Roni Khardon

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Education

Ph.D. in Computer Science, Harvard University, 1996.
Thesis: *Learning to be Competent.*
Advisor: Prof. Leslie G. Valiant.

M.Sc. in Electrical Engineering, Technion (Israel), 1992.
Thesis: *Optimizing Code Grain Size for Data Flow Machines.*
Advisor: Dr. Shlomit Pinter.

B.Sc. in Computer Science, Technion (Israel), 1988.

Appointments

Tufts University Associate Professor, September 2006 - Present.

Tufts University Assistant Professor, September 2000 - August 2006.

University of Edinburgh, UK Lecturer (equivalent to Assistant Professor in the US system), 1997 - 2000

Harvard University Postdoctoral Fellow, 1996 - 1997.

Research Interests Theoretical foundations, efficient algorithms, practical aspects and applications of machine learning, data mining and knowledge representation. More generally my interests lie in (design and analysis of) algorithms and artificial intelligence.

Grants

Harvard, Initiative in Innovative Computing, Time Series Center. Member of core team. Funding provides partial support for graduate student at Tufts.

NSF grant IIS-0099446 ($276,489), "Learning and Reasoning with Relational Structures", 2001-2005.
EPSRC grant GR/M21409 (£53270), "Learning Approximation and Reasoning", 1998-2002 (UK).
EPSRC grant GR/N03167 (£1500), "Learning Relational Expressions for Natural Language Applications", visiting fellowship grant ,1999 (UK).

Research and Other Professional Activities

Program Committee Area Chair

Twenty-Second International Conference on Machine Learning (ICML) 2005.

Program Co-Chair

Twelfth International Conference on Algorithmic Learning Theory (ALT), November 2001.

Organization

Co-Organizer and Workshop Co-Chair for the Learning Track in the 2008 International Planning Competition that is held as part of the International Conference on Automated Planning and Scheduling (ICAPS) 2008.

Co-Organizer and Program Co-Chair for the Workshop on Logic and Learning, affiliated with the IEEE symposium on Logic in Computer Science (LICS), June 2001.

Steering Committee

Member of the Steering Committee for the Algorithmic Learning Theory (ALT) conference series, 2001-2007.

Thesis Committee

External examiner of PhD for Scott Sanner, Department of computer Science, University of Toronto, 2007; advisor Craig Boutilier.

Outside member on PhD thesis committee for Jiang Chen, Computer Science Department, Yale University, 2006; advisor Dana Angluin.

External reader of PhD for Jerome Maloberti, Laboratoire de Recherche en Informatique, Universite Paris-Sud, France, 2005; advisor Michele Sebag.

Graduate Students

Saket Joshi, PhD (in progress).
Gabriel Wachman, MS May 2005. PhD (in progress).
Chenggang Wang, PhD (May 2007).
Marta Arias, PhD (May 2004).

Andre Quina, MS (project, May 2006).
Beau Tremblay, MS (project, May 2006).
Mete Atamel, MS (project, May 2005).
Martin Paczynski, MS (project, Jan 2005).
Mikhail Urinson, MS (project, Jan 2005).
Goksel Otzturk, MS (project, August 2004).
Shuqing Huang, MS (thesis, May 2002).

Editorial Work

Associate Editor (action editor) for the Machine Learning Journal (since November 2006). Previously on the editorial board during 2003-2006.

Co-editor for a special issue of the journal *Theoretical Computer Science* including selected papers from the ALT 2001 conference (with N. Abe); published February 2004.

Co-editor for the Proceedings of the 12th International Conference on Algorithmic Learning Theory (ALT) 2001. Lecture Notes in Artificial Intelligence (LNAI) 2225, Springer, 2001. (with N. Abe and T. Zeugmann).

Program Committee Member

Learning track of International Planning Competition 2008 (held as part of ICAPS 2008): co-chair.

ICML (International Conference on Machine Learning) 2008.

Workshop on Algorithms for Large-Scale Information Processing in Knowledge Discovery (held in conjunction with PAKDD) 2008.

ISAIM (International Symposium on Artificial Intelligence and Mathematics) 2008.

ICML (International Conference on Machine Learning) 2007.

ICML (International Conference on Machine Learning) 2007.

COLT (The International Conference on Learning Theory) 2007.

AAAI (The US National Conference on Artificial Intelligence) 2007.

KDD (The International Conference on Knowledge Discovery and Data Mining) 2006.

