Curriculum Vitae for Joshua Allen McCoy

Contact Information

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University of California Santa Cruz
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Education

Ph.D. in Computer Science

University of California Santa Cruz
Advisor: Michael Mateas
Santa Cruz, CA
June 2012

Master of Science in Computer Science

University of California Santa Cruz
Advisor: Michael Mateas
Santa Cruz, CA
June 2009

B.A. Degrees in Computer Science and Sociology/Anthropology

Earlham College
Richmond, IN
May 2004

Employment History

Postdoctoral Scholar

The Strategic Social Interaction Modules DARPA Program
Center for Games and Playable Media
University of California Santa Cruz
June 2012 to present

Graduate Researcher

Expressive Intelligence Studio

Center for Games and Playable Media

University of California Santa Cruz

September 2006 to June 2012

Post-Baccalaureate Researcher

Cluster Computing Group

Earlham College

May 2004 to August 2006

Publications

Dissertation

McCoy, J. All the World's a Stage: A Playable Model of Social Interaction Inspired by Dramaturgical Analysis. 2012, 330 pages. [pdf]

Peer-Reviewed Publications

Samuel, B., J. Mccoy, M. Treanor, A. Reed, N. Wardrip-Fruin and M. Mateas. Story Sampling: A New Approach to Evaluating and Authoring Interactive Narrative. The 9th International Conference on the Foundations of Digital Games, (2014). [forthcoming]

McCoy, J., M. Treanor, B. Samuel, A, Reed, and M. Mateas and N. Wardrip-Fruin. "Social Story Worlds with Comme il Faut." Transactions on Computational Intelligence and AI in Games special issue on Narrative (forthcoming). [forthcoming,journal]

Shapiro D., M. Mateas, A. Stern, J. McCoy, R. Swanson, B. Samuel, M. Treanor. "Creating Playable Social Experiences through Whole-body Interaction with Virtual Characters." Proceedings of the Ninth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. Boston, MA. October 14-18, 2013.

McCoy, J., M. Treanor, B. Samuel, A, Reed, and M. Mateas and N. Wardrip-Fruin. "Prom Week: Designing past the game/story dilemma." Proceedings of the 8th International Conference on Foundations of Digital Games, Chania, Crete, Greece. May 14-17, 2013.

Mateas, M. and J. McCoy. "An Architecture for Character-Rich Social Simulation." Game AI Pro: Collected Wisdom of Game AI Professionals.

McCoy, J., M. Treanor, B. Samuel, N. Wardrip-Fruin and M. Mateas, "Comme il Faut: A System for Authoring Playable Social Models." Proceedings of the 7th AI and Interactive Digital Entertainment (AIIDE'11), Stanford, CA, October 12-14, 2011. [pdf]

McCoy, J., M. Treanor, B. Samuel, M. Mateas and N. Wardrip-Fruin, "AI-based Design and The Prom." In Proceedings of the 6th International Conference on the Foundations of Digital Games (FDG 2011), Bordeaux, France, June 29-July 1, 2011, pp. 319-321. [pdf]

McCoy, J., M. Treanor, B. Samuel, B. Tearse, M. Mateas, and N. Wardrip-Fruin, "Authoring Game-based Interactive Narrative using Social Games and Comme il Faut", Proceedings of the 4th International Conference & Festival of the Electronic Literature Organization: Archive & Innovate (ELO 2010), Providence, Rhode Island, USA, June, 2010. [pdf]

McCoy, J., M. Mateas, and N. Wardrip-Fruin, "Comme il Faut: A System for Simulating Social Games Between Autonomous Characters", Proceedings of the 8th Digital Art and Culture Conference (DAC), Irvine, CA, December 12-15, 2009. [pdf]

McCoy, J., and M. Mateas, "An integrated agent for playing real-time strategy games", AAAI'08: Proceedings of the 23rd national conference on Artificial intelligence: AAAI Press, pp. 1313-1318, 2008. [pdf]

Workshop and Symposium Publications

M. Johansson, M. Eladhari, J. McCoy, H. Verhagen, Social Believability in Games. In: Proceedings of DIGRA 2013, pp. 216-228.

