

Curriculum Vitae

R. MATTHEW KRETCHMAR

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EDUCATION

- Ph.D. **Colorado State University**, 2000 (Chuck Anderson, advisor)
Dissertation title: *Synthesis of Reinforcement Learning and Robust Control*
- M.S. **Rensselaer Polytechnic Institute**, 1995
Thesis title: *Using Neural Networks for Pattern Recognition in Graphs*
- B.S. **Penn State University**, 1992.
Thesis title: *A Small Operating System for use with a Multi-User Custom Computer*

JOURNAL PUBLICATIONS (peer reviewed)

- Feil, T., Hutson, K., Kretchmar, R. M. Tree traversals and permutations. *Congressus Numerantium*, vol. 172. pp. 201-221. 2005.
- Kretchmar, R. M., Feil, T., Bansal, R. (2003) Improved Automatic Discovery of Subgoals for Options in Hierarchical Reinforcement Learning. *Journal of Computer Science and Technology*, October, 2003.
- Kretchmar, R.M., Young, P.M., Anderson, C.W., Hittle, D.C., Anderson, M. L., Delnero, C. C. (2001) Robust Reinforcement Learning Control with Static and Dynamic Stability. *International Journal of Robust and Nonlinear Control*, no. 11, pp. 1469-1500, 2001.
- Anderson, C.W., Hittle, D.C., Katz, A.D., Kretchmar, R.M. Synthesis of Reinforcement Learning, Neural Networks, and PI Control Applied to a Simulated Heating Coil. *Journal of Artificial Intelligence in Engineering*, vol. 11, no. 4, pp. 423-431, 1997
- Kretchmar, R. Matthew. Uncontrolling Technology: A Review of Kevin Kelly's Book Out of Control. In *Research in Philosophy and Technology*. ed by Carl Mitcham, vol 16, 1997.

CONFERENCE PUBLICATIONS (peer reviewed)

- Bucatanschi, D., Hoffman, B. Hutson, K. Kretchmar, R.M. A Neighborhood Search Technique for the Freeze-Tag Problem. Submitted to: *INFORMS ICS 2007*. Miami, FL, December 2006.
- Kretchmar, R.M. Multi-agent Reinforcement Learning. *ACM WASP03. Workshop on Agent and Swarm Programming*. John Carroll University, Cleveland, OH, October 2003.
- Kretchmar, R.M. Parallel Reinforcement Learning. *SCI2002. The 6th World Conference on Systemics, Cybernetics, and Informatics*. Orlando, FL, July 2002.
- Kretchmar, R.M., Young, P.M., Anderson, C.W., Hittle, D.C. Robust Reinforcement Learning Control. *2001 American Control Conference*. Washington D.C. June 2001.

- Kretchmar, R.M., and Anderson, C.W. Using temporal neighborhoods to adapt function approximators in reinforcement learning. In *IWANN99: International Work Conference and Artificial and Natural Neural Networks*. Alicante, Spain. June 1999.
- Kretchmar, R.M., and Anderson, C.W. Comparison of CMACs and Radial Basis Functions for Local Function Approximators in Reinforcement Learning. In *Proceedings of the International Conference on Neural Networks, ICNN'97*, Houston, TX. June, 1997
- Anderson, C.W., Hittle, D.C., Katz, A.D., Kretchmar, R.M. Reinforcement Learning, Neural Networks and PI Control Applied to a Heating Coil. *Solving Engineering Problems with Neural Networks: Proceedings of the International Conference on Engineering Applications of Neural Networks (EANN'96)*, ed. by Bulsari, A.B., Kallio, S., and Tsaptsinos, D., Systems Engineering Association, PL 34, FIN-20111 Turku 11, Finland, pp. 135–142. Also see <http://www.abo.fi/~abulsari/EANN96.html>

