Program

The Fourth Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-08)

October 22–24, 2008

Stanford University
Stanford, CA

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Association for the Advancement of Artificial Intelligence

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Acknowledgments

The Association for the Advancement of Artificial Intelligence acknowledges and thanks the following individuals for their generous contributions of time and energy to the successful creation and planning of the Fourth Conference on Artificial Intelligence and Interactive Digital Entertainment.

AIIDE-08 Conference Chair
Michael Mateas (University of California, Santa Cruz)

AIIDE-08 Program Chair
Chris Darken (Naval Postgraduate School)

Organizing Committee
Ruth Aylett (Heriot-Watt University, UK), Kevin Dill (Rockstar New England), Richard Evans (Maxis), Ana Paiva (Technical University of Lisbon, Portugal), Michael Youngblood (University of North Carolina, Charlotte), Robert Zubek (Three Rings Design)

A complete listing of the AIIDE-08 Program Committee members appears in the conference proceedings.

Opening Reception

The AIIDE-08 Opening Reception will be held Wednesday, October 22, 6:00 – 7:00 PM in the Red and Gold Lounge of the Stanford Faculty Club. Hors d'oeuvres will be served, and hosted beer, wine, and soft drinks will also be available. Admittance to the reception is free to AIIDE-08 registrants. A $35.00 per person fee ($10.00 for children) will be charged for spouses and other nontechnical conference registrants.

Poster / Demo Session

The AIIDE-08 Poster / Demo Session will be held on Thursday, October 23, 4:00 – 6:00 PM, in the Black Community Center House. Light refreshments will be served. The complete program is available in the schedule that follows.

AIIDE-08 Technical Program

Please note that the first day of the conference will be held in the Oak Lounge, Tresidder Union, and the second and third days will be held in the nearby Black Community Center House. Directions and a map are included in your registration materials.

Wednesday, October 22

Sessions will be held in the Oak Lounge, Tresidder Union

8:45 – 9:00 AM

Opening Session
Welcome and Introduction
Michael Mateas (University of California Santa Cruz), AIIDE-08 Conference Chair
Chris Darken (Naval Postgraduate School), AIIDE-08 Program Chair

9:00 – 10:00 AM

***Panel*: Realistic Human Characters**
Moderated by Chris Darken (Naval Postgraduate School). Panelists: Richard Evans (Maxis), Borut Pfeifer (EALA), and Michael Mateas (University of California, Santa Cruz)

10:00 – 10:30 AM

Coffee Break

10:30 AM – 11:30 PM

***Session*: Applications of Reinforcement Learning**
Chair: Sven Koenig

Intelligent Trading Agents for Massively Multi-player Game Economies
John Reeder, Gita Sukthankar, M. Georgiopoulos (University of Central Florida); G. Anagnostopoulos (Florida Institute of Technology)

Learning to be a Bot: Reinforcement Learning in Shooter Games
Michelle McPartland, Marcus Gallagher (University of Queensland)

Agent Learning using Action-Dependent Learning Rates in Computer Role-Playing Games
Maria Cutumisu, Duane Szafron, Michael Bowling, Richard S. Sutton (University of Alberta)

11:30 AM – 12:30 PM

***Session*: Singular Techniques**
Chair: Vadim Bulitko

Combining Model-Based Meta-Reasoning and Reinforcement Learning for Adapting Game-Playing Agents
Patrick Ulam, Joshua Jones, Ashok Goel (Georgia Institute of Technology)

Lightweight Procedural Animation with Believable Physical Interactions
Ian Horswill (Northwestern University)

TAP: An Effective Personality Representation for Inter-Agent Adaptation in Games
Chek Tien Tan, Ho-lun Cheng (National University of Singapore)

12:30 – 2:00 PM

Lunch Break

2:00 – 3:00 PM

***Session*: Planning for Actions, Story, and Design**
Chair: Duane Szafron

Offline Planning with Hierarchical Task Networks in Video Games
John-Paul Kelly (Australian National University); Adi Botea (NICTA and Australian National University); Sven Koenig (University of Southern California)

Simulation-Based Story Generation with a Theory of Mind
Hsueh-Min Chang (National Tsing Hua University); Von-Wun Soo (National University of Kaohsiung)