McCoy, J. and M. Treanor, B. Samuel, B. Tearse, M. Mateas, and N. Wardrip-Fruin, "Comme il Faut 2: a fully realized model for socially-oriented gameplay", INT3'10: Proceedings of the Intelligent Narrative Technologies III Workshop, New York, NY, USA, ACM, pp. 1-8, 2010. [pdf]

McCoy, J. and Mateas, M. "The Computation of Self in Everyday Life : A Dramaturgical Approach for Socially Competent Agents." Proceedings of the AAAI Intelligent Narrative Technologies 2 Symposium (AAAI-INT2 2009). Stanford, CA. [pdf]

Demonstrations, Posters and Magazine Articles

McCoy, J. and M. Treanor, B. Samuel, B. Tearse, M. Mateas, and N. Wardrip-Fruin, "Prom Week." Playable Experiences at AI and Interactive Digital Entertainment, October 14-18, 2013. [demo]

McCoy, J., Treanor, M. "Prom Week." Inventing the Future of Games (IFoG), April 15th, 2011. [poster, demo]

McCoy, J. and M. Treanor, B. Samuel, B. Tearse, M. Mateas, and N. Wardrip-Fruin, "The Prom: An Example of Socially-oriented Gameplay" AI and Interactive Digital Entertainment. October 11-13, 2010. [demo]

McCoy, J. and M. Treanor, B. Samuel, B. Tearse, M. Mateas, and N. Wardrip-Fruin, "The Prom." Foundations of Digital Games, June 19-21, 2010. [demo]

McCoy, J. "Simulating Stigma." Digital Media Factory, May 2008. [poster demo]

Skorupski, J., Yee, J., McCoy, J., and Davis, J. "Facial type, expression, and viseme generation." In ACM SIGGRAPH 2007 Posters (San Diego, California, August 05 - 09, 2007). SIGGRAPH '07. ACM, New York, NY, 34. [pdf]

Charles Peck, Joshua Hursey, Josh McCoy, and Vijay Pande. "Building Internet Distributed Computing applications Using Existing Scientific Cores" Dr. Dobb's Journal Volume 378, November 2005. [magazine article link]

"Folding@Clusters: Harnessing Grid-Based Parallel Computing Resources for Molecular Dynamics Simulations." SIAM 2005 Conference on Computational Science and Engineering. [poster]

"Calculating 1/sqrt(x) for Molecular Dynamics Packages on Commodity Vector Architectures." SIAM 2005 Conference on Computational Science and Engineering. [poster]

"Benchmarking and Tuning the Gromacs Molecular Dynamics Package on Beowulf Clusters." SIAM 2004 Conference on Parallel Processing for Scientific Computing. best poster

Peer Reviewed and Invited Talks

“Playable Experiences Panel.” Ninth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. Boston, MA. October 14-18, 2013.

McCoy, J., and M. Treanor, "Prom Week." Beyond Eliza: Construction Socially Engaging AI panel, AI Summit of GDC 2012. San Francisco, CA. March 5-9, 2012.

McCoy, J., "Prom Week and Academic Game Development." E-Games Gathering, Santa Cruz, CA. February 15, 2012.

McCoy, J., and M. Treanor, "Prom Week: Enabling Playable Social Models."Game/AI Conference. Paris, France. June 23-24, 2011. [slides pdf]

McCoy, J., "Simulations of Interaction Through a Game Model." MidWest Student Sociology Conference, 11-12 April 2003.

McCoy, J. "High Dimensional Rendering in OpenGL." 2004 Butler Undergradate Research Conference.

