (1996) observation that every network or web, however, extensive and difficult to trace, will eventually meet its limits, its discontinuities. We have seen that the governance of intractables – whether it focuses on citizen participation, state modernization or in the networking of experts and local governance knowledge – must be negotiated, its terms accepted by an expressive parcel

of us, and its reach situated within a reasonable horizon of possibilities. To govern these intractables technologically is an exercise of enlarging: enlarging the scope of who and/or what can be governed, how extensive this governing will be, how many material elements will take part in the network, the possible means of governance, how tractable is the problem in question and who this treatment will enroll. But no matter how large it can get, there is a limit to the apparent endlessness of actor-networks, a point when expansion will start to decelerate, if not halt entirely, and that will define the boundary of the 'technological', setting-up the beginning of the 'human'. To Strathern (1996, p.531), this halting point can be attributed to ownership: "where technology might enlarge networks, proprietorship can be guaranteed to cut them down to size." And while I entirely agree with her, it is worth exploring the exact terms in which such cutting is performed.

I do not particularly tag along the division between the human and the technological, nor, I would risk betting, some of the readers that have been persistent enough to reach this point of the thesis. As Stiegler notes in the lecture "La société automatique", even the idea of hominisation (hominization in a very crude translation) presupposes that the human is only human through technique (STIEGLER, 2014). But even if we recognize the taut entanglement between the human and the technological throughout the history of humankind, it is undeniable that this is a division that lies at the heart how governing violence and insecurity is enacted and negotiated. One consequence of this would be that we would need to acknowledge that setting-up – the enframing that has concerned so extensively those influential western philosophers writing about technology that help ground my claim – is also subject to encounter insurmountable walls, which are themselves the limits imposed through the practices that substantiate such enframing in the first place.

This considered, it would not be entirely far-fetched to consider that the act of cutting, in my entirely arbitrary appropriation of Strathern's text, belongs thus to a legitimacy struggle around what counts as technology and technologically-mediated action. It is a struggle that takes place in multiple sites at once: around the creation of technical/expert milieu, which includes the definition of the boundaries between the human and the algorithmic; around the coherence between technical elements and the overall politics pursued by app creators; and around the technical and infrastructural enactment of key topics that appear to be core to global security governance (my apps orbit around four: transparency, accountability, participation and empowerment). This and the following subsection of the chapter will address the terms of such

struggle and its role in constituting an app's authority.

So far, I have been weaving the argument on authority to Bruno Latour's (1994) on complicated societies. To recapitulate: complex societies, that is, societies glued together through social skills, are a reality for both baboons and humans. But besides complex, the human society is also a complicated society, that is, mediated by artifacts, where social skills alone cannot explain the endurance of its arrangements. As he notes, "our delegation of action to other actants that now share our human existence is so far progressed that a program of antifetishism could only lead us to a nonhuman world, a world before the mediation of artifacts, a world of baboons" (LATOUR, 1994, p.41). Latour's emphasis, as an ANT theorist, is on the variety of connections – human, material or otherwise – that strive to make particular social arrangements endure. These connections are, in principle, endless, almost as if composing an ever-growing wool ball, indicating that, be it Kraken or squid, computation inhabits an ocean incredibly vast.

His point complements what I have been discussing in terms of the tropes representing theories of authority and their emphasis on social skills as drivers of authority. To be fair, there is also attention to rules and symbols, but more often as auxiliary or adding up to these skills. These skills may take varied forms: expertise or knowledge about a particular issue/matter; occupying a given office/position; the ability to make people accept commands, and so on. The complement comes in the recognition that artifacts, things, materials, etc., in addition to social skills, also constitute authority. In some cases it even appears that more decisively than such skills, such as when we see people arguing that it is humans, not computers, that are biased, that computation's authoritativeness has to do with the fact that it is objective, etc.

Relationships established between experts and their techniques entail a unique milieu of action/knowledge. For Callon, the idea of a *homo economicus* is the result of a process of configuration/framing that conceals its conditions of production, or "cut the ties between the things and the other objects or human beings one by one" (CALLON, 1998, p.19), rather than a natural, a-historical reality. In a similar fashion, crime, urban violence or international conflict are also always constantly being (re)configured not only in the skin of those living these realities or in the heads of those assessing them, but equally in how these apps both propose to participate in security decisions and frame the problems they seek to help address.

How the 'technological' and the 'human' are negotiated in this process foregrounds the emergence of a milieu where experts-machines identify the necessary conditions for governance and make themselves available to help

in security decision-making. These negotiations also comprise the attempts of one to define the limits of the other: what is responsibility of the expert, what is machinic work, where do they meet, and so on. For example, when EagleView's project manager tells me that "[T]echnology without process and governance serves absolutely nothing" (ARIEL, 2019, personal interview), it is pure boundary-making in action. They are telling me that the condition for a system like EagleView 2.0 to be minimally functional is its capacity to enroll good police protocols and practices. This is an tacit (but in their case, also explicit) acknowledgement that the road from how more efficient policing and, thus, statecraft, is conducted to how data is registered affects the final output of the algorithm, but is not regarded as part of the technology proper; rather, it either belongs to the realm of 'process' or of 'governance'.

More boundary making is at play when one EagleView's programmer, in response to a discussion about what prediction added to action over crime when compared to other criminal analysis techniques, noted that it would "give argument to the police officer, vis-à-vis the commander, to make [resource] allocation." I interpreted their usage of the expression 'giving the argument' as implying that computational calculations would help ground the decision of why to allocate a particular resource in a particular place. The sentence suggests that the authority of prediction (and, more pointedly, of the system) could be sustained by, one, the speed with which it provided the police with informed analyses for operational planning; two, the fact that it could make complex calculations while providing simplified results and, three, that this analysis could back up a police officer's decision about whether and how to allocate resources. All of this, would give policing more efficiency.

On the one hand, the ever-shifting delimitation between 'social skills' and artifacts helps define the scope of the technological, and, by consequence, its authoritativeness. On the other hand, this is always shifting precisely because, as I have already argued, apps combine many different things together.

Previously, I wrote about how, for Biersteker, the authority of the app's creators is embedded in the UN SanctionsApp, their expertise constructed into this app through the hyperlinked menus, case analyses and descriptions and effectiveness evaluations. But because expertise is often challenged and contested, it needs constantly to be performed and made circulate: "The extent to which expertise remains accessible, timely and useful through the invention of new forms of distributing and working with the information influences the likelihood that the instrument in its material embodiment retains its authoritativeness" (BIERSTEKER, 2018, p.162-163). It is also precisely this embodiment that allows for such expertise to be successfully

employed by diplomats, government representatives, and others, as their own. Individual expertise is surely an important kickoff. I more than once heard the question about whether UN SanctionsApp's relevance, use, purchase, etc., was not because of the knowledge and credentials of Biersteker. But as the app circulates, through training courses, 'mouth-to-mouth' and institutional advertising, the boundary, however temporarily, fades away. What comes in its place is rather how this expertise gets further and further entangled – through the app many menus, databases, and sources of data – with governance groups and expertise 'on the ground.'

A similar thing happens to Fogo Cruzado. Its origin story can be traced back to a spreadsheet, which was instrumental to the efforts of one person, Olliveira, to do counting. The impression of a former analyst was that, in practice, the app was indiscernible from the figure of Olliveira: "the app is Cecília" (Fieldnotes, June 2019). With this, they meant that it still remained a very much personal project, somehow attached to its creator's experience with covering armed violence as a journalist. But however relevant Olliveira's figure is/was, I could observe during fieldwork that the app's authority, and the resistance it encountered, were mostly credited to the method through which data was produced and to how it was communicated.