Wednesday

Automatic Generation of Game Level Solutions as Storyboards
David Pizzi, Marc Cavazza (University of Teesside); Alex Whittaker (Eidos – Beautiful Games Studios); Jean-Luc Lugrin (University of Teesside)

3:00 – 4:00 PM

***Session:* Social Intelligence**
Chair: Ian Horswill

Modeling Culturally and Emotionally Affected Behavior
Vadim Bulitko (University of Alberta); Steven Solomon, Jonathan Gratch (USC Institute for Creative Technologies); Michael van Lent (Soar Technology, Inc.)

Otello: A Next-Generation Reputation System for Humans and NPCs *(Industry Submission)*
Michael Sellers (Online Alchemy, Inc.)

Modeling the Dynamics of Non-Player Characters' Social Relations in Video Games
Magalie Ochs, Nicolas Sabouret, Vincent Corruble (Université Pierre & Marie Curie)

4:00 – 4:30 PM

Coffee Break

4:30 – 5:30 PM

Invited Talk
Experiments in Musical Intelligence
David Cope (University of California at Santa Cruz)

David Cope will explain why he created his computer program Experiments in Musical Intelligence, how this program works, why he created over 6,000 music compositions using Experiments in Musical Intelligence, and why he no longer composes using this software. The program will include a musical Turing test, a composed-on-the-spot computer composition, and the world premiere of a new work.

6:00 – 7:00 PM

AIIDE-08 Opening Reception
Stanford Faculty Club

Thursday, October 23

Sessions will be held in the Stanford Black Community Center

9:00 – 10:00 AM

Invited Talk

The AI of Spore

Eric Grundstrom (Electronic Arts/Maxis)

Spore is a game that takes the player on an epic journey, leading the gamer through a story with five distinct phases — Cell, Creature, Tribe, Civilization, and Space. Each phase has different game play and placed unique demands on the game AI. The approach to developing the various AI systems was heavily influenced by certain aspects of the game design. In particular, non-player characters do not follow the same game rules as the player. Instead, the NPCs are designed to fill specific roles in the player experience. Developing an asymmetric, player-facing AI is a different way of thinking about AI, and has the potential for wider application in games. In most video games the player has a unique role to play, so it only makes sense to acknowledge and embrace that fact when designing an interesting environment and compelling interactions for the gamer.

10:00 – 10:30 AM

Coffee Break

10:30 – 11:30 AM

***Session:* Stochastic and Evolutionary Approaches**

Chair: Pieter Spronck

Stochastic Plan Optimization in Real-Time Strategy Games

Andrew Trusty, Santiago Ontañón, Ashwin Ram (Georgia Institute of Technology)

Constructing Complex NPC Behavior via Multi-Objective Neuroevolution

Jacob Schrum, Risto Miikkulainen (University of Texas at Austin)

Effects of Communication on the Evolution of Squad Behaviours

Darren Doherty, Colm O'Riordan (National University of Ireland Galway)

11:30 AM – 12:30 PM

***Session:* Hierarchical Models for Behavior and Plot**

Chair: Michael Youngblood

Implementation Walkthrough of a Homegrown "Abstract State Machine" Style System in a Commercial Sports Game *(Industry Submission)*

Brian Schwab

Dynamic Expansion of Behaviour Trees

Gonzalo Flórez-Puga, Marco Gómez-Martín, Belén Díaz-Agudo, Pedro A. González-Calero (Universidad Complutense de Madrid)

Hierarchical Petri Nets for Story Plots Featuring Virtual Humans

Daniel Balaš, Cyril Brom, Adam Abonyi, Jakub Gemrot (Charles University in Prague)

12:30 – 2:00 PM

Lunch Break

2:00 – 3:00 PM

***Session:* Robustness and New Capabilities from Reasoning**

Chair: Bill Ferguson

Explicit Knowledge Programming for Computer Games

Andreas Witzel, Jonathan Zvesper (University of Amsterdam); Ethan Kennerly (University of Southern California)

Thursday

Logical Agents for Language and Action
Martin Magnusson, Patrick Doherty (Linköping University)

