Pontifícia Universidade Católica
do Rio de Janeiro

Pedro Luchini de Moraes

Motion Synthesis for Non-Humanoid Virtual Characters

DISSERTAÇÃO DE MESTRADO

Dissertation presented to the Postgraduate Program in Informatics of the Departamento de Informática PUC–Rio as partial fulfillment of the requirements for the degree of Mestre de Informática

Advisor: Prof. Bruno Feijó

Rio de Janeiro
March 2010

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Pedro Luchini de Moraes

Pedro Luchini graduated in Computer Engineering from PUC-Rio in 2005. He has worked as a programmer in several small and large enterprises, including Eonsgames, Positivo Informática, and K2 Sistemas. As a result, he has a broad range of skills in many different software platforms and research fields, among them educational software, mobile game development, and geographic databases. Since 2008 he works at PUC-Rio's Computer Graphics research laboratory (Tecgraf), specializing in real-time 3D rendering and virtual reality applications. In his spare time, he is an amateur video game developer.

Bibliographic data

Luchini, Pedro

Motion Synthesis for Non-Humanoid Virtual Characters / Pedro Luchini de Moraes; advisor: Bruno Feijó. – 2010.

49 f.: il.(color.) ; 29,7 cm

1. Dissertação (Mestrado em Informática) – Pontifícia Universidade Católica do Rio de Janeiro, Rio de Janeiro, 2010.

Inclui bibliografia

1. Informática – Teses. 2. Inteligência artificial. 3. Vida artificial. 4. Computação inspirada na biologia. 5. Animação procedimental. 6. Algoritmos genéticos. 7. Simulação física. I. Feijó, Bruno. II. Pontifícia Universidade Católica do Rio de Janeiro. Departamento de Informática. III. Título.

CDD: 004

To my brother Francesco, who has always been my #1 fan.

Acknowledgments

Special thanks to the following people:

To Waldemar Celes, who introduced me to the world of physics simulation for electronic games.

To Marco Aurélio Pacheco, who introduced me to the world of genetic algorithms.

To Bruno Feijó, my adviser, who believed my crazed ravings and helped me pursue research in those two fields.

To CAPES, that funded our research.

To Matthew Wall, who developed GAlib, and the Massachusetts Institute of Technology, that distributes it free of charge.

To the people who supported and encouraged me throughout these very difficult months: Laura, Marco, Italo, Frieda, Flora, Pablo Bioni, and Gustavo Wagner.

To Maurício, Olívia, Eleonora, Helena, Adriana, and Regina, who love me even though I'm a huge nerd.

To Maíra and Eduardo, whom I love even though they are too young to love me back.

To Michael Kelley, who is a wonderfully generous person.

To Paulo Ivson, who is a delightfully loony person.

To Rafael Delerue, who is an outrageously funny person.

To Vinícius Segura, who is an exquisitely random person.

To Marcela Câmara, whose laughter is contagious.

To Savelli and Nader, who showed up looking for a room-mate right when I was doing the same.

To José Berutti, my personal Jesus Christ.

To Primeirão, whom I dragged out of bed on Saturday morning to go to the gym. It was for your own good, man.

To the crew at Tecgraf that organized our weekly *Team Fortress 2* sessions: Valente, Maioli, Guigs, Arantes, Evandro, and many others. All work and no play were making Pedro a dull boy.

Abstract

Luchini, Pedro; Feijó, Bruno. **Motion Synthesis for Non-Humanoid Virtual Characters**. Rio de Janeiro, 2010. 49p. MSc Dissertation — Departamento de Informática, Pontifícia Universidade Católica do Rio de Janeiro.

We present a technique for automatically generating animations for virtual characters. The technique is inspired by several biological principles, especially evolution and natural selection. The virtual characters themselves are modeled as animal-like creatures, with a musculoskeletal system that is capable of moving their bodies through simple physics principles, such as forces and torques. Because our technique does not make any assumptions about the structure of the character, it is capable of generating animations for any kind of virtual creature.

Keywords

Artificial intelligence. Artificial life. Biologically-inspired computing. Procedural animation. Genetic algorithms. Physics simulation.

Resumo

Luchini, Pedro; Feijó, Bruno. **Síntese de Movimentos para Personagens Virtuais Não-Humanóides**. Rio de Janeiro, 2010. 49p. Dissertação de Mestrado — Departamento de Informática, Pontifícia Universidade Católica do Rio de Janeiro.

Nosso trabalho apresenta uma técnica capaz de gerar animações para personagens virtuais. A inspiração desta técnica vem de vários princípios encontrados na biologia, em particular os conceitos de evolução e seleção natural. Os personagens virtuais, por sua vez, são modelados como criaturas semelhantes a animais, com um sistema locomotor capaz de movimentar seus corpos através de princípios simples da física, tais como forças e torques. Como nossa técnica não depende de nenhum pressuposto sobre a estrutura do personagem, é possível gerar animações para qualquer tipo de criatura virtual.

Palavras–chave

Inteligência artificial. Vida artificial. Computação inspirada na biologia. Animação procedimental. Algoritmos genéticos. Simulação física.

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Ce qui embellit le désert, dit le petit prince, c'est qu'il cache un puits quelque part...

Antoine de Saint Exupéry, *Le Petit Prince, Chapter XXIV.*