

# SHIWALI MOHAN

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## EDUCATION

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Doctor of Philosophy in *Computer Science and Engineering* August 2009 - Present  
**University of Michigan**, Ann Arbor

Thesis: Comprehension and acquisition of verbs using situated context in interactive instruction

Areas of Interest: cognitive agents and architectures, embodied language processing, learning with human-agent interaction

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

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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 such that the robot is able 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](#)  
[Indian Institute of Technology](#), New Delhi, India

December 2006 - May 2007

*Single document summarization, Word-Space models for language*

Designed, implemented and analyzed algorithm for single-document summarization using PageRank and Random Indexing.

## PUBLICATIONS

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### Journal Articles

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

### Conference/Symposium Proceedings

**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

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** 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 7th the 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

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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

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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 Technology**, Nagpur, India

## SERVICE

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- 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  
*Mentor*, EduMentoring
- 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  
*Creative Head*, The Choreography Team, Netaji Subhas Institute of Technology, Delhi

## PROFESSIONAL EXPERIENCE

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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

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Operating Systems: Linux(Ubuntu/Red Hat), Windows(XP/Vista/7)

Programming Languages: C/C++, JAVA, Perl, Soar

Programming IDEs/Editors: Eclipse, Emacs

Document Markup Language: Latex