OTHER PUBLICATIONS AND PRESENTATIONS

- Kretchmar, R.M., Young, P.M., Anderson, C.W., Hittle, D.C. Chapter in book: *Handbook of Learning and Approximate Dynamic Programming*. Wiley-IEEE Press. July, 2004.
- Kretchmar, R.M. (Invited Speaker). Complex Systems: Searching for the Empirical in CS. *The MITC Symposium on Innovative Science Teaching: Enhancing Learning with Technology*. Greencastle, IN. May, 2003.
- Kretchmar, R.M., Antonova, D. Machine Learning in a Distributed Agent Environment. *The GLCA Conference on Complex Systems*. Kalamazoo, MI. February, 2003.
- Kretchmar, R. M. Presentation: “Using Robotics as a Pedagogical Tool”. *AAAI Symposium on Robotics in Education*. American Association for Artificial Intelligence. Stanford University, Palo Alto, CA. March 2001.
- Kretchmar, R. M. TM: A text-based, object-oriented, Turing machine simulator. *Technical Report and Web Publication: Denison University*. October 2000.
- Kretchmar, R.M. Dissertation: *Synthesis of Reinforcement Learning and Robust Control*. Ph.D. Colorado State University. August 2000.
- Bontempo, Charles, Zagelow, George. The IBM Data Warehouse Architecture. *Communications of the ACM*. v41. n 9. September 1998. pages 38-48.

RESEARCH SUPERVISED

- 2006 D. Bucatanschi *Kernel Method for Image Processing: A Denison University Honors Thesis.* The use of various kernel techniques to identify photographs of people and learn common distinguishing features.
- 2005 D. Bucatanschi *Dimensionality Reduction Via Alternative Basis in Reinforcement Learning.* An application of principal component analysis to the learned value function landscape of reinforcement learning.
- 2004 B. Hoffman, and D. Bucatanschi *Solutions to the freeze tag problem.* Application of genetic algorithms and ant-algorithm heuristics to finding optimal awakening schedules for the freeze tag problem.
- 2003 D. Antonova *Parallel Reinforcement Learning.* An investigation of information sharing for multi-agent Q-learning.
- 2002 N. Hristov *Stellar model searching.* Application of simulated annealing to parameter fitting for a stellar density model.
- 2001 R. Bansal *Q-Learning for a mobile robot.* A continuation of D. Michael's work on Q-learning and map formation.
- 2000 D. Michael *Using Q-Learning for environment mapping.* Equipped a small mobile robot with a crude sonar sensor to construct internal mappings the robot's environment.

EMPLOYMENT

8/05	present	Associate Professor , Department of Mathematics and Computer Science, Denison University.
8/99	8/05	Assistant Professor , Department of Mathematics and Computer Science, Denison University.
7/95	8/99	Graduate Research Assistant , Department of Computer Science, Colorado State University. Research involving function approximation and reinforcement learning. Application to HVAC systems.
8/97	8/98	Instructor Department of Computer Science, Colorado State University.
10/97	8/99	Research Assistant , Department of Cognitive Psychology, Colorado State University.
6/92	6/95	Software Engineer , IBM, Data Warehouse Development Laboratory.

PROFESSIONAL ACTIVITIES

Conference Committees

- 2004 MCURCSM. Midwest Conference on Undergraduate Research in Computer Science and Mathematics. Program chair (for October 2004).
- 2003 MCURCSM. Midwest Conference on Undergraduate Research in Computer Science and Mathematics. General program committee member.
- 1999 GECCO. Genetic and Evolutionary Computation Conference: invited general program committee member.
- 1998 NIPS. Neural Information Processing Systems: volunteer staff.

Professional Organizations

- ACM (Association for Computing Machinery).
- ISAB. (International Society of Adaptive Behavior).
- MAA. (Mathematical Association of America).

Other Activities

Competitive distance running (9th place 2002 Cleveland Revco Intl Marathon, 16th place 2002 Columbus Marathon), games, chess, cycling.