Recombinable Game Mechanics for Automated Design Support
Mark J. Nelson (Georgia Tech); Michael Mateas (University of California, Santa Cruz)

3:00 – 4:00 PM

Coffee Break

4:00 – 6:00 PM

AIIDE-08 Poster and Demonstration Program

AIIDE-08 Posters

Adaptive Spatial Reasoning for Turn-based Strategy Games
Maurice Bergsma, Pieter Spronck (Tilburg University)

Automatically Generating Summary Visualizations from Game Logs
Yun-Gyung Cheong (Samsung Electronics, Co., LTD); Arnav Jhala, Byung-Chull Bae, R. Michael Young (North Carolina State University)

Automatically-generated Convex Region Decomposition for Real-time Spatial Agent Navigation in Virtual Worlds
D. Hunter Hale, G. Michael Youngblood, Priyesh N. Dixit (University of North Carolina at Charlotte)

Cerberus: Applying Supervised and Reinforcement Learning Techniques to Capture the Flag Games
Ahmed S. Hefny, Ayat A. Hatem, Mahmoud M. Shalaby, Amir F. Atiya (Cairo University)

Direction Maps for Cooperative Pathfinding
M. Renee Jansen, Nathan R. Sturtevant (University of Alberta)

Agent Architecture in Social Games - The Implementation of Subsumption Architecture in Diplomacy
Aleksander Krzywinski, Weiqin Chen, Arne Helgesen (University of Bergen)

A Framework for the Semi-Automatic Testing of Video Games
Alfredo Nantes, Ross Brown, Frederic Maire (Queensland University of Technology)

Integrating Story-Centric and Character-Centric Processes for Authoring Interactive Drama
Mei Si, Stacy C. Marsella (University of Southern California); Mark O. Riedl (Georgia Institute of Technology)

An Intelligent IDE for Behavior Authoring in Real-Time Strategy Games
Suhas Virmani, Yatin Kanetkar, Manish Mehta, Santiago Ontañón, Ashwin Ram (Georgia Institute of Technology)

AIIDE-08 Demonstrations

Monte-Carlo Tree Search: A New Framework for Game AI
Guillaume Chaslot, Sander Bakkes, Istvan Szita, Pieter Spronck (Universiteit Maastricht)

Classic approaches to game AI require either a high quality of domain knowledge, or a long time to generate effective AI behavior. These two characteristics hamper the goal of establishing challenging game AI. In this demonstration, we put forward Monte-Carlo Tree Search as a novel, unified framework to game AI. In the framework, randomized explorations of the search space are used to predict the most promising game actions. We will demonstrate that Monte-Carlo Tree Search can be applied effectively to classic board-games, modern board-games, and video games.

A Demonstration of Agent Learning with Action-Dependent Learning Rates in Computer Role-Playing Games

Maria Cutumisu, Duane Szafron (University of Alberta)

We demonstrate combat scenarios between two NPCs in the *Neverwinter Nights* (NWN) game in which an NPC uses a new learning algorithm ALeRT (action-dependent learning rates with trends) and the other NPC uses a static strategy (NWN default and optimal) or a dynamic strategy (dynamic scripting). We implemented the ALeRT algorithm in NWScript, a scripting language used by NWN, with the goal to improve the behaviors of game agents. We show how our agent learns and adapts to changes in the environment.

OpenNERO: A Game Platform for AI Research and Education

Igor V. Karpov (University of Texas at Austin), John Sheblak (Retro Studios), Risto Miikkulainen (University of Texas at Austin)

OpenNERO is an open source game platform designed for game AI research. The software package combines features commonly available in modern game engines (such as 3D graphics, physics simulation, 3D audio rendering, networked play, and a powerful scripting interface) with an easy to use API and tools for defining machine learning tasks, environments, and agents. Flexibility and ease of use of the system is demonstrated by following the process of creating a machine learning game from scratch. The scalability of the platform is tested through the implementation of the existing NERO machine learning game using the new tools.

