Shiwali Mohan

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Research Interests

Interactive AI/machine learning agents, cognitive systems and modeling, situated language processing

Education

University of Michigan, Ann Arbor, MI USA
Ph.D., Computer Science and Engineering — 2015

University of Michigan, Ann Arbor, MI USA
M.S.E., Computer Science and Engineering — 2009

University of Delhi, New Delhi, India
Netaji Subhas Institute of Technology
B.E., Instrumentation and Control Engineering — 2007

Employment

Palo Alto Research Center, Palo Alto, CA USA
Member of Research Staff — January 2016 - *present*

Palo Alto Research Center, Palo Alto, CA USA
Postdoctoral Researcher — November 2014 - December 2015

Yahoo! Research and Development, Bangalore, Karnataka India
Software Development Engineering — August 2007 - July 2008

Publications

Dissertation

[D1] **Shiwali Mohan**. From Verbs to Tasks: An Integrated Account of Task Learning from Situated Interactive Instruction. *University of Michigan, Ann Arbor*, 2015.

Book Chapters

[B1] John Laird, **Shiwali Mohan**, James Kirk, Aaron Mininger. The Learning Problem in Interactive Task Learning. *Ernst Strunngman Forum - Interactive Task Learning Agents, Robots, and Humans and Acquiring New Tasks through Natural Interaction (invited, to appear).* 2017.

[B2] Dario Salvucci, John Laird, Fredrick Chang, Kenneth Forbus, Parisa Kordjamshidi, Tom Mitchell, **Shiwali Mohan**, Michael Spranger, S Stevenson, Andrea Stocco, Gregory Trafton. Learning in Interactive Task Learning. *Ernst Strunngman Forum - Interactive Task Learning Agents, Robots, and Humans and Acquiring New Tasks through Natural Interaction (to appear)* 2017.

Journal Articles

[J1] **Shiwali Mohan**, Matthew Klenk. Behavior Change: A Motivating Domain for Human-Aware AI Research. *In preparation.* 2018.

[J2] Aaron Springer, Anusha Venkatakrishnan, **Shiwali Mohan**, Les Nelson, Michael Silva, Peter Pirolli. Leveraging Self-Affirmation to Increase mHealth Behavior Change. *Under review.* 2018.

[J3] Peter Pirolli, **Shiwali Mohan**, Anusha Venkatakrishnan, Len Nelson, Michael Silva, Aaron Springer. *Journal of Medical Information Research.* 2017.

[J4] John E Laird, Kevin Gluck, John Anderson, Kenneth D Forbus, Odest Chadwicke Jenkins, Christian Lebiere, Dario Salvucci, Matthias Scheutz, Andrea Thomaz, Greg Trafton, Robert E Wray, **Shiwali Mohan**, James R Kirk. Interactive Task Learning. *IEEE Intelligent Systems*, Volume 32, Issue 4, IEEE 2017.

[J5] **Shiwali Mohan**, Aaron Mininger, and John Laird. Towards an Indexical model of Situated Comprehension for Real-World Cognitive Agents. *Advances in Cognitive Systems 3*, ACS 2014.

[J6] John Laird and **Shiwali Mohan**. A Case Study of Knowledge Integration Across Multiple Memories in Soar. *Biologically Inspired Cognitive Architectures* (invited), BICA 2014.

[J7] **Shiwali Mohan**, Aaron Mininger, James Kirk, and John Laird. Acquiring Grounded Representations of Words with Situated Interactive Instruction. *Advances in Cognitive Systems 2*, ACS 2012.

Conference Proceedings

[C1] Filip Dvorak, **Shiwali Mohan**, Victoria Bellotti, Matthew Klenk. Collaborative Optimization and Planning for Transportation Energy Reduction. *In preparation.* 2018.

[C2] **Shiwali Mohan** and Anusha Venkatakrishnan. Observations from Deploying an Intelligent Interactive Health Coach to Promote Aerobic Exercise. *Under review.* 2018.

[C3] **Shiwali Mohan**, Anusha Venkatakrishnan, Peter Pirolli, Les Nelson, Michael Silva. On Developing Behavior Change Theory-based Coaching Interactions for a Comprehensive mHealth System. *Under review.* 2018.

