Frederick W. P. Heckel

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Education

Ph.D. , Computer Science, University of North Carolina at Charlotte, 2011

M.S., Computer Science, Washington University in St. Louis, 2008

B.A. Computer Science and Political Science, Swarthmore College, 2005

Research Goals

My research interests are primarily in the area of inexpensive real-time methods for artificial intelligence. In addition, I am interested in the development of tools and user interfaces that make intelligent systems accessible to non-experts in artificial intelligence. I successfully defended my dissertation, *Dynamic Behavior-Based Control and World-Embedded Knowledge for Interactive Artificial Intelligence*, in April 2011.

Peer-Reviewed Conference Publications

Frederick W. P. Heckel and G. Michael Youngblood, "Failure Detection and Reactive Teaming for Behavior-Based Subsumption." To appear in IVA 2011, Reyjavik, Iceland, September 2011.

Frederick W.P. Heckel and G. Michael Youngblood, "Contextual Affordances for Intelligent Virtual Characters." To appear in IVA 2011, Reyjavik, Iceland, September 2011.

Frederick W. P. Heckel and G. Michael Youngblood, "Multi-Agent Coordination Using Dynamic Behavior-Based Subsumption." In Proceedings of AIIDE 2010, Palo Alto, California, October 2010.

Frederick W. P. Heckel, Nikhil S. Ketkar, and G. Michael Youngblood, "Representational Complexity of Reactive Agents and its Impact on Authorial Tools". In Proceedings of CIG 2010, Copenhagen Denmark, August 2010.

George Alexander, G. Michael Youngblood, Frederick W. P. Heckel, D. Hunter Hale, and Nikhil S. Ketkar. "Rapid Development of Intelligent Agents in First/Third-person Training Simulations via Behavior-based Control." In Proceedings of the 19th Behavior Representation in Modeling and Simulation Conference (BRIMS). Charleston, South Carolina. 2010.

Frederick W. P. Heckel, G. Michael Youngblood, and D. Hunter Hale, "BehaviorShop: An Intuitive Interface for Interactive Character Design". In Proceedings of AIIDE 2009, Palo Alto, California, October 2009.

Frederick W. P. Heckel, G. Michael Youngblood, and D. Hunter Hale, "Making User-Defined Interactive Game Characters BEHAVE".In Proceedings of FLAIRS 2009, Sanibel Island, Florida, May 2009.

Frederick W. P. Heckel, G. Michael Youngblood, and D. Hunter Hale, "Influence points for tactical information in navigation meshes". In Proceedings of the 4th international Conference on Foundations of Digital Games (Orlando, Florida, April 26 - 30, 2009). FDG '09.

Michael Dixon, Frederick Heckel, Robert Pless, and William D. Smart, "Faster and More Accurate Face Detection on Mobile Robots Using Geometric Constraints". In Proceedings of IROS 2007, San Diego, California, October 2007.

Bruce A. Maxwell, Nicolas Ward, and Frederick Heckel, "Game-Based Design of Human-Robot Interfaces for Urban Search and Rescue", CHI 2004 Fringe, April 2004.
http://www.chiplace.org/chifringe/2004/796.pdf

Book Chapters

G. Michael Youngblood, Frederick W. P. Heckel, D. Hunter Hale, and Priyesh N. Dixit, "Embedding Information into Game Worlds to Improve Interactive Intelligence." Artificial Intelligence for Games. Pedro A. Gonzalez Calero, ed. Springer, 2011.

Workshop Papers, Posters, and Videos

Frederick W. P. Heckel, and G. Michael Youngblood, "Failure Detection and Dynamic Extensions for Behavior-Based Subsumption", FLAIRS 2011. Palm Beach, Florida, May 2011.

Frederick W. P. Heckel and G. Michael Youngblood, "Reactive Teaming for Game Characters" (video). 2010 AAAI Video Competition, Atlanta, Georgia. (Best Student Video)

Frederick W. P. Heckel, G. Michael Youngblood, and Nikhil S. Ketkar, "Reactive Teaming for Intelligent Game Characters". FLAIRS 2010, Daytona Beach, Florida, May 2010.

Allison M. Jacobs, Benjamin Fransen, J. Malcolm McCurry, Frederick W. P. Heckel, Alan R. Wagner, and J. Gregory Trafton, ' 'A Preliminary System for Recognizing boredom". In Proceedings of the 4th ACM/IEEE International Conference on Human Robot Interaction (La Jolla, California, USA, March 09 - 13, 2009). HRI '09.

Frederick Heckel and William D. Smart, "Mapping the Field of Human Robot Interaction", ICRA 2008 NEWHRI Workshop, Pasadena, California.

Frederick Heckel and William D. Smart, "Non-Speech Aural Communication for Robots" in "Aurally Informed Performance: Integrating Machine Listening and Auditory Presentation in Robotic Systems: Papers from the 2006 AAAI Fall Symposium", pp. 28-32, AAAI Technical Report FS-06-01.

Frederick Heckel, Tim Blakely, Michael Dixon, Chris Wilson, and William D. Smart, "The WURDE Robotics Middleware and RIDE Multi-Robot Tele-Operation Interface", AAAI Mobile Robotics Workshop, Boston, Massachusetts, July 2006.

Bruce A. Maxwell, Nicolas Ward, and Frederick Heckel, "A Configurable Interface and Architecture for Robot Rescue", AAAI Mobile Robotics Workshop, San Jose, California, July 2004.

Bruce A. Maxwell, Nicolas Ward, and Frederick Heckel, "A Human-Robot Interface for Urban Search and Rescue", in Proc. of AAAI Mobile Robot Competition and Exhibition Workshop, Acapulco, Mexico, pp. 7-12, August 2003.