We already know that the app, its database, analysts and users, all play a role in the outcome that is a gunshot notification or its register in the database, and later its aggregation, disagreggation, combination and re-combination alongside other events in the daily, weekly and monthly reports, in such a way as to provide a snapshot of the state of the art of gun violence in a particular neighborhood, region, or municipality. We have also been following its trajectory from the gun chamber to a notification in a smartphone screen, along with all the actors and actants enrolled in the way. This trajectory, alongside the protocols designed to make sure it is repeated again and again, amount to what I mean by method of data collection/production.

The method, the methodology, both are perceived to be aligned with the purpose of opening up public security to the scrutiny of civil society, including by making it possible for civil society itself to participate in the setting of the security agenda and, from such position, attempt to influence the variables which state authorities take into account when planning and effecting its security policy. "This database is important because it thematizes a topic that did not exist before... [I]t stimulates this approximation of civil society with this thematization of security" (COUTO, 2018, personal interview).

The other side of the same coin – the app – comprises the problem of communicating the database. In our talk, Couto is quite clear that the

app was not a must for collecting data and that they never wanted it to be simply to extract information. Rather, "the app is important because it returns to people what is happening in real time" (COUTO, 2018, personal interview). And, alongside with real time communication, comes an attention to how information is communicated. Part of this I have discussed in chapter 5, but it may be worth recalling: it went from an attempt at devising a 'neutral language' – whereby no judgements about the status of the victim of a gunshot or whether or not to avoid a particular region, were allowed – to an embrace of storytelling while maintaining the same ethics of communication, of not worsening the situation of the victim or not resorting to derogatory language; it also involves an attempt at building methodological credibility by inviting academic scrutiny over the database and the delimiting of a time-span of 30 minutes, between the time when the event was first reported and the time it was validated, for it to be sent as a push notification. The dynamic of real-life events is an ever-present challenge to such communication:

> Our biggest challenge is that we are working with a phenomenon that is pretty much alive and changes all the time. So we need to be always alert to be able to account for the new dynamics and the new issues... without changing the methodology. Because we want to be a database that will help public authorities to do something. For this, we need a solid database. We need a solid historical series, that can be comparable, that can serve to evaluate public policy. So we need to account for what's changing without changing the methodology. (COUTO, 2018, personal interview)

I will soon return to Couto's insistence on keeping the methodology true to its original purpose, which basically consisted on hearing the community and being attuned to what people were experiencing as gun violence. For now, I hope to have exposed some more threads of the argument – that the setting-up of governance issues is a complicated play of (in)visibilities, where the roles of apps and humans are continuously re-negotiated, entangling the 'technological' with the 'human' in multiple ways (e.g., Fogo Cruzado's data analysts as algorithms), that sometimes erects boundaries between experts and apps, defining clear-cut roles for each, or that sometimes benefits from the enmeshment between those (e.g., UN SanctionsApp expanding expertise, leading to the adoption of expert categories without explicit knowledge that these are expert categories), and that, moreover, defines what intractables can be nevertheless treated (through indicators, effectiveness evaluations, criminal analysis, etc., all substantiating more informed decisions), despite their difficult conditions.

The second moment of my engagement with Strathern's movement of cutting concerns the problem of ownership properly, that is, where proprietorship defines the scope of the technology in question. Openness – understood as the act of making data as well as the processes surrounding the creation and operation of the app widely available through open software, open databases, etc. – is part of a web culture anchored on ideals of a transparent, collaborative and participatory engagement, which would better communicate the political and democratic potentialities of the Internet. This is partly the rationale behind participatory crowdsourcing, and more strongly the case of open source software and open data. "Democracy is this" Bel notes during the interview with Olliveira and her, "you provide data in broadly and transparently. Of course this presents some dilemmas. Anyone can use our data to argue whatever" (COUTO; OLLIVEIRA, 2019, personal interview). Likewise, Tourinho explains to me: "when we created the app the idea was to democratize the level of knowledge of elected members of the UN Security Council... In practice, the power of veto was only one among many aspects of power in the Council." (TOURINHO, 2019, personal interview). In a different occasion, Biersteker observes regarding the way the app works,

> It is transparent. And it is available. I am not saying that we get everything right, I mean, there is so much we try to cover. But I think we did a pretty good job of covering the basics in a systematic way which I think contributes to the authorities. [T]he authority [of the app] comes out of the broad, multinational, and quite serious scholarly standard we used to build up the consortium, and then the ways in which we develop the app and update it. (BIERSTEKER, 2019, personal interview).

The 1.0 version of EagleView also professed its commitment with transparency and openness. Because it was publicly available, TechLab staff, in many of the interviews and op-eds they have published, argued that the app would belong to a wider movement to make data open and accessible and to contribute to empower the public to get involved in crime prevention. It is worth noting that this commitment, however, was somehow partial, especially considering that its code was proprietary. This is the side of the spectrum of openness/closeness where proprietary software lies. Proprietorship restricts how a software and its components, including data, can be used, modified and shared, while generating revenue to its owners in the form of revenues from use licenses.

EagleView 2.0, likewise, saw a spectrum of closure in place as it morphed into a police-facing platform: when I first approached TechLab to ask

permission to conduct this research, there was still the desire of developing such platform as open source. Furthermore, having an open source software would be coherent with their initial intention of building transparency and accountability into the platform. However, the new shape of the app would push it towards more traditional, proprietary designs, truncating the presumably endless interconnections enabled by the use of open-source software.

Making the algorithm proprietary not only excluded the possibility of outside and independent collaboration (in favor of hiring private consultants and developers), it also defined the two rules under which the tool was going to circulate: commercialization and intellectual property rights. The controversy surrounding the ownership of the 1.0 version was finally resolved: TechLab could now have ownership and control over who could access the source code and other details about EagleView 2.0, and they could claim to have conducted fairness tests and follow algorithmic accountability standards while sketching how much information about these practices would in fact turn public. This shift therefore reshuffled the contours of the app's call for algorithmic transparency. Algorithmic transparency, a commitment implemented in different layers of EagleView's algorithms, had its reach cut down in size.

6.5
Democratic, participatory, accountable

To Strathern, ownership cuts networks down in size because it curtails relations between persons (and, given intellectual property over algorithms, between persons and artifacts as well). Ownership establishes commerce as an evaluation criteria pertaining to who should belong or not into a particular relation or arrangement and what can be known and analyzed about it. It establishes belonging and property at once: "belonging divides and property disowns" (STRATHERN, 1996, p.531). The owner has the power to define who is in and who is out of the network.

Like it does with the case of patents over research on blood testing for Hepatitis C that she explores, ownership also has the power to curtail the relations afforded by digital technologies. The discussion around proprietary, 'black box' algorithms and open source technology is a case in point, but this is an issue that in fact also already comprises those attempts at making oneself more 'open' and 'transparent'. Remember the Swissnex event that opened this chapter? At that time, the three apps promised to make things more transparent and accountable also by making themselves equally transparent and accountable. Transparency and accountability are profoundly entangled in the issue of ownership, especially as they come to be seen as fundamental

principles of civic and institutional democratic governance, and more so of the kind of governance that digital technologies are supposed to enact.

So, in principle, it is should be of little surprise that apps intending to democratize, modernize and make themselves or some organization more accountable would pay attention to both. Of course, what it is meant by transparency and accountability, in each case, was (and remains) a very infrastructural and technical matter, this is to say, it depends on how the app is configured to enact both principles. However, some commonalities can be observed. One is the fact that transparency, in each case, is about openness – of the app, its story and technical processes to whoever asks for it or seeks it. We can see this transparency-as-openness at work in the recent introduction of Fogo Cruzado's API and its promise of a more immediate and at-hand access to their data, in the availability of UN SanctionsApp quantitative database and codebook online for anyone to download, and even in the disposition of both apps' teams to answer to interview-, chat- and other requests from the public, researchers, etc.

