2013 IEEE Conference on Computational Intelligence and Games

(CIG 2013)

Niagara Falls, Ontario, Canada
11-13 August 2013
# Table of Contents

## Session 1: Level and Map Generation

**PSMAGE: Balanced Map Generation for StarCraft** [7] 1  
Alberto Uriarte and Santiago Ontañón

**Landscape Automata for Search Based Procedural Content Generation** [32] 9  
Daniel Ashlock and Cameron McGuinness

**Story-Based Map Generation** [8] 17  
Josep Valls-Vargas, Santiago Ontañón and Jichen Zhu

**An Approach to Level Design Using Procedural Content Generation and Difficulty Curves** [61] 25  
Hector Adrian Diaz Furlong and Ana Luisa Solis

## Session 2: New CI Applications in Games

**Behavioral-Based Cheating Detection in Online First Person Shooters using Machine Learning Techniques** [29] 33  
Hashem Alayed, Fotos Frangoudes and Clifford Neuman

**Soft computing for content generation: Trading market in a basketball management video game** [33] 41  
Jose Maria Pena, Ernestina Menasalvas, Santiago Muelas, Antonio Latorre, Luis Pena and Sascha Ossowski

**Stacked Calibration of Off-Policy Policy Evaluation for Video Game Matchmaking** [67] 49  
Eric Laufer, Raul Chandias Ferrari, Li Yao, Olivier Delalleau and Yoshua Bengio

## Session 3: Monte Carlo Tree Search I

**EvoMCTS: Enhancing MCTS-Based Players through Genetic Programming** [5] 57  
Amit Benbassat and Sipper Moshe

**Using Genetic Programming to Evolve Heuristics for a Monte-Carlo Tree Search Ms Pac-Man Agent** [60] 65  
Atif Alhejali and Simon Lucas

**Monte Carlo Tree Search with Macro-Actions and Heuristic Route Planning for the Multiobjective Physical Travelling Salesman Problem** [83] 73  
Edward J. Powley, Daniel Whitehouse and Peter Cowling

**Bandits all the way down: UCB1 as a simulation policy in Monte Carlo Tree Search**[25] 81  
Edward J. Powley, Daniel Whitehouse and Peter Cowling
Session 4: Player Modeling I

Archetypical Motion: Supervised Game Behavior Learning with Archetypal Analysis [10] 89
Rafet Sifa and Christian Bauckhage

Give Me a Reason to Dig: Minecraft and the Psychology of Motivation [24] 97
Alessandro Canossa, Josep B. Martinez and Julian Togelius

Predicting Skill from Gamplay Input to a First-Person Shooter [80] 105
David Buckley, Ke Chen and Joshua Knowles

Psychometric Modeling of Decision Making Via Game Play [79] 113
Kenneth Regan and Tamal Biswas

Session 5: Monte Carlo Tree Search II

Online and Offline Learning in Multi-Objective Monte Carlo Tree Search [34] 121
Diego Perez, Spyridon Samothrakis and Simon Lucas

Monte-Carlo Tree Search and Minimax Hybrids [49] 129
Hendrik Baier and Mark H. M. Winands

UCT for PCG [75] 137
Cameron Browne

Production of Various Strategies and Position Control for Monte-Carlo Go - Entertaining human players [42] 145
Kokolo Ikeda and Simon Viennot

Session 6: Player Modeling II

Modeling Player Preferences in Avatar Customization Using Social Network Data: A Case-Study Using Virtual Items in Team Fortress 2 [55] 153
Chong-U Lim and D. Fox Harrell

Behavior Evolution in Tomb Raider Underworld [57] 161
Rafet Sifa, Anders Drachen, Christian Bauckhage, Christian Thurau and Alessandro Canossa

Spatial Game Analytics and Visualization [48] 169
Anders Drachen and Matthias Schubert

Play Style: Showing Your Age [28] 177
Shoshannah Tekofsky, Pieter Spronck, Aske Plaat, Jaap van Den Herik and Jan Broersen

Session 7/8: Best Paper Nominations

Reactive Strategy Choice in StarCraft by Means of Fuzzy Control [44] 185
Mike Preuss, Daniel Kozakowski, Johan Hagelbäck and Heike Trautmann
A Video Game Description Language for Model-based or Interactive Learning
[16] 193
Tom Schaul .................................................................

MirrorBot: Using Human-inspired Mirroring Behavior To Pass A Turing Test
[3] 201
Mihai Polceanu ..............................................................

Adaptive Game Level Creation through Rank-based Interactive Evolution [76] 209
Antonios Liapis, Hector Perez Martinez, Julian Togelius and Georgios N. Yannakakis .

Portfolio Greedy Search and Simulation for Large-Scale Combat in StarCraft
[68] 217
David Churchill and Michael Buro ........................................

Recursive Monte Carlo Search for Imperfect Information Games [71] 225
Timothy Furtak and Michael Buro ........................................

