8 Contributions and Directions for Future Research

This chapter presents some comments and concluding remarks on the research effort, its major contributions, and recommended future work.

8.1.Concluding Remarks

While digital games have gained wide acceptance and it is clear that more engaging entertainment experiences can be provided due to interactivity (as compared to passive media like movies and books), the field of Interactive Storytelling (IS) remains unsettled, still presenting many open issues.

Different approaches have been tried to reach some of the goals of IS, such as works of interactive fiction and adventure games, but those did not fully match expectations. One of the main challenges of interactive storytelling is still the generation of stories that are both coherent and interesting, while allowing meaningful user interaction during their creation.

Even though there has been a boom in research in the field in the last fifteen years, with lots of interesting projects and systems tackling it from different points of view, there has been limited success in reaching IS goals.

We feel that more generative approaches are necessary for the field of interactive storytelling to reach a wider appeal and become truly successful, probably because most approaches to IS so far do not propose to address the problem of what constitutes a proper story space [Magerko 2007] or how to model the characteristics of events pertaining to a plot, preferring to focus, perhaps too strongly, on more controlled environments and stories.

This thesis presented our efforts to combine plan-generation and plan-recognition during plot composition and adaptation, and extensions to LOGTELL's conceptual model of a genre to encompass all four essential relations between events described in [Furtado 2008]; which are in turn connected to the four master tropes of semiotics and literary theory [Culler 2009]. The use of these extensions is supported by a proof-of-concept editor to be used in creating the hierarchy of typical plans (via PMA) and in editing the genre context.

8.2.Main Contributions

Application of the plan-recognition/plan-generation paradigm to interactive plot composition and adaptation:

By adding support in LogTell-R for plan-recognition over a hierarchy of typical plans, along with the existing plan-generation mechanism, we provide alternative ways to compose plots by combing the two approaches. The use of

this plan-generation/plan-recognition paradigm allows the creation of coherent plots by making use of the conceptual model of a genre, while also permitting reuse of plot pieces from the library during the composition and/or adaptation stages. The plan library can serve both as inspiration and as support for prospective authors.

Enhancements to the expressiveness of the conceptual model of a genre:

During the review of bibliography about interactive storytelling and related areas, the potential of LOGTELL's conceptual model became more apparent to us. However, even though coherence and diversity are essential for plot composition, they do not guarantee dramatic impact. By extending the conceptual model to encompass not only syntagmatic and paradigmatic relations between events, but all the four relations identified as essential in [Furtado 2008] - which in turn are connected to the four master tropes of semiotics [Burke 1969] - we are in a position to structure in a more meaningful way the space of stories that our system can generate.

In particular, LogTell-R provides support for meronymic and antithetic relations, representing them at the dynamic schema level. Meronymic relations are there represented as complex operations, resulting from the composition or generalization of other operations (in turn either complex or simple). As such, these operations represent abstractions whose semantics help clarifying the course of actions within a detailed plot.

Also according to our approach, antithetic relations between events may be handled via the insertion of special operations outside the direct competence of characters pursuing certain conflict-raising goals, but serving as narrative tools to allow the manipulation of facts, beliefs or previously unacceptable sequences of events. In order to fit the conventions of a given genre, these operations mimic universally popular motifs [Thompson 1989], encoding ingenious solutions to contradictions or dead-ends in a tale.

LogTell-R also extends the Plot Manager user interface to allow their use, thus providing better tools to prospective authors intent on creating and telling stories.

Use of hierarchy of plans as tool to help achieve dramatic structure:

In order to support plan-recognition and to model meronymic relations, our approach very much relies on the hierarchies of typical plans, structured by connecting complex operations via is-a and part-of links.

The benefits accruing from one such hierarchy are threefold:

a) by adding semantics (representing generalizations and compositions among the low-level events), it helps better visualize story structures, showing

prospective authors how to adequately chain events into narrative schemes (like the three-parts classic structure of Aristotle [2004]);

b) authors can more easily visualize and understand the space of stories that can be generated through the exploitation of the conceptual model; and

c) it serves as a repository of past narrative experiences wherefrom authors may profitably draw along the composition and adaptation processes.

While the usage of the hierarchy as guidance/inspiration is available in Plot Manager, support for the other two usages is made available in a proof-of-concept editor that utilizes the Plot Manipulation Algebra (PMA) − defined in [Karlsson and Furtado 2009] − to create and manipulate the hierarchy, allowing one to experiment with different ways to chain the events.

Re-structured system architecture that makes use of the implemented features:

By refactoring the system to better separate concerns between the different modules, and adding a bi-directional communication channel between the Drama Manager and the Plot Manager, we achieve a more flexible architecture which, with a few extensions, can support both author and player interaction.

8.3.Directions for Future Research

Let us recall that we have addressed the fabula level only, where one simply indicates which events are to be included in the plots. A no less complex problem is how to deal with event translation at the next level – the story level, where the question is how to tell these events – especially when contextual disruptions are introduced via user interaction, and even more if fanciful motifs are annotated in the plot.

Some areas for future research that make use of the facilities discussed here could be categorized as: system integration, system improvements, and player-mode implementation.

Efforts in system integration include coupling LogTell-R architecture with: LOGTELL's new graphics engine (Unity 3D); the new developments in LOGTELL 2 in audience interaction and continuous generation of stories [Camanho et al. 2008, Camanho et al. 2009]; and support for a cinematography director [Lima et al. 2009].

Opportunities for system improvements and extensions would include: evaluation of "best plot" alternatives via heuristics for choosing the best alternative to use in a given moment; further investigation of our plot manipulation algebra (and its possibly stronger integration into the system); and better support for altering the plot hierarchy/library during plot composition.

Regarding player-mode implementation, we argue that LogTell-R architecture could, with minimal changes, support it. As a sub-module of Drama Manager,

the system can use a semi-autonomous module acting as mediator between a player and the system. This module can also assume the role of a Game Master [Laws 2001] in controlling certain aspects of the storyworld, relieving the load on the Drama Manager.

The implementation of features to facilitate user identification with a character in player-mode interaction during dramatization is also necessary. If the user *feels* like the character, he will implicitly constrain his actions. It is important to notice that such constraints/manipulations of the user's freedom must remain implicit in order to maintain the "immersion" in the story [Kelso et al. 1993, Cialdini 2001, Barbaros 2009, Siew and Nareyek 2009].

We argue that a simple solution to many of the problems in dealing with a user controlling one of the characters in the story is to deal with the dramatization of what Propp [1968] calls "connecting events". This can be accomplished, for instance by implementing a set of dramatization-only verbs/actions, drawing from different effort in narrative studies [Todorov 1970] or the experiences of other IS systems [Crawford 2007, Mateas and Stern 2007]. Also, extending the system to allow the creation of contiguous "moves" [Propp 1968] can be used to map the structure of interlinked quests, very common in games [Karlsson 2005, Karlsson et al. 2006a, Howard 2008].

Other interesting areas for future work are analyzing how to increase engagement when using the system [Boorstin 1990] and to perform user evaluation studies, both relative to story quality and to user interface.

Also, the application of our model – along with the player-mode regime - to training and serious games seems interesting as the conceptual model can also be used in business domains [Furtado 2008].

Much work remains to be done towards the incorporation of the player mode of interaction (especially in refining the implementation). All in all, we feel that studying and designing a high-level architecture that could tackle both author and player interaction in the same system has provided valuable insights on what really constitutes an interactive storytelling system.