At the same time, transparency and accountability are also about publicness: the fact that the information conveyed through the platform, app or its database can be accessible to anyone, instead of hidden and only accessible to an exclusive group. Both Fogo Cruzado and UN SanctionsApp are public apps, meaning that they can be downloaded and used, in all of their features, by whoever is interested in doing so. For Fogo Cruzado, in particular, openness is also premised on having their database publicly available. These are Bel's words from our very first interview, back in 2018: "Today, we are more than an app. We are a data laboratory on gun violence" (COUTO, 2018, personal interview). This was also emphasized by former data analysts working from the Recife: "We are a data lab, we provide data to whoever wants to use it. Our database is always available to anyone, be it an organization, or an individual doing research. Our data is always there" (CRIS; DOMINIQUE, 2019, personal interview).

Transparency-as-publicness was also the main characteristic of the first EagleView and its purpose of making crime prediction open to the public, rather than a prerogative only of police departments. Among other things, TechLab expected that the platform could help its users to address the often present mismatch between crime data and the overall sensation of insecurity, that it could "help citizens to better understand the nature and distribution of crime in city X" (TechLab director, 2019, personal interview). However, part of the process of EagleView's closure started with the idea of having an 'inward' facing platform that would nevertheless have an open source algorithm. This

was still the plan when I boarded the project, something which Benjamin was most likely the strongest advocate.

Benjamin's compromise with transparency was evident from our chats. Not only he would answer to every question of mine without sidestepping it, but he would also raise topics and problematics of interest himself, especially regarding the need of working with techniques that would enable documenting the code (and details about these techniques that were too technical for a social scientist to fully grasp), the problem of transparency in large, complex codes (which he called 'dark grey boxes'), the limits and issues of prediction, police data, as well as the problem of bias and discrimination in those, among others. He would show me prototypes, advocate for my participation in meetings and openly discuss the algorithm (in a non-technical way) with me. Initially supported by TechLab director, he also wanted to have my help with the algorithm's social impact statement.

The question of transparency is ethically relevant to the authority of any app that professes to be democratizing. Considering that transparency is highly valued as a democratic practice, attempts at circumscribing it by closing the code of the app or restraining access to its data will be typically regarded with skepticism. Despite the concerns with algorithmic accountability that followed the entire development of EagleView 2.0, TechLab's plans to expand their tests with the app faced heavy criticism by civil society activists, who would argue that TechLab was not transparent about the development of such platform. Besides myself and TechLab's staff, the development of the software only welcomed a handful of people, most of which were hired or consulted to help them figure out how to build accountable predictive algorithms.

One obvious problem, however, are the obstacles to making things effectively transparent. Recall Benjamin's observation that codes that are transparent but simply too complex and gigantic to be properly analyzed – even by specialists – in the end are also fairly opaque.

Transparency-as-publicness was thus not the only form of transparency available to TechLab's designers. With the shifts that the EagleView project underwent since even before I started this research, and with the gradual closure of its algorithm, transparency-as-accountability became increasingly important. In the case of EagleView 2.0, accountability was double sided: on the one hand, it involved processes that would 'improve' the accountability of the system – documenting the code, fairness testing, data de-biasing, designing a social impact statement and following FATML principles. On the other hand, it involved creating accountability within the police, namely, making their practices more easily traceable internally, by having the system to inform

decision-making while making the knowledge about policing patterns available (perhaps not widely, but to the right people in charge of designing strategies of policing).

In the literature, the idea of algorithmic accountability complements but goes beyond mere transparency. It takes part on a certain audit culture (STRATHERN, 1997), in which "organizations are increasingly asked to be transparent about their dealings and ways of operating" (BUCHER, 2018, p.43). In the case of algorithms, audits, it is believed, could facilitate the detection and combat of algorithmic discrimination (SANDVIG et al., 2014). This idea depends on seeing algorithms as black boxes and, as such, as presenting us with the epistemological problem of the unknown that must be known, unveiled (BUCHER, 2018). But it goes beyond transparency because to claim that an algorithm is accountable is, in the end, also a claim of authority. Not one to rely on making things too public, but rather a claim informed by soothing presences – maybe of a social impact statement, of computational tests to prove that the system is not biased, or of principles validated in the industry.

6.6 Sticky authority

The exercise proposed in this thesis so far has been, oddly enough, one of undoing. Like it happens with a wool ball which threads we expose after slowly disentangling them. The undoing should demonstrate that very similar practices may serve to different governance purposes, but nevertheless concur to a common goal, which is to make some issues governable under certain terms. For example, there are some aspects of gun violence that can only be widely known as people talk about them in social media. Someone curates this and asks more people to report. These reports and all the information associated to them (time, place, contexts of the incident) become data, which is then returned to the user in the form of push notifications, real-time tweeting and posting, weekly and monthly reports, as well as 'grassroots' statistics. These can then serve to 'self-governance' purposes in face of state failure, inefficiency or incapability of solving these issues (COUTO; OLLIVEIRA, 2019, personal interview).

Maybe the purpose is to explore a market niche, one that is often overlooked by predictive policing vendors focused too much on the US and European markets. In this case, the governance goal is quite clear: to sell a solution that would empower state authorities with 'first-world-like' security apparatuses in order to make them more 'efficient', certainly not in the sense of

reducing social and economic inequalities that may be related to the 'endemic', 'chronic', and 'intractable' history of crime in these places, but rather in the sense of responding to crime and other events under their responsibility and under the scope of what computer algorithms can currently work.

Or maybe the purpose is to generate and disseminate, from the standpoint of 'international governance', up-to-date knowledge on international policy instruments, like UN sanctions, which in this case depends not only on having the adequate expertise to do the job, but also on making connections through the 'cases' that will be studied and used as references for decision-making. International governance, in this case, is enacted from a very unique standpoint, namely, that of those who design these sanctions.

These three apps intimately weave through very specific Global South contexts in order to operate: Fogo Cruzado, on contexts where gun violence is not only pronounced but equally public; EagleView 2.0, on contexts that ideally are on their way through technological modernization; and UN SanctionsApp on the contexts directly targeted by UN Sanctions. Knowledge of such contexts is fundamental to the assembling work of these apps, as is the possibility of rendering their chronic issues governable.

Algorithmic authority, according to Lustig et al. (2016), owes to the proliferation of big data and to the expectation that this data will be transformed into knowledge and inform decisions. Also, algorithms are no longer viewed as mere code, but rather represent "the authority of organizations in a variety of domains" (LUSTIG et al., 2016, p.1058). Moreover, algorithmic authority has also come to permeate our tripartite framework for security governance, namely, citizen participation in decision-making, public sector modernization and the networking of international sanctions expertise with local knowledge or knowledge produced from 'the ground', that is, from either local communities and specialists or from specialists who have been stationed in particular places and therefore have comprehensible knowledge of their dynamics. This makes our apps "obligatory passage points of governance" (CALLON, 1984) before our decisions are issued and crystallized through another series of decisions.

These frameworks are intimately connected to how algorithms come to define the contours of governance, as well as what come out of the system as a crime, violence or international sanctions expertise. In the first case, these contours depends on having the app to nurture forms of user engagement and reporting to keep its database – and, by consequence, numbers – alive. In the second case, an accountable system is a modern system, since it seeks to improve the use of time and resources in policing while following certain international standards and good practices shaping what the fine lines of

accountability should be (e.g., Compstat, FATML). Lastly, these contours are sketched by liaising the international with the local, the decisions taken in Geneva with the knowledge they need so badly and that come from the places targeted by UN sanctions.

