

Matthew D. Schmill

PO Box 27023
Baltimore, MD 21230
Phone: (413)244-3777
Email: matt@schmill.net
Web: <http://matt.schmill.net>

Education

Ph.D., Computer Science, University of Massachusetts, 2004.
Learning the Structure of Activity for a Mobile Robot
Paul R. Cohen, Advisor.

M.S., Computer Science, University of Massachusetts, 1997.

B.S., Computer Science, University of Massachusetts, 1994.

Professional Experience

1/2006 – present **Research Assistant Professor**
Department of Computer Science & Electrical Engineering
University of Maryland Baltimore County
Primary responsibility was design and development of the Meta Cognitive Loop, a domain-general metareasoning system intended to make intelligent systems more robust by allowing them to reason about and recover from unexpected failures. Additional research programs include computational finance and bootstrapped learning.

12/2004 – 12/2005 **Postdoctoral Research Fellow**
Department of Astronomy
University of Massachusetts, Amherst
<http://www.lmtgtm.org>
Involved in the design and development of monitor and control software for the Large Millimeter Telescope and related projects. Projects included real-time, networking, and user interface tools for use on a 50m diameter millimeter-wave telescope under construction in Puebla, Mexico, as well as design and development for monitor and control software for other instruments under development at the university.

10/2004 – 12/2004 **Postdoctoral Research Fellow**

Experimental Knowledge Systems Lab
University of Massachusetts, Amherst

I was involved in an intensive 3-month rolling start to DARPA's "Integrated Battle Command" program. The program involved integrating a handful of intelligent tools into a military planning setting to improve efficiency and performance. Our tool was a social simulation that projected long-term effects of military courses of action in regions where insurgent or terrorist activity was likely. The program concluded with a 4-day demo in which we presented and used our tool in a live planning scenario.

9/1995 – 5/2004 **Research Assistant**

Experimental Knowledge Systems Lab
University of Massachusetts, Amherst

I was involved in a variety of research projects in a multidisciplinary AI lab. Projects drew heavily from the areas of machine learning, intelligent data analysis, data mining, simulation, and planning. The majority of my work was on a project aimed at understanding the development of activity in intelligent agents, and included work with both simulated agents and the Pioneer-2 mobile robot.

6/1994 – 8/1995 **Systems Programmer**

Experimental Knowledge Systems Lab
University of Massachusetts, Amherst

I was the primary developer of a Macintosh interface to CLASP, a statistical analysis package developed in-house at the EKSL. I also extended the hypothesis testing and contingency table analysis components of this software.

Teaching Experience

Introduction to the Internet, University of Massachusetts, 1999.

Responsible for design, instruction, and grading of intensive internet course taken by a mix of university students, continuing education students, and gifted high school students.

Introduction to Assembly Language Programming (consultant),

University of Massachusetts, 1992.

Instructed students in understanding, writing, and debugging of x086 assembly language programs.

Publications

Conference Proceedings

Gary. W. King, Matthew D. Schmill, Andrew Hannon, and Paul Cohen. "The Asymmetric Threat Assessment Tool (ATAT)". In *Proceedings of the 14th Conference on Behavior Representation in Modeling and Simulation (BRIMS)* Orlando, FL, May 2005. L. Allender and T. Kelley, Eds.

Matthew D. Schmill, and Paul R. Cohen. 2002. A Motivational System That Drives the Development of Activity. *Proceedings of the Sixth International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)*.

Victor Lavrenko, Matthew D. Schmill, Dawn Lawrie, Paul Ogilvie, David Jensen, and James Allan. 2000. Language Models for Financial News Recommendation, *Proceedings of the Ninth International Conference on Information and Knowledge Management (CIKM)*.

Tim Oates, Matthew D. Schmill, Paul R. Cohen. 2000. A Method for Clustering the Experiences of a Mobile Robot that Accords with Human Judgements. *Proceedings of the Seventeenth International Conference on Artificial Intelligence*.

Matthew D. Schmill, Tim Oates and Paul R. Cohen. 2000. Learning Planning Operators in Real-World, Partially Observable Environments. *Proceedings of the Fifth International Conference on Artificial Intelligence Planning and Scheduling*.