Research Experience

Graduate Research Assistant — 2008–2011
G. Michael Youngblood — University of North Carolina at Charlotte
Development of a highly configurable agent architecture and engine for simulations and games.

Frederick W. P. Heckel

Graduate Research Assistant 2005–2008
William D. Smart Washington University in St. Louis
Development of Bayesian models for understanding human social interactions from physical motion.

Undergraduate Research Assistant 2003–2004
Bruce Maxwell Swarthmore College
Development of robot software and modification of hardware to compete in the 2003 and 2004 AAAI USAR competitions.

Teaching Experience

Teaching Assistant, Machine Learning, University of North Carolina at Charlotte, Spring 2009

Teaching Assistant, Introduction to Mobile Robotics, Swarthmore College, Spring 2005

Employment

Finite Wisdom Richmond, VA
Freelance Developer November 2010–Present
Integrated enterprise business management application with a third party web service using Django and Google App Engine.

Charles River Analytics Cambridge, MA
Assistant Software Engineer Summer 2010
Researched existing high level languages for building behavior models for artificial intelligence and designed extensions to the Herbal High Level Language to provide new language constructs for creating human behavior models.

Naval Research Lab Washington, D.C.
Ph.D. Student Intern Summer 2008
Worked with the ACT-RE cognitive architecture on a project to enable a cognitive agent to detect interest or boredom of a human from video and implemented iconic memory for ACT-RE.

Planned Systems International Falls Church, VA
Intern Summer 2001, Summer 2002
Provided UNIX systems support and developed software in Solaris environments. Deployed software and provided technical support for an outpatient insurance billing system.

Xperts, Inc. Glen Allen, VA
Intern Summer 1999, Summer 2000
Performed general IT systems support and web application development using Perl, PHP, and PostgreSQL.

Software

BehaviorShop (2010): BehaviorShop is a graphical user interface for allowing users who are new to artificial intelligence to easily build intelligent characters. Responsible for integrating understandable language information from the AI engine and game environment. (with G. Michael Youngblood, Arthur Carroll, and Hunter Hale) (C++ with FLTK)

BEHAVEngine (2009): The Behavior-Emulating Hierarchical Agent Vending Engine is a configurable behavior-based subsumption engine for executing intelligent agents in game environments. BEHAVEngine implements dynamic extensions for behavior-based subsumption, including multi-agent techniques. (Cross-platform C++)

CGUL Toolkit (2009): The Common Games Understanding and Learning Toolkit provides support libraries for game programming, including a library that provides navigation mesh services. Primary programmer and maintainer for the current version of CGUL. (with G. Michael Youngblood, Hunter Hale, and Nikhil Ketkar) (Cross-platform C++)

FI3RST (2009): The First and 3Rd-person Simulation Testbed is the simulation environment used by the Game Intelligence Group as an AI testbed. Primary programmer and maintainer for FI3RST.(with G. Michael Youngblood, Hunter Hale, and Nikhil Ketkar) (Cross-platform C++ with Irrlicht)

Willi-Nilli (2009): This game requires that the player physically rotate the game controller to navigate the world and collect the baby ladybugs before time runs out. Developed in 48 hours as part of the Global Game Jam (with Shawn Kirsch and Tiffany Barnes) (Windows, C# with XNA)

Canis Ex Machina (2008): A Real-Time Strategy game in which the player must use intelligent robot dogs to gather resources and escape the planet before the computer player can. Developed for the Introduction to Game Design and Development class at UNCC (With Andrea Nickel, Priyank Jain, Charanya Venkatesh Kumar, and Yoo Shin Kim)(Windows and XBox 360 C# with XNA).

WURDE (2007): The Washington University Robotics Development Environment is a modular software framework for developing robotics applications. Available at `http://wurde.sourceforge.net/`. (with William D. Smart) (Linux C++)

Service

Reviewer for: HRI 2007, HRI 2008, FDG 2009, FDG 2010, FLAIRS 2010, AIIDE 2010, SBGAMES 2010

Program Committee for FLAIRS 2011, FLAIRS 2011 Games Special Track, AIIDE 2009, AIIDE 2010

Secretary, Gamers Alliance, University of North Carolina at Charlotte, 2008-2009

Treasurer, Computer Science and Engineering Graduate Students Assocation, Washington University in St. Louis, 2006

Staff, Swarthmore College Computer Society, Swarthmore College, 2002-2005

Workshop Participation

ICRA 2008 NEWHRI Workshop. Presenter (Received travel award)

HRI Pioneers Workshop, 2008. Invited attendee (Received travel award)

HRI Pioneers Workshop, 2007. Invited attendee (Received travel award)

AAAI Fall Symposium: Aurally Informed Performance, 2006. Presenter

Project on People and Robots Graduate Student Invitational Workshop, 2006. Invited attendee (Received travel award)

Honors and Awards

Best Student Video, 2010 AAAI Video Competition

2nd Place, 2008-2009 UNC Charlotte Graduate Research Fair, Computer Science Category

TIAA-CREF Doctoral Fellowship, 2008-2009.

Swarthmore College nominee for Churchill Fellowship, 2005

Frederick W. P. Heckel

First Place, 2004 AAAI Urban Search and Rescue Competition

Second Place, 2003 AAAI Urban Search and Rescue Competition

Inducted into Sigma Xi, Swarthmore College Chapter, 2003

References

G. Michael Youngblood
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Robert Pless
Associate Professor, Washington University in St. Louis
Professor / mentor at Washington University
pless@cs.wustl.edu
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Richard Souvenir
Assistant Professor, University of North Carolina at Charlotte
Dissertation committee member
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