The authority of algorithms depends extensively on liaising with and through the Global South and its 'endemic' and 'intractable' problems of crime, conflict and violence. The assembling and reassembling that apps enable make these issues miraculously governable, even if partially. They make it possible to adapt and to transform knowledge into data and, more immediately, render it available to inform decision-making – human and machinic – and make this knowledge required for them to work seems like it has always been theirs, and theirs alone.

We are left with the constitutive excesses integral to the work of apps. Anthropologically, the concept of excess points to us those practices that cannot be comprehended nor grasped by modern practices, forcing them to be continuously negotiated (CADENA, 2015). The practices I have been navigating here, however, unlike those explored by Cadena (2015), do not present us with radical difference and ontological disagreement – we have never left the 'modern' terrain, in the first place. And since we never leave it, the excessive may not seem to be overwhelmingly exceeding. Still, they introduce to us different systems of knowledge production that ultimately come to exist through computation. Sometimes, it may be the case that these systems of knowledge resemble each other, sometimes they are quite divergent. Excess remains excessive nonetheless, because it is both in these apps interfaces and it is not, sometimes it appears in icons, categories, databases, numbers or even in maps but never explicitly as necessary.

Perhaps similarly to what Callon (1998) notes with regards to market relations, apps seem to themselves disentangle from their conditions of production, such as their funding constrains or maybe the somehow colonial impetus of computing it all that animates the commercial infrastructures on which they depend – nevermind that the making of security is profoundly relational. The problem is that, sometimes, this relationality gets too complicated.

Of course, this authority does not go uncontested. Contesting may come as a dispute to the methodology of data collection (e.g., Rio de Janeiro state government has, many times in its early years of operation, questioned the reliability of Fogo Cruzado's method), questioning by representatives of the countries targeted by sanctions (in our interviews, Biersteker has more than once resorted to anecdotes where the app's content was questioned by diplomats from these places), and eventually skepticism from their own user

base (including how some police officers are still more interested in person, rather than place-based prediction). Yet, and because of the capacity of these apps to re-combine again and again, rather than suggesting an undoing of authority, contesting somehow expose its stickiness.

7
Concluding thoughts

I would like to think of this thesis as an attempt to slow down. To slow down in the sense proposed by Stengers (2008), which comprises an effort not to denounce, but to expose, to make perceptible. But to make perceptible what and for what purpose, the reader may ask.

Digital politics is hardly a shady niche in security studies, restricted to those who would guard some enthusiasm and almost childish fascination with the technologies they write and research about. Whether the expression is openly employed or not, the unique intermingling of security practices and digital technologies which it communicates has become the focus of attention of a multitude of research agendas, from peacebuilding to policing, from development to border management. They go places, travel across the world, sprout in unique forms, embodying the connections they find in their way, and shape-shift, sometimes to become almost unrecognizable. To borrow Donna Haraway's words, they "rearrange the world for purposes, but go beyond function and purpose to something open, something not yet" (HARAWAY, interviewed by GANE, 2006).

In slowing down, this thesis has attempted to both to assess and to make perceptible. To assess the profound relation between technology and domination that philosophers of technology insistently warn us about (FEENBERG, 1995; LYRA, 2014; HEIDEGGER, 1977; HAN, 2017), while refraining from denouncing it, at least for now. To make perceptible both the resilience and the cracks in this relation, and to 'fabricate connections', 'lines of flight' able to concur to the provisional 'not yet' possibilities left by these technologies (STENGERS, 2008; GANE, 2006). In this sense, slowing down becomes wondering – wondering about the possibilities, but also constraints, of digitally embodied political action in, through and for the Global South.

Where are we to find these lines of flight? This thesis hints at the different enactments that apps give to simplification (chapter 3), formalism (chapter 4) and objectivity (chapter 5). Through them, I have tried to make explicit the extent to which computation connects with and across particular sites, objects, and people, from the entrepreneurial ideology embedded in the infrastructures built by the Silicon Valley to 'grassroots' and other apps developed to leverage institutional power relations (UN SanctionsApp), produce real time information on gun violence (Fogo Cruzado), and make police work more efficient and accountable (EagleView 2.0). We would be mistaken to assume that the three

logics explored throughout these empirical chapters are overarching, or rigid. It is their flexibility, their ability to bend, make and re-make connections, and to *compel*, that make computation particularly powerful but that, at the same time, offer us possibilities for engagement.

I have argued that apps are artifacts of governance that build their authority through the particular ways they engage the local and thus productively complicate, in the Strum/Latour sense (STRUM; LATOUR, 1987), our accounts of North-South inequalities. There were two senses in which I have mobilized this idea of complication. First was to show how governance work gets distributed across apps and their infrastructures and beyond human intentionality. This is not to attest to their intractable autonomous character, but rather their partial and distributed configuration. Recognizably, the "highly technical, part-automated terrain" of computation is continuously "littered with humans working in a range of sensory roles and registers" (JOHNS, 2017, p.67). More practically, such an understanding entail acknowledging apps as not merely instruments through which the digital is actualized, but as forms of distributing action: as argued throughout the work, their many affordances and techniques/tropes empower, contribute to making them proxies for modernization and governance, and connect together dispersed contexts and knowledge.

The second sense in which I mobilize the idea of complication has to do with methodology. Chapter 1 ("Introduction"), where I lay the foundations of the thesis, has advocated for a parasitic engagement beyond denunciation, one that acknowledges the ethico-political troubles of considering both the words of the powerful and the powerless, and the relevance of getting implicated in what we research. In this work, I have explored the former through my attention to the three apps, which range quite interestingly from a bottom-up, citizen initiative of monitoring not only gun violence but official security policies, a middle-up-down effort to modernize and provide mechanisms of governance to the police, and a effort to flatten, even if timidly, the enactment of 'top-down' international sanctions policy; and the latter through my engagement with and continuously blurring of my role as researcher and user or collaborator throughout the research. Evidently, this strategy is not intended to produce even more inequality by treating unequal relations as equivalent, but more pointedly to force the analysis to take seriously the conditions of possibility for both 'world political bads' and goods (AUSTIN, 2019a, p.217), as well as the limits of *only* resorting to denunciation of overarching logics of domination and violence as a strategy of change. It is only by seriously engaging with the many possibilities, including those that do not please us or with which we see ourselves in a normative disagreement, that we may properly advance

affirmative and engaged forms of action informed by critique.

Some of the troubles that this form of parasitic critique may encounter have been continuously acknowledged and confronted by different forms of activism, such as social movements struggling against violence. For example, while denouncing the violent policies carried out by the security strategy of the state of Rio de Janeiro, initiatives like *Memorial da Violência Armada* (Memorial of Armed Violence) by Fogo Cruzado Institute have mobilized Instagram's infrastructure to share the stories of the black bodies victimized by gun violence. Owned by Facebook, Instagram takes part in the same infrastructure which has provided financial and other means for the ample circulation of fake news and misinformation during the 2018 Brazilian elections. This infrastructure has recognizably contributed to the election of 'hard line' politicians aligned with the current president Jair Bolsonaro and who have supported aggressive and violent public security policies that target black bodies and peripheries more strongly (HAO, 2021; ARIMATHEA; ROMANI; WOLF, 2021). These connections, as well as the troubles and political possibilities that they entail, are more carefully discussed in Lobato and Gonzalez (2020), in the context of feminist activism during the 2018 elections in Brazil, and will be further explored in future research.