AAAI (The US National Conference on Artificial Intelligence) 2006.

ILP (Conference on Inductive Logic Programming) 2006.

LLLL (Workshop on Learning with Logics and Logics for Learning) 2006.

ICML (International Conference on Machine Learning) 2005: area chair.

ECML (European Conference on Machine Learning) 2005.

ILP (Conference on Inductive Logic Programming) 2005.

AAAI (The US National Conference on Artificial Intelligence) 2005.

ICML (International Conference on Machine Learning) 2004.

Workshop on Rich Representations for Reinforcement Learning (held in conjunction with ICML) 2005.

ILP (Conference on Inductive Logic Programming) 2004.

ECML (European Conference on Machine Learning) 2004.

ILP (Conference on Inductive Logic Programming) 2003.

ECML (European Conference on Machine Learning) 2003.

ILP (Conference on Inductive Logic Programming) 2002.

AAAI (The US National Conference on Artificial Intelligence) 2002.

ALT (Conference on Algorithmic Learning Theory) 2001: co-chair.

Workshop on Logic and Learning (adjoined to LICS 2001): co-chair.

ICML (International Conference on Machine Learning) 2001.

ILP (Conference on Inductive Logic Programming) 2000.

COLT (Conference on Computational Learning Theory) 2000.

ALT (Conference on Algorithmic Learning Theory) 2000.

ICML (International Conference on Machine Learning) 2000.

Workshop on Attribute-Value and Relational Learning: Crossing the Boundaries (adjoined to ICML 2000).

ILP (Workshop on Inductive Logic Programming) 1999.

AAAI (The US National Conference on Artificial Intelligence) 1996.

Additional Reviews for Conferences

COLT (Conference on Learning Theory) 2008.

ALT (Conference on Algorithmic Learning Theory) 2006.

STOC (Symposium of Theory of Computing) 2002.

NIPS (Neural Information Processing systems) 2001.

MFCS (Mathematical Foundations of Computer Science) 2000.

CC (Conference on Computational Complexity) 1999.

COLT (Conference on Computational Learning Theory) 1998.

ALT (Conference on Algorithmic Learning Theory) 1998.

STOC (Symposium of Theory of Computing) 1996.

Reviews for Journals

Acta Informatica,

Annals of Mathematics and Artificial Intelligence,

Artificial Intelligence,

Data Mining and Knowledge Discovery,

Discrete Applied Mathematics,

Information and Computation,

Information Processing Letters,

Journal of Computer and System Sciences,

Journal of Machine Learning Research,

Machine Learning,

Theoretical Computer Science.

Grant Reviews

Grant review for NSF (National Science Foundation) 2002, 2008.

Served on review panel for NSF (National Science Foundation) 2003.

Grant review for ISF (Israel Science Foundation) 2001, 2003.

Grant review for EPSRC (Engineering and Physical Sciences Research Council, UK) 1999.

Invited Talks

Learning to Classify Graphs and Hypergraphs, University of Toronto, Canada, December 2007.

Learning to Act in Relational MDPs, Workshop on Rich Representations for Reinforcement Learning, Bonn, Germany, August 2005.

From Complexity Results to Efficient Systems, Workshop on Learning with Logics and Logics for Learning, Kitakyushu, Japan, June 2005.

Kernels for Logic Learning: potential and overfitting. University of Kyoto, Japan, June 2005.

Kernels for Logic Learning: potential and overfitting. National Institute of Informatics, Tokyo, Japan, June 2005.

Learning and Logic: Theoretical Foundations and Efficient Systems, University of Massachussets at Amherst, February 2005.

Learning to Act in Relational MDPs, Dagstuhl seminar "Probabilistic, Logical and Relational Learning - Towards a Synthesis", February 2005.

Learning and Logic: Theoretical Foundations and Efficient Systems, University of Freiburg (Germany), January 2005.

Learning and Logic: Theoretical Foundations and Efficient Systems, Technion (Israel), December 2004.

Panel member (presentation and discussion) in Workshop on Relational Reinforcement Learning, held as part of the International Conference on Machine Learning, July 2004.

Machine Learning and Logic, Department of Mathematics, Tufts University, February 2003.

Learning and Logic: Theory and Implementation, University of Illinois at Chicago, November 2002.

Recent Progress in Learning Logic Programs with Queries, *17th Workshop on Machine Intelligence*, July 2000.

