Luis Paulo Santos Valente

A methodology for conceptual design of pervasive mobile games

Tese de Doutorado

Thesis presented to the Postgraduate Program in Informatics of the Departamento de Informática, PUC–Rio as partial fulfillment of the requirements for the degree of Doutor em Informática.

Advisor: Prof. Bruno Feijó

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Prof. Bruno Feijó
Advisor
Departamento de Informática – PUC-Rio

Prof. Julio Cesar Sampaio do Prado Leite
Departamento de Informática – PUC-Rio

Prof. Markus Endler
Departamento de Informática – PUC-Rio

Prof. Esteban Walter Gonzalez Clua
Instituto de Computação – UFF

Prof. José Viterbo Filho
Instituto de Computação – UFF

Prof. José Eugenio Leal
Coordinator of the Centro Técnico Científico – PUC-Rio

Rio de Janeiro, September 9th, 2011
Luis Paulo Santos Valente

Luis Valente graduated in Computer Science at UFF (Universidade Federal Fluminense) in 2002 and received his Master degree from UFF in 2005. He joined the Doctorate program at PUC-Rio in 2007, researching on mobile entertainment with mobile phones. He is also a Nokia Developer Champion since 2007.

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To my family, and to the dreamers:
“believe you can fly”
Acknowledgments

Well, it's been an adventure. As I write this and look at the past, it seems now that everything started just some time ago … and now it's finished … Time rushed, people came and went away, and now I'm writing this acknowledgments section. In 2007, I started from scratch in the mobile world, and from then I had the opportunity to meet several people (from around the world) and to travel to attend conferences and workshops, here and abroad. Yes, it's been an adventure … including an inner one. A movie of everything comes to my mind and there are many people in there that have contributed in some way to this adventure, as teachers, as friends, or just by being there …

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I'd like to end this section with one of the greatest lessons I've learned during this time, from Marcio Libar (impossible to translate ...):

– “Ri melhor quem ri de si mesmo, senão, ri melhor quem rivotril”.
Resumo


A “pervasividade” em jogos pode ser reconhecida cada vez que as fronteiras do jogo se expandem do mundo virtual para o mundo real. Sensores, aparelhos móveis, redes de computadores e a internet tornam possível a existência dos jogos pervasivos. Neste trabalho, consideramos como “jogos pervasivos móveis” os jogos que usam ciência de contexto e aparelhos móveis. Consideramos também que os “smartphones” são o veículo ideal para a viabilização dos jogos pervasivos. Até onde sabemos, este é o primeiro trabalho sobre projeto geral de jogos pervasivos móveis. Esta tese propõe uma metodologia para apoiar a etapa de projeto conceitual de jogos pervasivos móveis. As contribuições principais deste trabalho são duas: [1] uma lista de características peculiares e importantes de jogos pervasivos, identificadas na literatura do assunto e em projetos de jogos pervasivos existentes. Cada característica possui também um conjunto de perguntas de verificação. Essa lista de características (e as perguntas de verificação) podem ser usadas para inspirar novas ideias de jogos e também para ajudar a descobrir requisitos funcionais e não funcionais para jogos pervasivos móveis. [2] Uma linguagem específica de domínio para ajudar a especificar atividades em jogos pervasivos móveis que usam aparelhos móveis, sensores e atuadores como elementos principais de interface. Com essa metodologia, os projetistas podem discutir, identificar, verificar e aplicar características importantes de jogos pervasivos móveis. Também, por se tratar de uma metodologia de natureza “leve”, os projetistas podem trabalhar no “nível geral” dos jogos (projeto), ao manterem-se focados na especificação das atividades e evitando se preocupar com detalhes de implementação e código-fonte.

Palavras-chave

jogos pervasivos móveis; smartphones; linguagens específicas de domínio
Abstract


Pervasiveness can be recognized in game playing every time the boundaries of playing expand from the virtual (or fictional) world to the real world. Sensor technologies, mobile devices, networking capabilities, and the internet make pervasive games possible. In the present work, we consider “pervasive mobile games” as context-aware games that necessarily use mobile devices. Also we consider that smartphones are the main driver to fulfill the promises of pervasive mobile game playing. As far as we are aware, this is the first general work on pervasive mobile game design. This thesis proposes a methodology to support the conceptual design stage of pervasive mobile games. The main contributions of this research work are twofold: [1] A novel list of prominent features of pervasive games, identified from game projects and the literature, and checklists for each feature. This feature list (and corresponding checklists) can be used to spark novel game ideas, and to help in discovering functional and non-functional requirements for pervasive mobile games. [2] A domain specific language to help in specifying activities in pervasive mobile games that use mobile devices, sensors, and actuators as the main interface elements. With the proposed methodology, designers can discuss, identify, verify, and apply important features of pervasive mobile games. Also, due to the “lightweight” nature of the methodology, designers can easily catch the “big picture” of the games by keeping focused on the intents of the game activities, and not getting lost in the source code.

Keywords

pervasive mobile games; smartphones; domain specific languages
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