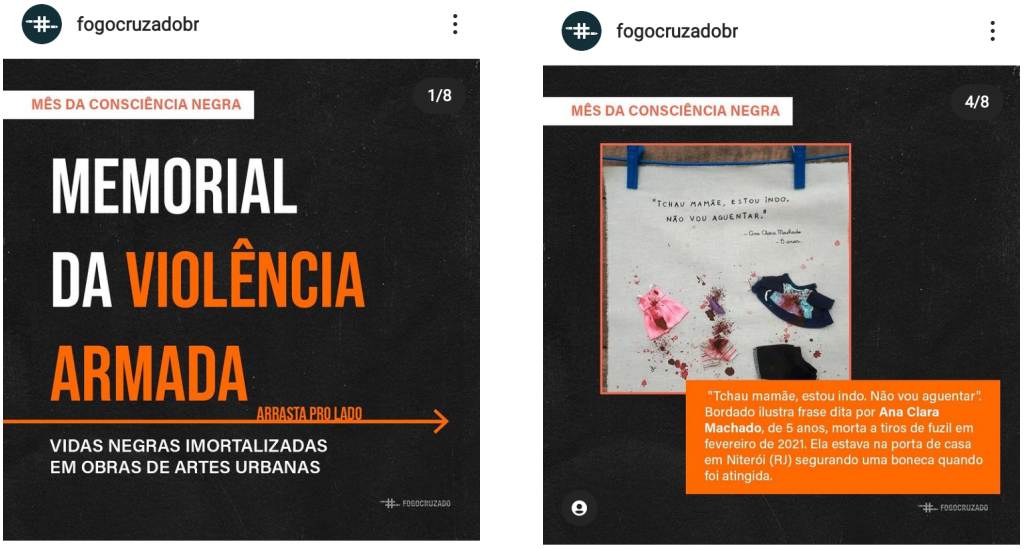


Figure 7.1: Memorial da Violência Armada on Instagram

In the case of this research, this complication also spans to my collaboration, even if limited, with the making of EagleView 2.0. On the side of TechLab, this collaboration was mainly guided by an assumption, much like what is typically the case with regards to 'human scientists' (AUSTIN; LEANDER, 2021, p.50), that my role, would be to reflect on the kind of ethical challenges of

the system. Considering that the promise of an official collaboration was hindered, it is hard to say if and how I have effectively affected the course of the development of the tool. However, even after my participation in the social impact statement was revoked, I – together with TechLab's social scientists – was still expected to offer my insights on what aspects of data the team should consider in order to reduce bias and discrimination. In addition, many of the exchanges and non-official collaborations established throughout fieldwork – and here I no longer refer exclusively to EagleView 2.0 – have come to inform how I would observe and interpret the events surrounding me. My continuous and close attention to Fogo Cruzado's social media publications, for example, have come to profoundly affect my perception and form of engaging with the topic of urban violence in Rio.

The complication above blurs the distinctions between the sites that we research and ourselves and may be read as part of what Austin and Leander (2021, p.3) call "problematically dirtying our hands." This form of engagement is (sometimes for good reasons) viewed with suspicion by many in the social sciences. The fear is that it can interfere with the credibility and independence of the research, serving as proof of the complicity of the researcher with problematic practices. This fear is especially valid given that it is not uncommon for the conditions of production of research to be deliberately occluded in the name of a very specific form of scientific objectivity (LEANDER, 2016).

The problem is that the other option left besides getting involved is most of the times to sit in our chairs and denounce. And to get off the chair, one has to get implicated. Sometimes with things they do not agree with. Of course, denouncing is politically important and I have not been not arguing against it. Instead, what I have argued for has been to *also* acknowledge the possibilities left for acting (against the political bads) with/in as a way of moving along, especially when we cannot close our eyes to our own complicity (HAN, 2017; AUSTIN; LEANDER, 2021). In intermingling the three case studies, it has been my intention to show that apps could provide us with such form of acting. That the three of them have been developed entirely by academics; by a journalist backed by a civil society organization (and more academics); and by a research lab full of academics, should work as an indicative of this possibility.

The methodology of the research has also informed the careful crafting of the connections between apps and security governance in/of the Global South with which chapter 1 has engaged. The chapter has proposed to understand the innovative thrust of apps through the many reassemblings they entail. These

reassemblings are responsible not only for inscribing apps into the seemingly overarching infrastructures of the digital, but fundamentally for opening them to re-inscription, circum-scription and sub-scription, as they permit digital technologies to travel beyond our much too familiar centers of innovation.

The emphasis on the (re)assemblings practiced by/through apps has exposed a first attempt of fabricating these lines of flight. The import of an assemblage-inflected materialism into IR has been celebrated for its promises of heterogeneity, fluidity and contingency, and their potential to circumvent, undermine, perhaps even challenge, the rigidity of the 'striated' territory of hegemonic domination (DELEUZE; GUATTARI, 1987). The recent shift from cyber-utopia to a disenchantment with a too familiar power-inflected digital politics, however, has taught the most optimistic that fluidity, contingency and heterogeneity may not always be on the side of resistance and emancipation (KAUFMANN; LEANDER; THYLSTRUP, 2020).

The first of line of flight crafted in the thesis has thus explored the ambivalent strategies of countering violence and (in)security afforded by the use of apps in the Global South. The cases of Fogo Cruzado, EagleView 2.0 and UN SanctionsApp have helped me illustrate the connections and dis-connections involved in governing with apps. On the one hand, these may be connected through their normative ambitions of empowering, democratizing, and giving more transparency to political institutions, and resort to more or less similar infrastructures to circulate and operate (Amazon, Google, Apple, Twitter, Facebook, etc.). On the other hand, they diffract quite traditional images of security referents (Man, State, War) while also advancing quite distinct, sometimes contrasting, approaches to security politics and governance. These apps should moreover guide us through the manifold and quite contradictory possibilities of acting with complicity.

Chapter 2 ("Governing through apps") has built the case that apps entail a processual understanding of political authority, an understanding that looks to the production of authority beyond the much too familiar bounded subjectivities of Man, State and War, towards the many '*ings*' implicated in the problem of governance. The chapter weds the study of sociomateriality with the study of governance, in an attempt to nurture the ghosts that have long haunted the making of security politics. These ghosts are particularly frightening in that they force us to cast a different look into a problematic with which political scientists and IR scholars have long been familiar with – political authority – and disfigure it to the point where some of us may find it difficult to recognize.

The parameters under which apps render particular events and objects

governable, quantifiable and tractable, the very things they render governable, quantifiable and tractable, and the authority with which they do so, attest to their active role in the political economy of knowledge production around violence and insecurity. What gets engaged and how: the different, ambivalent and likely conflicting answers that Fogo Cruzado, EagleView 2.0 and UN SanctionsApp offer to this same question should work as a reminder of the epistemological and ontological limits of a non-monstrous account of global politics – one persistently structured around the Man/State/War paradigm – as well of the impossibility of an universal, top-down and detached account of computational governance, whether it is about the South or the North that we are speaking.

And the same parameters that constrain may equally open up or suggest possible ways of political action – not detached, but with and through. The rest of this conclusion ponders about the practical impossibility and naivety of any theory or philosophy proposing to disengage, disconnect or detach from the authoritative infrastructures of computation that now mediate much of what is produced as security, as well as the many disputes around it. This, of course, includes our apps, and possibly us, as researchers, to the extent that we may be also capable of developing our own apps. The following sections will keep pushing for an embodied and situated account of political action, one that is fully aware of its own complicity with such infrastructures but still engages with them, nonetheless.