1998-2000 I gave several talks at Informatics in Edinburgh, in the: Computer Science Colloquium, Cognitive Science Seminar, Mathematical Reasoning Group, LFCS Lab Lunch.

Learning First Order Horn Expressions, York University, UK, 1998.

Learning Horn Expressions, University of Illinois at Urbana Champaign, USA, 1998.

Learning Logic Programs, Warwick University, UK, 1998.

Learning to be Competent, University of Helsinki, Finland, 1996.

Learning to be Competent, in AAAI Fall Symposium on Learning Complex Behaviors in Adaptive Intelligent Systems, 1996.

Industrial Experience

VLSI designer, Motorola Semiconductors, Design center, Israel, 1988-1990. Worked in circuit and system design of the MC68302, a VLSI chip in CMOS technology. Developed several peripherals for the 68000 processor such as an interrupt controller, and special circuits such as I/O drivers, and a clock generator.

Publications

Edited Volumes

[1] N. Abe, R. Khardon, and T. Zeugmann (Editors). Proceedings of the 12th International Conference on Algorithmic Learning Theory (ALT) 2001. Lecture Notes in Artificial Intelligence (LNAI) 2225, Springer, 2001.

[2] N. Abe and R. Khardon (Guest Editors). Special issue of the journal *Theoretical Computer Science*, Volume 313, Issue 2, Pages 173-312, February 2004. Volume includes complete and revised versions of selected papers from the ALT 2001 conference.

Refereed Journal Articles

[3] C. Wang, S. Joshi and R. Khardon. First Order Decision Diagrams for Relational MDPs. *Journal of Artificial Intelligence Research*, Volume 31, pages 431-472, 2008.

[4] M. Arias and R. Khardon and J. Maloberti. Learning Horn Expressions with LogAn-H. *Journal of Machine Learning Research*, Volume 8, pages 549–587, 2007.

[5] R. Khardon and G. Wachman. Noise Tolerant Variants of the Perceptron Algorithm. *Journal of Machine Learning Research*, volume 8, pages 227–248, 2007.

[6] M. Arias and A. Feigelson and R. Khardon and R. Servedio. Polynomial Certificates for Propositional Classes. *Information and Computation*, Volume 204, Issue 5, Pages 816-834, 2006.

[7] M. Arias and R. Khardon. Complexity Parameters for First Order Classes. *Machine Learning Journal*, Volume 64, pages 121-144, 2006.

[8] M. Arias and R. Khardon. The Subsumption Lattice and Query Learning. *Journal of Computer and Systems Science*, Volume 72, Issue 1, Pages 1-204, 2006.

[9] R. Khardon and R. Servedio. Maximum Margin Algorithms with Boolean Kernels. *Journal of Machine Learning Research*, Volume 6, pages 1405–1429, 2005.

[10] R. Khardon, D, Roth and R. Servedio. Efficiency versus Convergence of Boolean Kernels for On-Line Learning Algorithms. *Journal of Artificial Intelligence Research*, Volume 24, pages 341-356, 2005.

[11] D. Gunopulos, R. Khardon , H. Mannila, S. Saluja, H. Toivonen, and R. S. Sharma. Discovering All Most Specific Sentences. *ACM Transactions on Database Systems*, Volume 28, Number 2, June 2003, pages 140-174.

[12] M. Arias and R. Khardon. Learning Closed Horn expressions. *Information and Computation*, Vol 178, 2002, pages 214-240.

[13] R. Khardon. Learning function free Horn expressions. *Machine Learning* Vol 37, No 3, 1999, pages 241-275.

[14] R. Khardon. Learning action strategies for planning domains. *Artificial Intelligence*, Vol 113, 1999, pages 125-148.

[15] R. Khardon, H. Mannila, and D. Roth. Reasoning with examples: Propositional formulae and database dependencies. *Acta Informatica* Vol 36, 1999, pages 267-286.

[16] R. Khardon and D. Roth. Learning to reason with a restricted view. *Machine Learning* Vol 35, No 2, 1999, pages 95-117.

[17] R. Khardon. Learning to take actions. *Machine Learning* Vol 35, No 1, 1999, pages 57-90.

[18] H. Aizenstein, A. Blum, R. Khardon, A. Kushilevitz, L. Pitt, and D. Roth. On learning read-k satisfy-j DNF. *SIAM Journal of Computing* Vol 27, No 6, 1998, pages 1505-1530.