[C4] John Laird and **Shiwali Mohan**. Learning Fast and Slow: Levels of Learning in General Autonomous Intelligent Agents. *(to appear) In the Proceedings of the* 32^{nd} *AAAI Conference.* AAAI 2018.

[C5] **Shiwali Mohan**, Anusha Venkatakrishnan, Michael Silva, and Peter Pirolli. On Designing a Social Coach to Promote Regular Aerobic Exercise. *In the Proceedings of the 29th Annual Conference on Innovative Applications of Artificial Intelligence/AAAI*, IAAI 2017.

[C6] Justin Li, Steven Jones, **Shiwali Mohan**, and Nate Derbinksy. Architectural Mechanisms for Mitigating Uncertainty during Long-Term Declarative Knowledge Access. *In the Proceedings of the 4th Conference on Advances in Cognitive Systems*, ACS 2016.

[C7] Andrea L Hartzler, Anusha Venkatakrishnan, **Shiwali Mohan**, Michael Silva, Paula Lozano, James D Ralston, Evette Ludman, Dori Rosenberg, Katherine M Newton, Lester Nelson, Peter Pirolli. Acceptability of a Team-Based Mobile Health (mHealth) Application for Lifestlye Self-Management in Individuals with Chronic Illnesses. *In* 38^{th} *Annual International Conference of the Engineering in Medicine and Biology Society (EMBC)*, IEEE. 2016.

[C8] **Shiwali Mohan** and John Laird. Learning Goal-Oriented Hierarchical Tasks from Situated Interactive Instruction. *In the Proceedings of the 28th AAAI Conference*, AAAI 2014.

[C9] **Shiwali Mohan**, James Kirk, and John Laird. A Computational Model of Situated Task Learning with Interactive Instruction. *In Proceedings of the 17th International Conference on Computational Modeling*, ICCM 2013.

[C10] Mandar Joshi, Rakesh Khobragade, Saurabh Sarda, Umesh Deshpande, and **Shiwali Mohan**. Object-Oriented Representation and Hierarchical Reinforcement Learning in Infinite Mario. *In Proceedings of the 24th IEEE International Conference on Tools with Artificial Intelligence*, ICTAI 2012.

[C11] **Shiwali Mohan** and John Laird. An Object-Oriented Approach to Reinforcement Learning in an Action Game. *In Proceedings of the 7th Artificial Intelligence for Interactive Digital Entertainment Conference*, AIIDE 2011.

[C12] Niladri Chatterjee and **Shiwali Mohan**. Discovering Word Senses from Text using Random Indexing. *In Proceedings of the 9th International Conference on Computational linguistics and Intelligent Text Processing*, CICLing 2008. Best Paper Award.

[C13] Niladri Chatterjee and **Shiwali Mohan**. Extraction-based Single-Document Summarization Using Random Indexing. *In Proceeding of the 19th IEEE International Conference on Tools with Artificial Intelligence*, ICTAI 2007.

Refereed Symposia/Workshop Proceedings

[W1]: **Shiwali Mohan**, Anusha Venkatakrishnan, Daniel Bobrow, Peter Pirolli. Health Behavior Change: A Motivating Domain for Human-Aware AI Research. *In Proceeding of the AAAI 2017 Workshops*. AAAI 2017.

[W2]: Matthew Klenk, **Shiwali Mohan**, Johan de Kleer, Daniel Bobrow, Tom Hinrichs, Ken Forbus. Collaborative Autonomy Through Analogical Comic Graphs. *In Proceedings of AAAI 2017 Workshops*. AAAI 2017.

[W3]: John E. Laird and **Shiwali Mohan**. A Case Study of Knowledge Integration Across Multiple Memories in Soar. *In Papers from the AAAI Fall Symposium Series on Integrated Cognition*, 2013.

[W4]: **Shiwali Mohan***, Aaron Mininger*, James Kirk*, and John Laird. Learning Grounded Language Through Situated Interactive Instruction. *In Papers from the AAAI Fall Symposium Series on Robots Learning Interactively from Human Teachers*, 2012.

[W5]: John Laird, Keegan Kinkade, **Shiwali Mohan**, and Joseph Xu. Cognitive Robotics Using the Soar Cognitive Architecture. *In Proceedings of the 8th International Cognitive Robotics Workshop*, 2012.