Benchmarking and Tuning the GROMACS Molecular Dynamics Package on Beowulf Clusters at Ohio Linuxfest 2004.

Workshop Organization

Social Believability in Games. Conference for Advances in Computer Entertainment (ACE), 2013.

Social believability in Games. 6th Digital Games Research Association (DiGRA), 2013.

Research Projects

Prom Week

Prom Week, a finalist in the Technical Excellence category of the 2012 Independent Games Festival and a nominee for the IndieCade 2012 games festival, is the first example of new game genre enabled by playble models of social interaction (such as the one I have developed in my dissertation work, see CiF below). Prom Week is fundamentally about the social interactions and relationships of a group of high school students during the week before their high school prom. The player helps the characters accomplish their goals through solving social puzzles. As a byproduct of game play, a new story is created that is based deeply on how the player changes the social lives of the students. This project is heavily based on my doctoral research and has been experienced by thousands of players. I initiated Prom Week and gathered a collaborative design and development team around myself to develop the game.

IMMERSE

IMMERSE is a projected funded under the DARPA Strategic Social Interaction Modules program. The goal of the project is to produce a game-based training environment that teaches people how interact as "good strangers" via practicing the skills necessary to have successful social interactions in unfamiliar languages and context. This will be accomplished via virtual dramatic scenarios, realized within the Unity game engine, in which the player interacts with computer-controlled autonomous characters in high-consequence social environments, learning how to quickly recognize and navigate the social interactions norms in these environments. We build upon the autonomous character and story management technologies successfully demonstrated in the interactive drama Façade, and the social simulation system successfully demonstrated in the experimental game Prom Week.

Comme il Faut

The implementation of my doctoral research, Comme il Faut (CiF) is an artificial intelligence system that implements a playable, authorable model of social interactions between characters in a storyworld. Based on dramaturgical analysis, CiF leverages normal patterns of social interactions, or social exchanges, in conjunction with a production system style set of encoded social norms to allow characters to not only enact performances consistent with the storyworld but to determine what performances are appropriate given a character's history, relationships, and present characters. CiF is designed as a component to be used in video games and interactive narratives to allow for playable social interaction and is used heavily in Prom Week.

Holodeck

Engaging supporting and background characters are important to many media forms -- from film to novels. But games, virtual worlds, and training simulations have lacked such characters. In this project we developed a theory of background character realism, built Second Life bots to test the theory, and then had human players compare these bots to human-controlled background characters. A full study then determined that the Holodeck avatars were seen as very close to human-driven avatars in the experiences

of the study's participants. I served as the lead behavior analyst and prototyper.

Real-Time Strategy Game AI

The goal for this project was to use expert domain knowledge of general real-time strategy (RTS) game play to create an AI system capable of playing complete games in the Warcraft 2: Tides of Darkness clone, Wargus. By breaking down the game play into salient domains, such as strategy, tactics, economy, and construction, each with their own manager, I created an integrated AI system based on domain knowledge that was easy to extend and adaptable to the opponent's gameplay. The AI system was written in a behavior language (ABL) which is a reactive planner implementation of a behavior, desire and intent (BDI) system. This served as my M.S. project.

Folding@Clusters

Folding@Clusters is an adaptive framework for harnessing low latency parallel computation resources for protein folding research. It combines capability discovery, load balancing, process monitoring, and checkpoint/restart services to provide a platform for molecular dynamics simulations on a range of grid-based parallel computing resources including clusters, SMP machines, and clusters of SMP machines. The software uses open source building blocks, such as the GROMACS molecular dynamics package and the LAM/MPI communications library, to provide the lowest level functionality. Building on this foundation we constructed a three tiered architecture: cluster, node, and science core. This provides a basis on which to abstract the process of performing a molecular dynamics simulation. This includes work unit preparation, distribution, checkpointing, failure recovery, and result aggregation, on a compute resource with arbitrary capabilities (CPU speed, CPU count, memory, etc.). I served as a senior developer and system administrator for this project.