Integrating Drama Management into an Adventure Game

Anne Sullivan, Sherol Chen, Michael Mateas (University of California, Santa Cruz)

Often, video game designers must choose between creating a linear experience, and designing an open world with many different story lines that fail to form a tightly crafted narrative arc. A drama manager (DM) can provide a solution to this dilemma. A DM monitors an interactive experience, such as a computer game, and intervenes to shape the global experience so that it satisfies the author's expressive goals without decreasing a player's interactive agency. In this demonstration we present the first integration of declarative optimization-based drama management (DODM) into an adventure-style dungeon game called EMPath.

IDtension — Highly Interactive Drama

Nicolas Szilas (University of Geneva)

IDtension is an interactive drama project initiated ten years ago. It provides long term solutions to the problem of combining narrativity and interactivity. The demonstration consists of a playable text-based interactive drama called *The Mutiny*. The user is given many possibilities of meaningful narrative actions (around 100 in the middle of the story), which are fully interpreted by the narrative engine to generate story events on the fly. IDtension is based on a narrative-centered goal structure, second order narrative predicates and a model of the user. Actions are selected according to an innovative history-based interface.

PaSSAGE: A Demonstration of Player Modeling in Interactive Storytelling

David Thue, Vadim Bulitko, Marcia Spetch (University of Alberta)

This demonstration presents PaSSAGE (player-specific stories via automatically generated events), an AI system that uses player modeling to dynamically select the content of an interactive story. Through player modeling, PaSSAGE provides game designers with the opportunity to delay some of their design decisions to run-time, allowing further refinement based on an automatically learned model of its current player's preferences. The hands-on component of this demonstration allows players to interact with a PaSSAGE-created story while simultaneously observing its inner workings on a secondary screen.

Difficulty Scaling through Incongruity

Giel van Lankveld, Pieter Spronck (Tilburg University);
Matthias Rauterberg (Eindhoven University of Technology)

In this demonstration we discuss our work on using the incongruity measure from psychological literature to scale the difficulty level of a game online to the capabilities of the human player. Our approach has been implemented in a small game called *Glove*.

Friday

Friday, October 25

Sessions will be held in the Stanford Black Community Center

9:00 – 10:00 AM

Invited Talk

Halo 3 Objective Trees: A Declarative Approach to Multiagent Coordination

Damián Isla (Bungie Studios)

Encounters in Halo 3 are complex systems with many moving parts. Creating these systems — and scripting the movements and tactical decision-making of the many agents that make them up — is a tough problem. Not only do those many agents need to act tactically "smart," their movements and decisions also need to tell the story of the encounter, and provide a fun experience for the player. And of course, the tools for creating these systems need to lie firmly in the hands of the designers. In this talk Isla will introduce Objective Trees, the encounter-scripting technique devised for Halo 3. He will discuss the general problem of encounter design and describe the development of the Objective Tree system, as well as delve into the core decision-making algorithm behind it all. Finally, he will discuss in broad terms what Objective Trees — and other declarative authoring paradigms — might mean for game AI.

10:00 – 10:30 AM

Coffee Break

10:30 – 11:30 AM

***Session:* Unconventional Pathfinding Applications and Approaches**

Chair: Nathan Sturtevant

Navigating Detailed Worlds with a Complex, Physically Driven Locomotion: NPC Skateboarder AI in EA's *skate (Industry Submission)*

Mark Wesley (EA Black Box)

The Rise of Potential Fields in Real Time Strategy Bots

Johan Hagelbäck, Stefan J. Johansson (Blekinge Institute of Technology)

A Cover-Based Approach to Multi-Agent Moving Target Pursuit

Alejandro Isaza, Jieshan Lu, Vadim Bulitko, Russell Greiner (University of Alberta)

11:30 AM – 12:10 PM

***Session:* Towards Better Language-Using Characters**

Chair: Robert Zubeck

Talking with NPCs: Towards Dynamic Generation of Discourse Structures

Christina R. Strong, Michael Mateas (University of California, Santa Cruz)

Learning and Playing in Wubble World

Wesley Kerr, Paul Cohen, Yu-Han Chang (USC Information Sciences Institute)

12:10 – 1:30 PM

Lunch Break

1:30 – 2:30 PM

Invited Talk

The Past, Present, and Future of Game AI

Steve Rabin (Nintendo of America/Digipen Institute of Technology)

Game AI has progressed at a steady pace since the early days when we were being chased by Blinky, Pinky, Inky, and Clyde. As we stroll through game history, game AI has continued to cheat, steal and slowly progress. Where is it headed and what challenges should we be working on? Rabin will bring a unique perspective from his time as a game AI programmer, over a decade at Nintendo, as editor of roughly 250 game AI articles in the *AI Game Programming Wisdom* series, and as an instructor of game AI at DigiPen.

