

PRADEEP R. VARAKANTHAM

CURRENT POSITION

Postdoctoral Fellow

Intelligent Coordination and Logistics Lab
Robotics Institute
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RESEARCH INTERESTS

Decision making in uncertain domains; Multiagent systems; Probabilistic reasoning; Reinforcement learning; Distributed constraint reasoning; Scheduling with temporal uncertainty.

EDUCATION

Doctor of Philosophy

Computer Science 09/03 - 03/07
University of Southern California, USA
Thesis: Towards efficient planning for real world partially observable domains
Advisor: Prof. Milind Tambe
Committee: Prof. Milind Tambe, Prof. Manuela Veloso, Prof. Sven Koenig,
Prof. Makoto Yokoo, Prof. Stacy Marsella, Prof. Fernando Ordonez

Master of Science

Computer Science 09/03 - 05/06
University of Southern California, USA

Bachelor of Technology

Computer Science and Information Technology 09/98 - 06/02
International Institute of Information Technology, India
Thesis: XML Storage and Concurrency Manager
Advisor: Prof. Kamalakar Karlapalem

HONORS AND ACTIVITIES

Outstanding Research Assistant in the CS department at USC for the year 2005: There are only two outstanding research assistant awards given out each year in the department for excellence in research.

Awarded **dean's merit scholarship** at IIIT for two semesters: Given to students with a GPA above 9.5(out of 10) in a semester.

Awarded **merit certificate** in state wide Maths Olympiad: One of 60 (out of 10000) high school students who received this merit certificate.

EXPERIENCE

Postdoctoral Fellow

Intelligent Coordination and Logistics Lab(Prof. Stephen Smith) 03/07 - Present
Robotics Institute , Carnegie Mellon University
Pittsburgh, PA

Working on the problems of scheduling and learning in uncertain (mainly temporal uncertainty) personal assistant domains.

Graduate Research Assistant

Teamcore Research Group (Prof. Milind Tambe) 09/03 - 03/07
Computer Science Department, USC
Los Angeles, CA

Theory: *Working on the problems of decision making in partially observable domains, primarily using the POMDP (Partially Observable Markov Decision Problem) and Distributed POMDP models for representing the domains. The key contributions have been in providing efficient techniques to solve these models while providing bounds on the solution quality.*

Applied: *Working on developing a system that assists users in managing tasks on a project. This system is being developed in the context of CALO (Cognitive Agent that Learns and Organises) and employs POMDPs for making decisions about allocation/reallocation of tasks and adjustable autonomy.*

Teaching Assistant for Advanced Artificial Intelligence

Computer Science Department, USC 08/05 - 12/05
Los Angeles, CA

Was involved with teaching classes, creating and evaluating exams, and addressing students' concerns.

Software Developer

Divine Inc. 07/02 - 07/03
Hyderabad, India

Worked on an Instant Messaging tool called MindAlign. Was one of the few developers who was on the maintenance team for this product with 100 developers.

Summer Intern

Language Technologies Research Center
IIIT, Hyderabad, India

04/00 - 07/00

Developed a natural language querying interface for a relational database system. The interface was developed for two languages English and Hindi.

PUBLICATIONS

Journal Publications

Pradeep Varakantham, Ranjit Nair, Yoonheui Kim, Milind Tambe and Makoto Yokoo. *Exploiting Locality of Interaction in Networked Distributed POMDPs*. **Submitted** to Journal of Artificial Intelligence Research, JAIR.

Rajiv Maheswaran, Jonathan Pearce, Pradeep Varakantham, Emma Bowring and Milind Tambe, *Privacy Loss in Distributed Constraint Reasoning: A Quantitative Framework for Analysis and its Applications*. Journal of the Autonomous Agents and MultiAgent systems (JAAMAS),13:27–60, 2006.

Conference and Poster Publications

Pradeep Varakantham, Rajiv Maheswaran, Tapana Gupta and Milind Tambe. *Towards efficient computation of quality bounded solutions in POMDPs*. Accepted for ORAL PRESENTATION at the Twentieth International Joint Conference on Artificial Intelligence, IJCAI-2007. **Acceptance Rate: 15%**.

Pradeep Varakantham, Ranjit Nair, Milind Tambe and Makoto Yokoo. *Winning back the CUP for Distributed POMDPs: Planning over continuous belief spaces*. Proceedings of the fifth International Conference on Autonomous Agents and Multi Agent Systems, AAMAS-2006. **Acceptance Rate: 23%**.

Pradeep Varakantham, Rajiv Maheswaran, and Milind Tambe. *Exploiting Belief Bounds: Practical POMDPs for Personal Assistant Agents*. Proceedings of the fourth International Conference on Autonomous Agents and Multi Agent Systems, AAMAS-2005. **Acceptance Rate: 24%**.

Ranjit Nair, Pradeep Varakantham, Milind Tambe and Makoto Yokoo. *Network Distributed POMDPs, A Synthesis of Distributed Constraint Optimization and POMDPs*. Proceedings of the Twentieth National Conference on Artificial Intelligence, AAAI-2005. **Acceptance Rate: 18%**.