Analytics-Driven Dynamic Game Adaption for Player Retention in Scrabble
[51] 233
Brent Harrison and David Roberts ........................................

Automatic Generation and Analysis of Physics-Based Puzzle Games [52] 241
Mohammad Shaker, Mhd Hasan Sarhan, Ola Al Naameh, Noor Shaker and Julian Togelius ........................................

Creativity and Competitiveness in Polyomino-Developing Game Playing Agents
[72] 249
Daniel Ashlock and Jeremy Gilbert ........................................

Poster Papers

Observations on Strategies for Goofspiel [82] 257
Mark Grimes and Moshe Dror ............................................

Evolved Weapons for RPG Drop Systems [84] 259
Joseph Alexander Brown .................................................

Enhancing Touch-Driven Navigation Using Informed Search in Ms. Pac-Man
[86] 261
Samuel Maycock and Tommy Thompson .................................

Opponents Modeling with Incremental Active Learning: A Case Study of Iterative Prisoners Dilemma [93] 263
Hyunsoo Park and Kyung-Joong Kim .....................................

Comparison of Human and AI Bots in StarCraft with Replay Data Mining [95] 265
Ho Chul Cho and Kyung-Joong Kim .....................................
Session 9: Learning Planning and Believability

Evolutionary Feature Evaluation for Online Reinforcement Learning [73] 267
Julian Bishop and Risto Miikkulainen ......................................................

QL-BT: Enhancing Behaviour Tree Design and Implementation with Q-Learning [36] 275
Rahul Dey and Christopher Child ............................................................

LGOAP: adaptive layered planning for real-time videogames [4] 283
Giuseppe Maggiore, Carlos Santos, Dino Dini, Frank Peters, Hans Bouwknegt and Pieter Spronck .................................................................

The Turing Test Track of the 2012 Mario AI Championship: Entries and Evaluation [53] 291

Session 10: Mathematical Games

The Impact of Connection Topology and Agent Size on Cooperation in the Iterated Prisoner’s Dilemma [17] 299
Lee Ann Barlow and Daniel Ashlock ............................................................

The Structure of a 3-state Finite Transducer Representation for Prisoner’s Dilemma [59] 307
Jeffrey Tsang ..........................................................

Examination of Graphs in Multiple Agent Genetic Networks for Iterated Prisoner’s Dilemma [54] 314
Joseph Alexander Brown ...............................................................

A Tag-Mediated Game Designed to Study Cooperation in Human Populations [27] 322
Garrison Greenwood .................................................................

Session 11: RTS Game Playing I

Replay-based Strategy Prediction and Build Order Adaptation for StarCraft AI Bots [94] 329
Ho-Chul Cho, Kyung-Joong Kim and Sung-Bae Cho ........................................

Adjutant Bot: An Evaluation of Unit Micromanagement Tactics [92] 336
Nicholas Bowen, Jonathan Todd and Gita Sukthankar ........................................

Potential Flows for Controlling Scout Units in StarCraft [87] 344
Kien Nguyen, Zhe Wang and Ruck Thawonmas ..................................................
Using CIGAR for Finding Effective Group Behaviors in RTS Game [78] 351
Siming Liu, Sushil Louis and Monica Nicolescu ........................................

Session 12: Game and Puzzle Generation

Deductive Search for Logic Puzzles [74] 359
Cameron Browne .................................................................

Measuring Interestingness of Continuous Game Problems [66] 367
Samuel Roberts and Simon Lucas .............................................

AI for Game Production [88] 375
Mark Riedl and Alexander Zook ..............................................

Creating large numbers of game AIs by learning behavior for cooperating units
[1] 383
Stephen Wiens, Joerg Denzinger and Sanjeev Paskaradevan ..................

Session 13: RTS Game Playing II

Knowledge Discovery for Characterizing Team Success or Failure in (A)RTS
Games [70] 391
Pu Yang and David Roberts .....................................................

Finding Robust Strategies to Defeat Specific Opponents Using Case-Injected Co-
evolution [81] 399
Christopher Ballinger and Sushil Louis ......................................

Using Plan-Based Reward Shaping To Learn Strategies in StarCraft: Broodwar
[35] 407
Kyriakos Efthymiadis and Daniel Kudenko .................................

Multi-Objective Assessment of Pre-Optimized Build Orders exemplified for
StarCraft 2 [43] 415
Matthias Kuchem, Mike Preuss and Guenter Rudolph ......................

Session 14: Board and Card Games

A Statistical Exploitation Module for Texas Holdem And Its Benefits When
Used With an Approximate Nash Equilibrium Strategy [26] 423
Kevin Norris and Ian Watson ...................................................

Exploration and Analysis of the Evolution of Strategies for Mancala Variants
[45] 431
Colin Divilly, Colm Oriordan and Seamus Hill ............................

Mobile Games with Intelligence: a Killer Application? [85] 438
Philip Hingston, Clare Congdon and Graham Kendall ......................