Habitus Game Development and Graphics Group

My work in this group covers a large selection of topics revolving around game development and current graphic techniques. The focus of this group is to learn and research through creating compelling, substantial, open source video games. My contributions have been writing graphics engines, physical simulation (collision detection, light modeling, etc), software design, and user interaction. I founded and led this group.

Honors

Prom Week is a nominee for the IndieCade 2012 awards festival.

Prom Week as a Main Competition Finalist in Technical Excellence, The 14th annual Independent Games Festival, 2012.

Prom Week featured in the IndieCade 2012 E3 Showcase.

Prom Week was the Editor's Pick of Best AI in an Independent Game for the 2012 AiGameDev.com Awards for Game AI.

Best Poster Award, SIAM 2005 Conference on Computational Science and Engineering.

B.A. in Computer Science with Honors.

Professional Organizations

Associate for the Advancement of Artificial Intelligence

AI Game Programmers Guild

AIGameDev Member

International Game Developer's Association

Association for Computing Machinery

Press

Eldred, Sheila. "PROM WEEK: THE NEXT ANGRY BIRDS?" Discovery News. February 14th, 2012.[link]

Miljkovic, Nada. "Josh McCoy" Gamers on Game. 13 February 2012.[link]

Stephens, Tim. "'Prom Week' breaks new ground in computer game design" UC Santa Cruz. February 13th, 2012. [link]

Troxell, Lyle. "Prom Week Game" GeekSpeak, KUSP 88.9. February 12th, 2012. [radio broadcast, link]

Costikyan, Greg. "Prom Week: Playin ga Queen Bee" Play This Thing. February 12th, 2012. [link]

Alexander, Leigh. "Road to the IGF: Expressive Intelligence Studio's Prom Week" Gamasutra. January 31st, 2012. [link]

Meunier, Nathan. "8 Awesome Indie Games" Gamespy. January 30th, 2012. [link]

Meer, Alec. "IGF Factor 2012: Prom Week" Rock, Paper, Shotgun. January 30th, 2012. [link]

DeSantis, Nick. "Students' Video Game Tests New Artificial-Intelligence Engine -- at the Prom" The Chronicle of HIgher Education. January 20th, 2012. [link]

Manuel, Rob. "Always Bet on Indie -- Our Predictions for the IGF 2012 Awards" g4tv, January 19th, 2012. [link]

Griffiths, Daniel Nye. "Indie Games Finalists Announced - Lessons for the Big Players?" Forbes, January 11th, 2012. [link]

"2012 Independent Games Festival Announces Main Competition Finalists" Independent Games Festival. January 10th, 2012. [link]

Curtis, Tom. "GDC 2012 details new AI Summit highlights" Gamasutra, January 5th, 2012. [link]

Hubner, Alex. "UCSC Engineers are Trying to Make Video Games Smarter." Santa Cruz Patch. October 24th, 2011. [link]

Caoili, Eric. "Prom Week: Facade Follow-up Social Game" Game Set Watch. October 20th, 2011. [link]

Champandard, Alex J. "Paris Game/AI Conference '11: Highlights, Photos & Slides." AI Gamedev. August 5th, 2011. [link]

Soldofsky, Neal. "The Game of Life." June 29th, 2011. [link]

Glasser, AJ. "Academic Project Prom Week Points to Problems With Truly Social Social Games." Inside Social Games, April 18th, 2011. [link]

Nutt, Christian. "Future Of Games: Driving Gameplay Innovation With Technology Research." Gamasutra, April 15th 2011. [link]

Hiller, Igor. "Social Artificial Intelligence from UC Santa Cruz." April 1st, 2011. [link]

Thomsen, Michael. "The Era Of Behaving Playfully." Gamasutra, January 19th, 2011. [link]

Lowensohn, Josh. "GDC: What's next for video game AI?" March 10th, 2010. [link]