Shiwali Mohan

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Education

Doctor of Philosophy in *Computer Science and Engineering* *August 2009 - Present*
University of Michigan, Ann Arbor
Thesis: Learning to ground verbs in actions through situated interactive instruction for cognitive agents embodied in physical worlds.
Areas of interest: linguistic human-robot interaction, learning from human-robot interaction, embodied language processing, cognitive architectures and agents

Master of Science and Engineering in *Computer Science and Engineering* *August 2008 - December 2009*
University of Michigan, Ann Arbor
Relevant coursework: Introductory/Advanced Artificial Intelligence, Machine Learning, Natural Language Processing, Models of Cognition, Cognitive Functioning, Algorithms, Parallel Computing, Psychology of Language

Bachelor of Engineering in *Instrumentation and Control Engineering* *August 2003 - May 2007*
Netaji Subhas Institute of Technology, **Delhi University**, New Delhi, India
Thesis: Extraction based summarization of documents

Research Experience

Graduate Student Research Assistant to Professor John E. Laird *August 2010 - Present*
University of Michigan, Ann Arbor
Grounded language for physical agents
Investigating comprehension and acquisition of grounded representation of verbs for robotic systems acting in a complex environment enabling them to collaborate with humans on a wide variety of tasks.

Learning with human-agent interaction
Designed, implemented, and analyzed an interaction model for agents instantiated in Soar cognitive architecture that allows limited mixed-initiative interaction with an instructor. The agents can derive general action policies from a history of (available in episodic/semantic memory of the agent) using explanation based generalization.

Graduate Student Research Assistant to Professor John E. Laird *May 2009 - August 2010*
University of Michigan, Ann Arbor
Reinforcement learning in Soar cognitive architecture
Designed, implemented, and analyzed reinforcement learning agents for Infinite Mario. Implemented modular reinforcement learning for Soar cognitive architecture that allows the agent to learn multiple MDPs.

Research Assistant to Professor Niladri Chatterjee *May 2007 - May 2007*
Indian Institute of Technology, New Delhi, India
Sense disambiguation, Word-Space models for language
Designed, implemented and analyzed algorithm for sense disambiguation of homonyms using K-Means clustering and Random Indexing.

Undergraduate Thesis with Professor Niladri Chatterjee *December 2006 - May 2007*
Indian Institute of Technology, New Delhi, India
Single document summarization, Word-Space models for language
Designed, implemented and analyzed algorithm for single-document summarization using PageRank and Random Indexing.

Publications

Journal Articles

Shiwali Mohan, Aaron Mininger, James Kirk, and John Laird. Acquiring grounded representations of words with situated interactive instruction. *Advances in Cognitive Systems*, 2012

Conference/Symposium Proceedings

John E. Laird and **Shiwali Mohan**. A case study of knowledge integration across multiple memories in soar. In *(to appear) in AAAI Fall Symposium on Integrated Cognition*, 2013

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*, 2013

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

Shiwali Mohan*, Aaron Mininger*, James Kirk*, and John Laird. Learning grounded language through situated interactive instruction. In *Papers from Robots Learning Interactively from Human Teachers (AAAI Fall Symposium Series)*, 2012

Shiwali Mohan and John Laird. Towards situated, interactive, instructable agents in a cognitive architecture. In *Papers from the 2011 AAAI Fall Symposium Series*, 2011

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

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**

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

Workshop Proceedings

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

Shiwali Mohan and John Laird. Situated comprehension of imperative sentences in embodied, cognitive agents. In *The AAAI 2012 Workshop on Grounding Language for Physical Systems*, 2012

Short Papers and Extended Abstracts

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 (ECAI)*, 2012

Shiwali Mohan and John Laird. Learning actions and action verbs from human-agent interaction. In *Proceedings of the 26th AAAI Conference on Artificial Intelligence*, 2012

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*, 2012

Shiwali Mohan and John Laird. Relational reinforcement learning in Infinite Mario. In *Proceedings of the 24th AAAI Conference on Artificial Intelligence*, AAAI, 2010

Teaching Experience

Graduate Student Instructor *January 2012 - April 2012*
EECS 492: Introduction to Artificial Intelligence
University of Michigan, Ann Arbor

Student *September 2011 - December 2011*
CHE 580: Teaching Engineering
University of Michigan

Advising Experience

Undergraduate Student Advising *September 2012 - Present*
Anant Mittal, Anmol Gupta
Undergraduate thesis project: *Designing Soar agents for planet wars*
Bharati Vidyapeeth College of Engineering, New Delhi, India

Undergraduate Student Advising *September 2011 - May 2012*
Mandar Joshi, Rakesh Khobragade, Saurabh Sarda
Undergraduate thesis project: *Reinforcement learning agents for Infinite Mario*
Visvesvaraya National Institute of Techonology, Nagpur, India

Service

2013 *Co-Chair*, Special Interest Group - Faculty, University of Michigan
2012 *Co-Chair*, Special Interest Group - Faculty, University of Michigan
2011 *Vice-President*, CSE Graduate Organization, University of Michigan
Social Chair, Indian Students Association, University of Michigan
2010 *DCO Representative*, CSE Graduate Organization, University of Michigan
Social Chair, Indian Students Association, University of Michigan
2007 *Creative Head*, The Choreography Team, Netaji Subhas Institute of Technology, Delhi
2006 *Volunteer*, The Neighborhood Project, Netaji Subhas Institute of Technology, Delhi

Industry Experience

Software Engineer with Strategic Data Services *July 2007 - July 2008*
Yahoo! Research and Development, India
Implemented feed aggregation (to generate analytic numbers such as page views and click-through rate) for many Yahoo! websites on a custom distributed computing platform. Implemented better scheduling of I/O and CPU bound processes leading to performance improvement of Media Analytics processes.

Software Intern *May 2006 - July 2006*
Bharat Electronics Limited, India

Software Intern *May 2005 - July 2005*
Central Research Laboratory, **Bharat Electronics Limited**, India

Technical Skills

Operating Systems: Linux(Ubuntu/Red Hat), Windows(XP/Vista/7)
Programming Languages: C/C++, Java, Perl, Soar, Python, JavaScript
Document Markup Language: Latex

References

available on request.