The arguments raised in the thesis are deeply connected to the empirical research that grounds the writing of the three chapters in part II ("Simplification", "Formalism" and "Objectivity"). In addition to conveying the empirical part of the thesis, these chapters concur to this research's efforts at having the Global South as a ground from which to conceptualize the digital politics of security. Crucially, this implies regarding the 'South' not as a mere recipient of these technologies, or a laboratory where they can be thoroughly tested and applied, but as their active maker, one that makes 'in' and 'through' – in/through the South, and by combining and re-combining many different infrastructures, expertise, data collection methodologies, and contexts. To acknowledge this condition of maker should also serve as a reminder that as much as the South may reverberate through app like Fogo Cruzado, it may as well do so through such apps as EagleView 2.0 or UN SanctionsApp.

7.1
Global South and the politics of the digital

Mainstream tales around governance and digital technologies are often tales of a single history. With many different starting points, they typically converge into the groundbreaking set of innovations produced in the US and to some extent Western Europe: the computer, the Internet, the knowledge economy. These tales then breed a Trojan horse, one which persuades us that the history of technology is universal and has various stages of development. This single tale engenders the idea that some places are more advanced than others with regards to how they create and use these technologies, alongside a division of labor where the boundaries between makers and takers are discreetly set, with takers finding themselves stuck in the perpetual cycle of catching up to the next stage of technical development. This thesis has been an attempt to undo this view.

Yuk Hui (2020) has coined the concept of technodiversity to complicate the tale of a universal history of computation. Hui says that technodiversity would be an attempt at stepping back, at accepting the many different cosmotechnics involved in the making of such history. The question of cosmotechnics, he notes, revisits that of locality – not to partake in attempts of reinforcing ideologies or national and ethnic identities, but as an opening to the existence of many different, partially connected systems of knowledge. In proposing to understand apps as assemblages, this manuscript has tried to engage with a similar revisiting of 'locality' (including locality produced in the North through the South), with the explicit aim of attesting the partiality of strategies of governance and authority that, unwittingly or not, still stick to the project of a 'smooth' universality.

But maybe, instead of diversity, we are possibly speaking of a (techno)plurality. bell hooks in her book *Teaching Community* (2003), notes that what distinguishes plurality from diversity is that while diversity suggests the existence of differences in communities – whether it is differences related to race, ethics, religiosity, or forms of computing –, plurality entails a commitment to communicate and properly engage with such diversity, and, therefore, with the many forms of computing that there may be both out there and profoundly entangled with dominant computing practices (see also: KOTHARI et al., 2021). As Mignolo (2012) remind us, the localities which we have grown used to associate with the 'West' or the 'North' are themselves that: situated localities, albeit localities with universal ambitions, with their own cosmotechnics. These cosmotechnics, in turn, may suggest alternative and perhaps less colonial and divisive forms of creating and using knowledge computationally,

while also reminding us of the risks of complicity and co-opting by dominant digital infrastructures – current and future.

This research has furthermore intended to serve as an exercise of translation of sociomateriality into the study of Global South security politics. Many of its concepts, insights and ideas were borrowed from STS scholars, inspired by the recent attention that STS has got in critical security studies (BELLANOVA; JACOBSEN; MONSEES, 2020; EVANS; LEESE; RYCHNOVSKá, 2020). One contribution of this approach to the study of global security politics has been to make explicit the various ways in which normative and regulatory considerations around security are inscribed into and possibly re-inscribed by digital infrastructures; as well as the question of how these infrastructures allow these considerations to spread far and wide, certainly not remaining unchanged. I have sought to contribute to this literature by emphasizing the production of security politics beyond the scope of the traditional 'makers' of digital technologies and by foregrounding the paradoxically provisional yet sticky governing arrangements that come into being through app assemblages.

I have approached Fogo Cruzado, EagleView 2.0 and UN SanctionsApp as heterogeneous systems of knowledge that embody, mix-up together, engender – even dispute – distinct governing arrangements (Chapter 6). One the one hand, these apps are embedded in an oligopolistic yet fluid capitalist market for technology, one whose tentacles spread far and wide through apparently seamless infrastructures and affordances. This part of the argument has sought to call attention to the way in which distribution and fragmentation (particularly through digital infrastructures) may conceal power and make it more pervasive. On the other hand, their relationship with these infrastructures is not one of absolute reflection and automatic reproduction , but of diffractive repetition and difference. This means to say that apps, to follow Donna Haraway's remarks in the introduction to this chapter, re-arrange while remaining indeterminate. We must, however, not rush to assume that indeterminacy and open-endedness are always on the side of resistance against racist, capitalist and unequal power arrangements. They may be, and then may not be anymore. They may have never been. Or indeterminacy and open-endedness may find themselves in a state of not knowing on which side they should serve. Seeing the South as a maker of technology as proposed by this manuscript implies a commitment to the ambivalence of governing through digital artifacts.

As systems of knowledge, the three apps convey unique forms of enacting 'democratization' and 'empowerment', be it in enhancing access to knowledge, in creating new categories to quantify violence, or in improving the police's managerial capabilities. They also inscribe these aims into very distinct tech-

nical forms, embedding ways of knowing and experiencing the world that significantly affect how we perceive it. In this manuscript, I have emphasized a few such forms: crowdsourcing, hyperlinking, and filtering, but I could also have offered a more extensive list. The point was to make explicit the distributed and processual nature of governance and authority in the context of digital technologies, to mobilize Stengers' (2008) refrains in the benefit of a more nuanced understanding of political authority and global security politics, and, of course, of political action. The authority of apps lies not on the lap of those who create them; rather, it comes into being through the many things and processes that these artifacts combine together, the expertise of their creators included.

These knots or nodes that tie together an app comprise unique modes of knowing, seeing and acting connected to a particular practice or locality, something which I have tried to foreground with the case of Fogo Cruzado and its attempts at mimicking how local inhabitants of Rio de Janeiro used social media to talk about episodes of armed violence. They may also comprise the adapting and re-inscription of technologies imagined elsewhere to the realities presented by context, something which we have seen in EagleView's hard time implementing the predictive component of its platform. And, of course, they include the ways in which apps inscribe 'the South' into wider mechanisms of technical governance, foregrounding the imperative of knowing in order to govern more efficiently and inclusively. We see this at work in UN SanctionsApp comprehensive databases, which work to inscribe the contexts of its 'cases' in the annual updates to the app to leverage the unequal relations structurally embedded into the UN Security Council. But, to different extents, it would also be true for the other two apps.

Of course, this authority does not go unchanged, uncontested or non-negotiated. It is true that the digital is frequently proposed as a (sometimes all too easy) response to different kinds of security issues, but it is also the case that its exact terms are continuously disputed, negotiated, sometimes even circumscribed. To the extent that it opens up room for a more pervasive form of power, this flexibility equally allows for doing things differently, even if differently only within certain limits, for example, as in the attempts to prevent the identification of users reporting armed violence incidents, or refraining from including into the system data that would make it easier for the police to identify and track down whoever they assume to be a suspect.

At the same time, to the extent that we are speaking of ever-changing, modular infrastructures, their terms are, to a more or lesser degree, prone to reconfiguration, for better or for worse. At the time that the first draft of

this conclusion was being written, EagleView 2.0 faced considerable criticism from civil society activists for wanting to expand the number of prefectures where it would be piloted. While there had been scattered information around EagleView 2.0 available on TechLab's website since at least 2016, the call has placed it on the radar. The heavy criticism with which these plans were received has led TechLab to temporarily suspend the roll-out of the software and has raised questions about the implications of having actors other than corporations producing such technology with predictive capabilities. In reaction to the criticism, TechLab took the 1.0 version of the tool entirely offline, somehow bringing to completion the cycle of closure that started when the platform shifted towards a police-facing one. To the extent that this controversy is still ongoing, the horizons of EagleView's implementation remain somehow fuzzy and indeterminate, perhaps not exactly in the same terms that Haraway has remarked.

