SHIWALI MOHAN

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RESEARCH INTERESTS

Hybrid AI systems, human-agent interaction & collaboration, cognitive architectures and agents

EDUCATION

2009-2015 Doctor of Philosophy, Computer Science & Engineering
University of Michigan, Ann Arbor

2008-2009 Master of Science & Engineering, Computer Science & Engineering
University of Michigan, Ann Arbor

2003-2007 Bachelor of Engineering, Instrumentation & Control Engineering
Netaji Subhas Institute of Technology, Delhi University, New Delhi

EMPLOYMENT

2019-present Senior Member of Research Staff, Palo Alto Research Center

2015-2019 Member of Research Staff, Palo Alto Research Center

2014-2015 Postdoctoral Researcher, Palo Alto Research Center

2007-2008 Software Engineer, Yahoo! Research & Development, India

AWARDS & HONORS

2018 Blue Sky Award, at the 32^{nd} AAAI Conference on Artificial Intelligence

2014 HRI Pioneer

2008 Best Paper Award, at 9^{th} International Conference on Computational linguistics and Intelligent Text Processing

FUNDING

2020-2024 Defense Advance Research Projects Agency (DARPA) - Science of Artificial Intelligence and Learning for Open-world Novelty (SAIL-ON) $4M
Key Personnel, *Hypothesis-Guided Model Revision over Multiple Aligned Representations (*HYDRA*)*.

2019-2020 Defense Advance Research Projects Agency (DARPA) - Grounded Artificial Intelligence Language Acquisition (GAILA) $1M
Principal Investigator, *Advanced Cognitive Learning for Embodied Language* (AILEEN)

2018-2019 Air Force Office of Scientific Research (AFOSR) $300K
Co-Principal Investigator, *Levels of Learning in Natural and Artificial Agents*

2017-2018 Advanced Research Projects Agency-Energy (ARPA-E) $2M
Key Personnel, *Collaborative Optimization and Planning for Transportation Energy Reduction* (COPTER)

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. Eds. Kevin Gluck and John Laird*. 2019.

[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. Eds. Kevin Gluck and John Laird*. 2019.

Journal Articles

[J1] **Shiwali Mohan**, Matt Klenk. Analogical Concept Memory for Architectures Implementing the Common Model of Cognition. *(in preparation)*. 2020.

[J2] **Shiwali Mohan**. Exploring the Role of Common Model of Cognition in Designing Adaptive Coaching Interactions for Health Behavior Change *(in press)*. ACM Transactions on Interactive Intelligent Systems. 2020.

[J3] John Laird and **Shiwali Mohan**. A Case Study of Knowledge Integration Across Multiple Memories in Soar. Common Model of Cognition Bulletin, 1(1), 32-38. (Reprint in 2020)

[J4] **Shiwali Mohan**, Anusha Venkatakrishnan, Andrea Hartzler. Observations from Deploying an Intelligent Interactive Health Coach to Promote Aerobic Exercise. ACM Transactions on Interactive Intelligent Systems. 2020.

[J5] **Shiwali Mohan**, Hesham Rakha, Matthew Klenk. Acceptable Planning: Influencing Individual Behavior to Reduce Transportation Energy Expenditure of a City. Journal of Artificial Intelligence Research. 2019.

[J6] Aaron Springer, Anusha Venkatakrishnan, **Shiwali Mohan**, Les Nelson, Michael Silva, Peter Pirolli. Leveraging Self-Affirmation to Increase mHealth Behavior Change. *Journal of Medical Information Research*. 2018.

[J7] Peter Pirolli, **Shiwali Mohan**, Anusha Venkatakrishnan, Len Nelson, Michael Silva, Aaron Springer. *Journal of Medical Information Research*. 2017.

[J8] 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.

[J9] **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.

[J10] John Laird and **Shiwali Mohan**. A Case Study of Knowledge Integration Across Multiple Memories in Soar. *Biologically Inspired Cognitive Architectures* (invited), BICA 2014.

[J11] **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

[C1] **Shiwali Mohan**, Matt Klenk, Matthew Shreve, Aaron Ang, Kent Evans, John Maxwell. Characterizing a Concept Memory for Architectures Implementing the Common Model of Cognition. In Proceedings of the 8^{th} Annual Conference on Advances in Cognitive Systems. ACS 2020.