Ranjit Nair, Pradeep Varakantham, Makoto Yokoo and Milind Tambe. *Networked Distributed POMDPs: A Synergy of Distributed Constraint Optimization and POMDPs*. Poster paper at the proceedings of the International Joint Conference on Artificial Intelligence, IJCAI-2005. **Acceptance Rate: 22%**.

Rajiv Maheswaran, Jonathan Pearce, Pradeep Varakantham, Emma Bowring, and Milind Tambe. *Valuations of Possible States (VPS): A Unifying Quantitative Framework for Evaluating Privacy in Collaboration*. Proceedings of the fourth International Conference on Autonomous Agents and Multi Agent Systems, AAMAS-2005. **Acceptance Rate: 24%**.

Rajiv Maheswaran, Milind Tambe, Emma Bowring, Jonathan Pearce, Pradeep Varakantham. *Taking DCOP to the Real World : Efficient Complete Solutions for Distributed Event Scheduling*. Proceedings of the third International Conference on Autonomous Agents and Multi Agent Systems, AAMAS-2004. **Acceptance Rate: 24%**.

Book Chapters

Pradeep Varakantham, Rajiv Maheswaran, Milind Tambe. *Implementation Techniques for solving POMDPs in Personal Assistant Domains*. Programming Multiagent Systems (PROMAS). Springer Press Book Chapter, 2006.

Rajiv Maheswaran, Milind Tambe, Pradeep Varakantham and Karen Myers. *Adjustable Autonomy challenges in Personal Assistant Agents: A Position Paper*. Proceedings of Autonomy'03.

Symposium Publications

Yoonheui Kim, Ranjit Nair, Pradeep Varakantham, Milind Tambe and Makoto Yokoo. *Exploiting locality of interaction in Network Distributed POMDPs* . Proceedings of the AAAI Spring Symposium on Distributed Plan and Schedule Management, 2006.

Pradeep Varakantham, Rajiv Maheswaran and Milind Tambe. *Practical POMDPs for Personal Assistant Agents*. Proceedings of the AAAI Spring Symposium on Persistent Assistants, 2005.

Rajiv Maheswaran, Jonathan Pearce, Pradeep Varakantham, Emma Bowring and Milind Tambe. *Valuations of Possible Worlds (VPW): A Quantitative Framework for Analysis of Privacy Loss Among Collaborative Personal Assistant Agents*. Proceedings of the AAAI Spring Symposium on Persistent Assistants, 2005.

Workshop papers

Nathan Schurr, Pradeep Varakantham, Emma Bowring, Milind Tambe, and Barbara Grosz. *Asimovian Multiagents: Applying Laws of Robotics to Teams of Humans and Agents*. Proceedings of the Programming Multi-agent systems (PROMAS) workshop at AAMAS-2006.

Pradeep Varakantham, Rajiv Maheswaran, and Milind Tambe. *Implementation techniques for solving POMDPs in personal assistant domains*. Proceedings of the Programming Multi-agent systems (PROMAS) workshop at AAMAS-2005.

Ranjit Nair, Pradeep Varakantham, Makoto Yokoo and Milind Tambe. *Exploiting Interaction Structure in Networked Distributed POMDPs*. Proceedings of the Planning and Scheduling workshop at ICAPS, 2005.

Pradeep Varakantham, Rajiv Maheswaran and Milind Tambe. *Agent Modeling in Partially Observable Domains*. Proceedings of the AAMAS Workshop on Agent Modeling using Observations, 2004.

Invited papers

Praveen Paruchuri, Emma Bowring, Ranjit Nair, Jonathan Pearce, Nathan Schurr, Milind Tambe, Pradeep Varakantham. *Hybrids in Multiagent Teamwork*. Published in Communications of the Computer Society of India.

Milind Tambe, Emma Bowring, Jonathan Pearce, Pradeep Varakantham, Paul Scerri, David Pynadath. *Electric Elves: What Went Wrong and Why*. Proceedings of the AAI Spring Symposium on What Went Wrong and Why, 2006.

M. Tambe, E. Bowring, H. Jung, G. Kaminka, R. Maheswaran, J. Marecki, P. J. Modi, R. Nair, J. Pearce, P. Paruchuri, D. Pynadath, P. Scerri, N. Schurr, P. Varakantham. *Conflicts in teamwork: Hybrids to the rescue*. Invited paper at the Proceedings of the Fourth International Joint Conference on Autonomous Agents and Multiagent Systems, AAMAS-2005.

PROFESSIONAL ACTIVITIES

Program Committee

National Conference on Artificial Intelligence, AAI (2007).

Reviewer

Journal of Artificial Intelligence Research (JAIR).

Journal of Autonomous Agents and Multi Agent systems (JAAMAS).

International Joint Conference on Artificial Intelligence, IJCAI (2005, 2007).

Autonomous Agents and Multi Agent Systems, AAMAS (2006).

IEEE Transactions on Systems, Man, and Cybernetics Part B (2005).

Brazilian Symposium on Artificial Intelligence (2004).

Physics of Life Reviews (2004).

Miscellaneous

Maintainer of the distributed POMDP repository (teamcore.usc.edu/pradeep/dpomdp_page.html).

REFERENCES

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