Among the limitations of the research, particularly notable has been the question of how non-conventional and precarious forms of knowledge affect computational logics: how, for instance, things like small day-to-day improvisations and tricks – we call it "gambiarras", in Brazilian portuguese, but for sure different idioms will have different words for the same tricks – feed into the governing arrangements informed by these logics, how they serve to circumscribe them (MESSIAS; MUSSA, 2020), or how the many simplifications, formalisms and objectivities just studied may come at the expense of other forms of knowing and computing. Also beyond the scope of this research is a thorough account of authority from the standpoint of failure, especially considering how failure – rejection, being unable to engage the intended user base, irrelevance – is the rule, rather than the exception when it comes to apps (DIETER et al., 2019; GERLITZ et al., 2019).

7.2
The privilege of the 'idiot'

The many troubles posed by our interconnected infrastructures have frightened some to the point of radically wanting to detach from them. Movements like "delete your social media" preach that we should disconnect from these problematic infrastructures, as if this could contain their tentacles from grabbing us. In his book , Byung-Chul Han (2017) dedicates an entire chapter to this matter, which he poses as a question of idiotism. Philosophers have long been fond of the idea of idiotism, or playing the fool, because it would disclose a field of immanence of events. However, in Han's interpretation of idiotism, this is a figure that, at times, seem to want nothing more than to

detach from "the Inferno of the same" (HAN, 2017, p.65), even adding that "[b]y nature, the idiot is unallied, un-networked, and unininformed" (p.65).

The privilege of this 'idiot' which Han speaks about is that they can search for immanence without committing and getting entangled with power infrastructures. They can choose to detach and disconnect from such infrastructures. This research could not, and it would not dare to do this. Security infrastructures are seldom interested on whether of not those subjected to them want to commit or detach. No-fly lists do not need our permission to have us listed. Nor do the facial recognition cameras popping out here and there, in airports and on the street. Indeed, having in mind their ambitions of democratizing, empowering, making accountable and transparent, one may readily note that none of the apps I have looked into could have thrived outside these infrastructures. Fogo Cruzado is, from its inception, bound to them: Facebook, where its creator first had the idea of writing down reports about gunshots; WhatsApp and Twitter, where most of their data come from; and Google, which provides basic infrastructures for the app. EagleView 2.0, besides the infrastructural constraints, additionally cannot turn its back to the frenzy around crime prediction that started in the Global North of the early 2010s, much less to its underlying ontology of the enemy, which not so incidentally has served as inspiration to the birth of cybernetics (GALISON, 1994). Some, like UN SanctionsApp, dared to try some detaching, even if shyly. For a while, it stood in the form of a web-based application, which dispensed with the mediation of app stores. This did not last long. The lack of app store mediation paradoxically hindered its circulation and reach.

There are many dilemmas and frictions involved in acting politically with and through these infrastructures. This is not a happy and harmonious engagement, obviously. The move proposed in chapter 2, from governance to governing, has intended precisely to make room for the contradictions and frictions that emerge from this engagement. While the literature on governance has tended to emphasize cooperative, intentional arrangements, the stories of our three apps are probably little illustrative of this side of governance work. They were rather filled with different sorts of frictions, from adaptations and improvisations, to circumscriptions and re-inscriptions.

This exercise of refrain, of course, still guards some resemblance with idiotism. Not in the proposal to detach, evidently, but in its common purpose of setting a different pace, making perceptible, and fabricating possibilities. The fabricating which was intended here is one that involves making some connections evident, while paving the way for others. As already noted, one of the intended contributions of such proposal has been to fabricate an image

of the South as maker of security technologies, not merely as their takers. Another has been to open up apps as sites of political action themselves, that is to say, as things we can do things with, and that do things to us in return. But doing things with apps may be problematic and discomforting, since it involves assuming the responsibility for the good and the bad things they do. This whole claim is evidently complicated by the fact that digital infrastructures are frequently scattered, fragmented, and, most of the time, hardly perceptible. Thus the emphasis on assemblages as forms of making, and emphasis that suggests that making resembles much less the image of the craftsman working in the workshop and more likely the act of knitting, the subtle difference being that the first puts emphasis on the *agent* occupying their social position, whereas the second draws attention to the *process* of object formation, rather than on the finished thing itself. In putting emphasis on the process rather than on the final arrangement, and in weaving the argument with the stories of Fogo Cruzado, EagleView 2.0 and UN SanctionsApp, I have sought to make room for the agency of 'the South' as sites with and through which security knowledge is produced (and through which to act politically through apps), hence adding up to efforts of theorizing from, in and about the South within security politics.

7.3
Getting along with some ghosts and monsters

Cybernetic thinking – namely, the thinking that haunts the design and implementation of contemporary computation – has two important conceptual drivers: feedback loops and control. The idea of feedback is profoundly related to that of recursivity, which, as chapter 4 discussed, suggests a move that is no longer linear, Cartesian, but circular, a movement of going back to itself over and over again only to determine itself, and, in what some biologists would say, of continuously adapting to the environment.

Recursivity translates cyberneticians' aspirations of self-regulation, an aspiration that deposits its expectations on the ability of a closed and open systems to function more or less independently, based on an input of information flowing in and out. The roots of this thinking can be traced back to war efforts to radically improve antiaircraft technology. Cybernetic thinking expanded from what Galison (1994) calls 'ontology of the enemy' towards a project with planetary ambitions that intended to create a model of cybernetic understanding of the universe itself. It is beyond the scope of this thesis to get into the fine details of cybernetic theory, its history and politics. Many others have explored this in more informed and comprehensive ways (HUI, 2019;

HAYLES, 2012; PARISI; DIXON-ROMáN, 2020; PARISI, 2013). But even a superficial approach like the one advanced in this work should somehow contribute to thinking beyond the regulatory telos constitutive of computation, this "illegitimate offspring of militarism and patriarchal capitalism, not to mention state socialism" (HARAWAY, 1991). In Parisi's and Dixon-Román's (2020, n/p) words, this telos "give[s] us the droste effect of a spiral of the same."

While it was born as a war science, cybernetic thinking today may only partially resemble its origins. Its planetary ambitions, however, were at least partially fulfilled. To account for this partiality, I have sought to advance a reading of recursivity somehow aligned with the philosophies of Hui, Parisi and others, whose concerns lie in digging up a place for indeterminacy and difference within a very manichean science (GALISON, 1994) and at carving out a space for a politics of engagement which rather than escaping it, 'stays with the trouble' in its most troublesome forms (HARAWAY, 2016). Conceptually and methodologically, the intention was to inscribe more forcefully the many situated systems of knowledge that take part in the making of security arrangements back into the study of security politics, to acknowledge how they enable action, and to invite security scholars to consider embracing these forms of action both as a political commitment with *making* and as a form of opening their own work to scrutiny.

This research has been a call for acting with/in and through. With/in and through IR, with/in and through security studies, with/in and through our own involvement as researchers, and with/in and through digital technologies. More importantly, with/in and through those left systematically in the everlasting position of 'takers'. This is a call for having more methodologically and theoretically embodied research strategies. Methodologically, it has tried to commit to making explicit, as much as possible, the connections, paths, counterparts and affects, that take part of the research at different stages, and to to take responsibility for our own, sometimes promiscuous, engagements with those who research, whether they are made of flesh or plastic (or whatever the material), and however troublesome these engagements may turn out to be. The current shape of this research owes to a sort of promiscuous engagement with the apps researched and to their creators, with the centers of power that transverse them, and with those who struggle strenuously to reconfigure (sometimes, also to reproduce) their relation with the former. This engagement has been marked by its own attempts at continuously adjusting to the conditions of access to each app, the degree of openness and closure offered in each case, as well as variegated degrees of distance and proximity with each interlocutor.