[W6]: **Shiwali Mohan** and John Laird. Situated Comprehension of Imperative Sentences in Embodied, Cognitive Agents. *In Papers from the AAAI Workshop on Grounding Language for Physical Systems*, 2012.

[W7]: **Shiwali Mohan** and John Laird. Towards Situated, Interactive, Instructable Agents in a Cognitive Architecture. *In Papers from the AAAI Fall Symposium Series on Advances in Cognitive Systems*, 2011.

Refereed Extended Abstracts

[A1] Peter Pirolli, **Shiwali Mohan**, Rong Yang, Anusha Venkatakrishnan, Michael Silva, Michael Youngblood, Ashwin Ram and Les Nelson. User Modeling and Planning for Improving

Self-efficacy and Goal Adherence in mHealth. *Frontiers Public Health. Conference Abstract: 2nd Behaviour Change Conference: Digital Health and Wellbeing.*, 2016.

[A2] **Shiwali Mohan**, and John E. Laird. Learning New Tasks for Situated Interactive Instruction. *In the 2014 HRI Pioneers Workshop at Human-Robot Interaction*, 2014.

[A3] Mandar Joshi, Rakesh Khobragade, Saurabh Sarda, Umesh Deshpande, and **Shiwali Mohan**. Hierarchical Action selection for Reinforcement Learning in Infinite Mario. *In Proceedings of the 6th Starting Artificial Intelligence Research Symposium at European Conference on Artificial Intelligence*, STAIRS 2012.

[A4] **Shiwali Mohan** and John Laird. Learning Actions and Action Verbs from Human-Agent Interaction. *In Proceedings of the 26th AAAI Conference on Artificial Intelligence*, AAAI 2012.

[A5] **Shiwali Mohan** and John Laird. Exploring Mixed-Initiative Interaction for Learning with Situated Instruction in Cognitive Agents. *In Proceedings of the 26th AAAI Conference on Artificial Intelligence*, AAAI 2012.

[A6] **Shiwali Mohan** and John Laird. Relational Reinforcement Learning in Infinite Mario. *In Proceedings of the 24th AAAI Conference on Artificial Intelligence*, AAAI 2010.

Patents

Ashwin Ram, Gregory Michael Youngblood, Lester D Nelson, Anusha Venkatakrishnan, Peter L Pirolli, Michael K Silva, Shiwali Mohan. *System and Method to Create, Monitor, and Adapt Individualized Multidimensional Health Programs.* Application number: 15/130,770. Publication date: 2016/4/15.

Funding

Advanced Research Projects Agency-Energy — January 2017 - July 2018
Collaborative Optimization and Planning for Transportation Energy Reduction
Key contributor, $2,177,717.00

Air Force Office of Scientific Research — *Under review*
Levels of Learning in Natural and Artificial Agents
Co-PI, $164,362.47

Invited Talks, Workshops, & Panels

NSF Workshop on Interactive Cognitive Assistants — November 2017
Ernst Strunngmann Forum on Interactive Task Learning — May 2017

On Designing a Programmable Cognitive Assistant
IBM Cognitive Systems Institute — September 2015

Learning Hierarchical Tasks with Situated Interactive Instruction
Information Sciences Institute, Los Angeles — December 2013
Interaction Lab, Computer Science and Engineering, USC — December 2013
University of California, Los Angeles — November 2013
USC Institute for Creative Technologies — November 2013.

Service	*Program Committee*: ICRA, HRI, IUI, AAAI, AAAI Doctoral Consortium	2018
	Reviewer: Autonomous Robots	2018
	Program Committee: AAAI, AAAI Doctoral Consortium	2017
	Program Committee IJCAI, AAAI	2016
	Program Committee AI-HRI AAAI Fall Symposium Series	2015
	Organizing Committee, Students of Cognitive Systems at ACS	2015
Honors and Awards	HRI Pioneers Scholarship	2014
	AAAI Travel Grant, AAAI Fall Symposium Series	2013
	Doctoral Consortium Scholarship, AAAI	2012
	Rackham Travel Grant	2011, 2012, 2013
	Best Paper Award, CICLing	2008
	Scholarship for Academic Excellence at the University of Delhi	2003 - 2007
Skills	Programming: Java, Python	
	AI Architecture: Soar	
	Machine Learning: Scikit-learn, H2O	
	Data Analysis: R, Pandas, Numpy	