Tim Oates, Matthew D. Schmill and Paul R. Cohen. 1999. Efficient Mining of Statistical Dependencies. *Proceedings of the Sixteenth International Joint Conference on Artificial Intelligence*.

Tim Oates, Matthew Schmill and Paul R. Cohen. 1999. Identifying Qualitatively Different Outcomes of Actions: Gaining Autonomy Through Learning. *The Fourth International Conference on Autonomous Agents*.

Matthew D. Schmill, Michael T. Rosenstein, Paul R. Cohen, and Paul Utgoff. 1998. Learning What is Relevant to the Effects of Actions for a Mobile Robot. *Proceedings of the Second International Conference on Autonomous Agents*, pp. 247-253.

David Jensen and Matthew D. Schmill. 1997. Accounting for Multiple Comparisons in Decision Tree Pruning. *Proceedings of the Third International Conference on Knowledge Discovery and Data Mining*.

Tim Oates, Matthew D. Schmill, and Paul R. Cohen. 1996. Parallel and Distributed Search for Structure in Multivariate Time Series. *Proceedings of the Ninth European Conference on Machine Learning*.

Matthew D. Schmill, Tim Oates and Paul R. Cohen. 1995. Tools for Detecting Dependencies in AI Systems. In *Proceedings of the Seventh International IEEE Conference on Tools with Artificial Intelligence*.

Book Chapters / Articles

Matthew D. Schmill, Michael L. Anderson, Scott Fults, Darsana Josyula, Tim Oates, Don Perlis, Hamid Shahri, Shomir Wilson, and Dean Wright. The Metacognitive Loop and Reasoning about Anomalies. *Metareasoning: Thinking about thinking*. MIT Press. In preparation.

Michael L. Anderson, Scott Fults, Darsana P. Josyula, Tim Oates, Don Perlis, Matthew D. Schmill, Shomir Wilson, and Dean Wright. A self-help guide for autonomous systems. *AI Magazine*, Summer 2008.

Tim Oates, Matthew D. Schmill, Dawn E. Gregory and Paul R. Cohen. 1995. Detecting Complex Dependencies in Categorical Data. In Doug Fisher and Hans Lenz, editors, *Finding Structure in Data: Artificial Intelligence and Statistics V*. Springer Verlag.

Workshop Proceedings

Matthew D. Schmill, Tim Oates, Michael L. Anderson, Darsana Josyula, Don Perlis, Shomir Wilson, and Scott Fults. The role of metacognition in robust AI systems. In *Papers from the Workshop on Metareasoning at the Twenty-Third AAAI Conference on Artificial Intelligence*, 2008.

Matthew D. Schmill, Darsana Josyula, Michael Anderson, Tim Oates, Don Perlis, and Scott Fults. Ontologies for Reasoning about Failures in AI Systems. In *First International Workshop on Metareasoning in Agent-Based Systems*, 2007.

Michael L. Anderson, Matthew D. Schmill, Tim Oates, Don Perlis, Darsana Josyula, Dean Wright, and Shomir Wilson. Toward Domain-Neutral Human-Level Metacognition. In *Proceedings of the Eighth International Symposium on Logical Formalizations of Commonsense Reasoning*, 2007.

Victor Lavrenko, Matthew D. Schmill, Dawn Lawrie, Paul Ogilvie, David Jensen, and James Allan. 2000. Mining of Concurrent Text and Time Series, In *Proceedings of the Sixth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*.

Tim Oates, Matthew D. Schmill, and Paul R. Cohen. 1999. Identifying Qualitatively Different Outcomes of Actions: Experiments with a Mobile Robot. In *Working Notes of the IJCAI-99 Workshop on Robot Action Planning*,

Matthew D. Schmill, Tim Oates, and Paul R. Cohen. 1999. Learned Models for Continuous Planning. In *The Preliminary Papers of the Seventh International Workshop on Artificial Intelligence and Statistics*.