2:30 – 3:30 PM

Invited Talk

Performing Intent

Doug Church and Borut Pfeifer (Electronic Arts)

In attempting to create high fidelity, believable human characters that can interact with a player more meaningful ways, we run into many problems revolving around an agent's inability to manage the many levels of decision making coordinating mind and body. Humanlike agents must be able to effectively manage what would be both conscious and subconscious performance on the part of a real person. Current research and production methods of building AI characters are often oriented towards abstractly simulating intelligence, and not offering dramatic interaction possibilities — when we apply these methods towards this goal we run into communication problems conveying an agent's intent to a player because of the complexity of layers of behavior and performance (as well as scalability problems). This talk will look at some of the less addressed problem areas in the research while suggesting possible directions to push forward on this goal, based on Church and Pfeifer's experience at EA working on one of the Spielberg game projects.

3:30 – 3:45 PM

Closing Remarks

Michael Mateas, Conference Chair, and Chris Darken, Program Chair

3:45 – 4:45 PM

AIIDE 2009 Planning Meeting

General Information

Banking

Wells Fargo Bank is located on 459 Lagunita Drive in the Tresidder Building. It is open 8:00 AM – 5:00 PM, Monday through Friday.

A Bank of America ATM machine is located in Tresidder Building, Room 214.

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The following business center is located in Palo Alto:

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Internet Access

Please note that there will be no internet room organized by the conference. For those people with their own laptop computers, complimentary high-speed internet access will be available to AIIDE-08 registrants in Tresidder Union and the Black Community Center. Details about how to take advantage of this offer will be available at the onsite registration desk.

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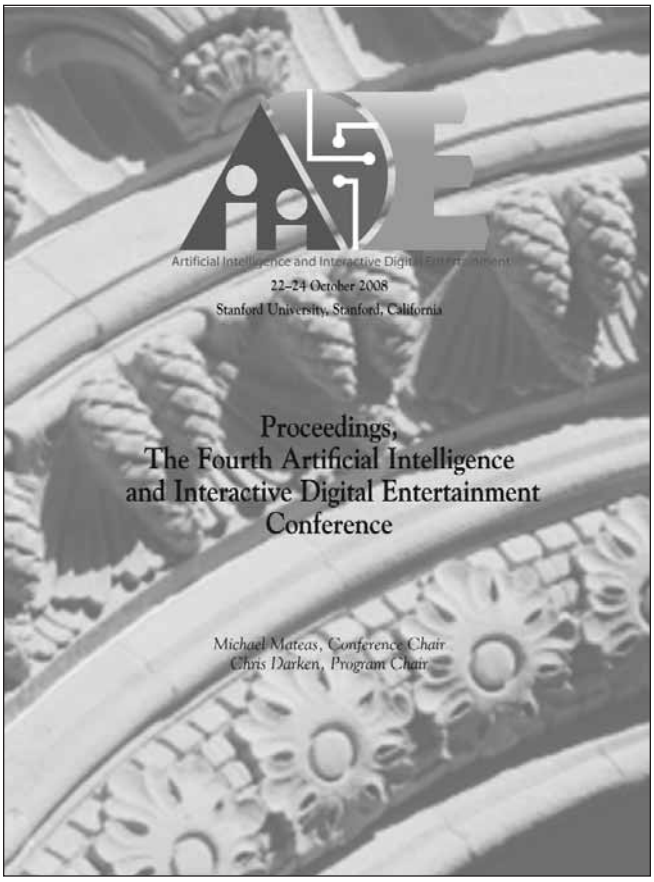

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$32.00 (special preorder onsite rate)*

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(a few copies of the AIIDE-05, AIIDE-06, and AIIDE-07 proceedings are also available at a special conference price)

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