[C2] **Shiwali Mohan**, Frances Yan, Victoria Bellotti, Hesham Rakha, Matthew Klenk, On Influencing Individual Behavior for Reducing Transportation Energy Expenditure in a Large Population. *In Proceedings of the 2^{nd} AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society*. AIES 2019.

[C3] John Laird and **Shiwali Mohan**. Learning Fast and Slow: Levels of Learning in General Autonomous Intelligent Agents. *In Proceedings of the 32^{nd} AAAI Conference on Artificial Intelligence*. AAAI 2018.

[C4] **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.

[C5] 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.

[C6] 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* 38th *Annual International Conference of the Engineering in Medicine and Biology Society (EMBC)*, IEEE. 2016.

[C7] **Shiwali Mohan** and John Laird. Learning Goal-Oriented Hierarchical Tasks from Situated Interactive Instruction. *In the Proceedings of the* 28th *AAAI Conference*, AAAI 2014.

[C8] **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.

[C9] 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.

[C10] **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.

[C11] 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.

[C12] 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.

A complete list of peer-reviewed publications is at Google Scholar

Invited Talks, Workshops, & Panels

January 2021	Technology and Society in the Next Generation: Growth, Security, and Well-Being
November 2020	Guest Lecture, *Interactive Task Learning: An AI Next Problem*, Upcoming talk Occidental College.
September 2020	*Incorporating Behavioral Economics in AI Systems for Effective Human-AI Collaborative Behavior* Upcoming talk at Aggregate Intellect.
July 2020	*Humans of AI* AI Seminar at USC Information Sciences Institute
June 2020	*Common Model of Cognition and Health Behavior Change* Virtual International Symposium on Cognitive Architectures (VISCA 2020)
January 2020	Augmented Reality for Task Training Electronic Imaging 2020
May 2019	Machine Learning and User Experience + Ladies that UX meetup group
November 2017	NSF Workshop on Interactive Cognitive Assistants
May 2017	Ernst Strunngmann Forum on Interactive Task Learning
September 2015	*On Designing a Programmable Cognitive Assistant* IBM Cognitive Systems Institute
December 2013	*Learning Hierarchical Tasks with Situated Interactive Instruction* Institude of Creative Technologies, University of Southern California Information Science Institute, University of Southern California

Students and Interns Mentored

2020	Preeti Ramaraj, University of Michigan, PARC
2019	Aarathi Venkatesan, PARC; Naman Shah, Arizona State University, PARC
2014	Anant Mittal, Indraprastha University, New Delhi India

2009 Mandar Joshi, Rakesh Khobragade, Saurabh Sarda and Umesh Deshpande, VNIT, Nagpur, India

Patents

2018, USA Robert Price, Shiwali Mohan, *Rule-based Augmentation Of Perceptions To Augment And Filter Perceptions Of Observed Systems*. Application number 16/237,241, Publication date: 2020/7/2

2018, USA Matthew Klenk, Shiwali Mohan, Victoria Bellotti, *User Behavior in Transportation Influence*. Application number 16/181152. Publication date: 2020/5/7

2018, USA Matthew Klenk, Victoria M Bellotti, Filip Dvorak, Shiwali Mohan. *Generating collaboratively optimal transport plans*. Application number 16/024,208. Publication date: 2020/1/2

2017, European 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: 17165632.5 Publication date: 2017/04/07.

2016, USA 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.

Media

2017 *Could a Bot Coach You to a New PR? Artificial intelligence is making its way into fitness apps*. Interview. Outside magazine

Service

Chair/Co-Chair ACS 2020, AAAI-DC 2020, 2021

OC Students of Cognitive Systems Workshop at ACS 2015

SPC IJCAI 2020, 2021

PC AAAI (2016-present), IJCAI (2016), IUI (2018-present), ICRA (2018), HRI (2018), AAAI DC (2018-present), ACS (2017-present)

Reviewer Autonomous Robots, Transactions of Intelligent Interactive Systems, Advances in Cognitive Systems

August 18, 2020