Part of the conceptual discussion may at times flash lights of incoherence, which possibly reflects the variation, not only in access to my interlocutors, but in each app's governance work. Thus, this promiscuity, in order to be properly promiscuous, should also acknowledge the influence in the research of the distinct, sometimes even contradictory, normative ambitions of each app, not to be swallowed by these contradictions, but in such a way that it takes the trouble of tracing along the nuances of digital politics, specifically in the way in which computational infrastructures embodying situated systems of knowledge work to 'empower' a different array of groups, from (in)security providers to those at the more fragile end of the rope. This is the reality of the naive 'through' that figures in this section's title, naive to the extent that it engages not so sure of where it will go, in the hope to find a way that is not out, but that can at least be navigated; that, with some refrains, makes room for new connections, some very troublesome – in some cases unexpected – connections.

Conceptually and theoretically, such a commitment has attempted to render back some core constructs that permeate our relationship with security technologies, albeit in hardly recognizable form, one which embraces the many embodiments inscribed into digital technologies – powerful, mysoginistic, discriminatory, unsafe embodiments, that turn engaging into an ever ambivalent process (HAYLES, 2012; KAUFMANN; LEANDER; THYLSTRUP, 2020; LOBATO; GONZALEZ, 2020). In this sense, the contribution of having the three logics of simplification, formalism and objectivity is precisely to rip through the chest of computation to bring its situated enactments to the fore via the ways in which each logic gets re-configured, re-inscribed, re-signified and shaped alongside with material and contextual considerations, in the everyday making, implementation, adjustments, and use of these technologies. Fogo Cruzado, EagleView 2.0, and UN SanctionsApp, each convey a situated system of governance – crowdsourcing, prediction/filtering, analogy via hyperlinking –, connected together by a common tentacular infrastructure which only intends to pass as universal. This diversity in security practices, alongside the process of translating computation according to local contexts (and translating local contexts computationally), diffract the technologically-mediated security from what's is imagined in the centers of technological entrepreneurship, while still remaining somehow complicit with these power arrangements (MILAN; TRERé, 2019; BARAD, 2007).

Here is where the 'with' becomes particularly radical. Radical because it suggests acting with and along these infrastructures, and not only despite them. It is also an intentional overturn of from whose standpoint the story

of technology is told: 'with' comes to take part in those attempts of doing and re-doing governance work beyond, well, our most traditional 'makers'. Acting with means inflecting these infrastructures with what perhaps Hui would call technodiversity, and which I discussed, could maybe span into 'techno-plurality'. To the extent that it admits errors, incident, incomputables and failure, recursivity not only exposes the incompleteness of these self-regulating systems: it makes digital universalism an impossibility from the start. Competing means of computing and imagining computational present and future exist alongside and beyond the ideology of creative destruction embodied in the motto 'move fast, break things', alongside and beyond market incentives for putting into our pockets efficient instruments of self-regulation and tracking. Suddenly, the king is not wearing any clothes.

To commit to such a diversity, however, is not the same than assuming that there is a way out, that we should aspire to some idyllic version of digital politics in the many alternatives to the current model of securing with these technologies. If anything, techno-plurality, or whatever the term that we use to attest the impossibility of universalism, may end up resembling a wolf in sheep's clothing, since having more systems of knowledge feeding into computation does not automatically translate into having a less unequal and unjust setting. Alternative imaginaries may embody precarious yet quite powerful forms of asserting authority that make us unable to realize what makes it so sticky. We see this, to different degrees, in each of the three cases: they may serve to press against arbitrary, hierarchical and/or unjust security practices as much as they may be 'co-opted' or even from the start serve to reinforce and replicate them. Still, "the technical machine is not simply a mirror of the normative apparatus of knowledge reproduction" (PARISI; DIXON-ROMáN, 2020). The fact that many philosophers have sought to carve a way through the manichaeism of cybernetics when thinking about the governance work that these technologies do could be read as an attempt to fabricate troublesome connections. Thus, I am tempted to think that as much as refraining offers no definitive response to the question "what now?", it at least makes room for some ghosts and monsters. And they are very welcome.

8
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List of interviews and personal communications

Primary interviews

A ARIEL (project manager, TechLab). Interviewed by Luisa Cruz Lobato. City X, 12 August 2019.

B BENJAMIN (programmer, TechLab). Interviewed by Luisa Cruz Lobato. City X, 11 July 2019.

C BIERSTEKER, Thomas (creator, UN SanctionsApp). Interviewed by Luisa Cruz Lobato. Geneva, 11 October 2019.

D BIERSTEKER, Thomas (creator, UN SanctionsApp). Interviewed by Luisa Cruz Lobato. Skype, 04 May 2020.

E COUTO, Maria Isabel McDowell (database manager, Fogo Cruzado). Interviewed by Luisa Cruz Lobato. Rio de Janeiro, 21 August 2018.

F COUTO, Maria Isabel McDowell (database manager, Fogo Cruzado); OLLIVEIRA, Cecilia (creator, Fogo Cruzado). Interviewed by Luisa Cruz Lobato. Rio de Janeiro, 20 March 2019.

G CRIS (analyst, Fogo Cruzado). Interviewed by Luisa Cruz Lobato, Skype, 28 June 2019.

H TechLab director. Interviewed by Luisa Cruz Lobato. City X, 27 August 2019.

I NINO (programmer, Fogo Cruzado). Interviewed by Luisa Cruz Lobato. São Paulo, 18 July 2019.

J TOURINHO, Marcos (creator, UN SanctionsApp). Interviewed by Luisa Cruz Lobato. São Paulo, 17 July 2019.

K DIEGO (consultant, EagleView 2.0), Skype, 02 September 2019.

L TATIANA (researcher, TechLab). Interviewed by Luisa Cruz Lobato. Skype, 20 December 2019.

M ELI (researcher, TechLab). Interviewed by Luisa Cruz Lobato. Skype, 09 August 2019.

N ELI; TATIANA (researchers, TechLab). Interviewed by Luisa Cruz Lobato. Skype, 23 June 2020.

O PATRICK (researcher, TechLab). Interviewed by Luisa Cruz Lobato. Skype, 17 June 2020.

P DAVI (independent researcher). Interviewed by Luisa Cruz Lobato. Rio de Janeiro, 04 July 2019.

Additional Interviews:

1. BENJAMIN (programmer, TechLab). Interviewed by Luisa Cruz Lobato. WhatsApp, September 2019.
2. JOÃO (Fogo Cruzado's user). Interviewed by Luisa Cruz Lobato. WhatsApp, April 2020.
3. RAFAELA (Fogo Cruzado's user). Interviewed by Luisa Cruz Lobato. WhatsApp, July 2020.
4. CRIS; DOMINIQUE (analysts, Fogo Cruzado). Interviewed by Luisa Cruz Lobato. City Y, June 2019.
5. BIERSTEKER, Thomas (creator, UN SanctionsApp). Interviewed by Luisa Cruz Lobato. Zoom, May 2021.
6. COUTO, Maria Isabel McDowell (database manager, Fogo Cruzado). Interviewed by Luisa Cruz Lobato. Google Meets, 15 February 2021
7. PAMELA (analyst, Fogo Cruzado). Interviewed by Luisa Cruz Lobato. Google Meets, 2 March 2021.

Personal communications:

- Personal communication with Maria Isabel Couto, February 2021
- Personal communication with Patrick, December 2020.
- Personal communication with Benjamin, September 2019.