Tim Oates, Matthew D. Schmill, Paul R. Cohen, and Casey Durfee. 1999. Efficient Mining of Statistical Dependencies. In *Preliminary Papers of the Seventh International Workshop on Artificial Intelligence and Statistics*, pages 133 – 141.

Tim Oates, Matthew D. Schmill, David Jensen, and Paul R. Cohen. 1997. A Family of Algorithms for Finding Temporal Structure in Data. *The Preliminary Papers of the Sixth International Workshop on Artificial Intelligence and Statistics*.

M.T. Rosenstein, Paul R. Cohen, Matthew D. Schmill, and Marc S. Atkin. 1997. Action representation, prediction and concepts. In *Preliminary Papers of the AAAI Workshop on Robots, Softbots, Immobots: Theories of Action, Planning and Control*,

Technical Reports

Victor Lavrenko, Matthew D. Schmill, Dawn Lawrie, Paul Ogilvie, David Jensen, and James Allan. 2000. Information Mining of Concurrent News and Time Series *Technical Report IR-203*, Dept. of Computer Science, University of Mass/Amherst.

Matthew D. Schmill, 1998. A Distributed Approach to Finding Complex Dependencies in Data. *Technical Report 98-13*, Dept. of Computer Science, University of Mass/Amherst.

Matthew D. Schmill and Paul R. Cohen. 1995. Learning Predictive Generalizations for Multiple Streams: An Incremental Algorithm. *Technical Report 95-55*, Dept. of Computer Science, University of Mass/Amherst.

Presentations

“Ontologies for Reasoning about Failures in AI Systems”. In *First International Workshop on Metareasoning in Agent-Based Systems*. May 2007.

“Learning Planning Operators in Real-World, Partially Observable Environments”. Full presentation to *The Fifth International Conference on Artificial Intelligence Planning and Scheduling*. May 2000.

“Learned Models for Continuous Planning”. Poster presented to *The Seventh International Workshop on Artificial Intelligence and Statistics*. January 2000.

“Learning What is Relevant to the Effects of Actions for a Mobile Robot”. Full presentation to *The Second International Conference on Autonomous Agents*. May 1998.

“A Family of Algorithms for Finding Temporal Structure in Data”. Poster presented to *The Sixth International Workshop on Artificial Intelligence and Statistics*. January 1998.

Tools for Detecting Dependencies in AI Systems. Full presentation to *The Seventh International IEEE Conference on Tools with Artificial Intelligence*. November 1995.

Committee Member

Ph.D. dissertation committee member, Marc Pickett (Dr. Tim Oates, advisor).
Thesis topic: *Concept Formation from Undifferentiated Sensor Data*

Reviewing

Reviewer for the 2009 International Conference of Machine Learning.
Reviewer for the 2008 International Conference on Development and Learning.

References

Professor Paul R. Cohen – thesis advisor

Center for Research on Unexpected Events (Director)
Intelligent Systems Division (Deputy Director)
USC Information Sciences Institute
4676 Admiralty Way
Marina del Rey CA 90292-6695
Email: cohen@isi.edu,
Phone: 310 448 9342

Professor Tim Oates

Department of Computer Science & Electrical Engineering
University of Maryland Baltimore County
1000 Hilltop Circle
Baltimore, MD 21250
Email: oates@cs.umbc.edu
Phone: 410.455.3082

Professor David Jensen

Department of Computer Science
140 Governors Drive
University of Massachusetts, Amherst
Amherst, MA 01003-4610
Email: jensen@cs.umass.edu
Phone: 413-545-9677
Fax: 413-545-1249

Professor Rod Grupen

Laboratory for Perceptual Robotics
Department of Computer Science
140 Governors Drive
University of Massachusetts, Amherst
Amherst, MA 01003-4610
Email: grupen@cs.umass.edu
Phone: 413-545-3280
Fax: 413-545-1249

Professor Victor R. Lesser

Multi-Agent Systems Lab
Department of Computer Science
140 Governors Drive
University of Massachusetts, Amherst
Amherst, MA 01003-4610
Email: lesser@cs.umass.edu
Phone: 413-545-1322
Fax: 413-545-1249