[19] R. Khardon and D. Roth. Learning to reason. *Journal of the ACM*, Vol 44, No 5, 1997, pages 697-725.

[20] R. Khardon and D. Roth. Defaults and relevance in model based reasoning. *Artificial Intelligence*, Vol 97, No 1-2, 1997, pages 169-193.

[21] R. Khardon and D. Roth. Reasoning with models. *Artificial Intelligence* 87(1-2):187–213, 1996.

[22] R. Khardon and S. Pinter. Partitioning and scheduling to counteract overhead. *Parallel Computing*, 22(1996):555–593.

[23] R. Khardon. Translating between Horn representations and their characteristic models. *Journal of AI Research* 3(1995):349–372.

[24] R. Khardon. On using the Fourier transform to learn disjoint DNF. *Information Processing Letters*, 49(5):219–222, March 1994.

Refereed Conference Articles

[25] C. Wang and R. Khardon. Policy Iteration for Relational MDPs. Proceedings of the International Conference on Uncertainty in Artificial Intelligence, 2007.

[26] G. Wachman and R. Khardon. Learning from Interpretations: A Rooted Kernel for Ordered Hypergraphs. Proceedings of the International Conference on Machine Learning (ICML), 2007.

[27] C. Wang, S. Joshi and R. Khardon. First Order Decision Diagrams for Relational MDPs. Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI), 2007, pages 1095-1100. A preliminary version of [3]

[28] G. Garriga, R. Khardon and L. De Raedt. On Mining Closed Sets in Multi-Relational Data. Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI), 2007, pages 804-809.

[29] M. Arias and R. Khardon. The Subsumption Lattice and Query Learning. Proceedings of the Conference on Algorithmic Learning Theory (ALT), 2004, pages 410-424. A preliminary version of [8]

[30] M. Arias and R. Khardon. Bottom-Up ILP using Large Refinement Steps Proceedings of the Conference on Inductive Logic Programming (ILP), 2004, pages 26-42. Material included in Journal article [4]

[31] M. Arias and R. Khardon and R. Servedio. Polynomial Certificates for Propositional Classes. Proceedings of the Conference on Computational Learning Theory (COLT), 2003, pages 537-551. A preliminary version of [6]

[32] R. Khardon and R. Servedio. Maximum Margin Algorithms with Boolean Kernels. Proceedings of the Conference on Computational Learning Theory (COLT), 2003, pages 87-101. A preliminary version of [9]

[33] M. Arias and R. Khardon. Complexity Parameters for First Order Classes. Proceedings of the Conference on Inductive Logic Programming (ILP), 2003, pages 22-37. A preliminary version of [7]

[34] R. Khardon, D, Roth and R. Servedio. Efficiency versus Convergence of Boolean Kernels for On-Line Learning Algorithms. Proceedings of the International Conference on Neural Information Processing Systems (NIPS), 2001, pages 423-430. A preliminary version of [10]

[35] M. Arias and R. Khardon. A new algorithm for learning range restricted Horn expressions. Proceedings of the International Conference on Inductive Logic Programming (ILP), 2000, pages 21-39. A preliminary version of [12]

[36] R. Khardon. Learning Horn expressions with LogAn-H. Proceedings of the International Conference on Machine Learning (ICML), 2000, pages 471-478. Material included in Journal article [4]

[37] R. Khardon, D. Roth and L. Valiant. Relational learning for NLP using linear threshold elements. In Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI), 1999, pages 911-919.

[38] R. Khardon. Learning range restricted Horn expressions. In Proceedings of the European Conference on Computational Learning Theory (EuroCOLT), 1999, LNAI 1572, pages 111-125.

[39] R. Khardon. Learning first-order universal Horn expressions. In Proceedings of the Conference on Computational Learning Theory (COLT), 1998, pages 154-165. A preliminary version of [13]

[40] D. Gunopulos, R. Khardon, H. Mannila, and H. Toivonen. Data mining, hypergraph transversals, and machine learning. In Proceedings of the Symposium on Principles of Database Systems (PODS), 1997, pages 209-216. A preliminary version of [11]

[41] R. Khardon. Learning to take actions. In Proceedings of the National Conference on Artificial Intelligence (AAAI), 1996, pages 787–792. A preliminary version of [17]

[42] R. Khardon and D. Roth. Learning to reason with a restricted view. In Proceedings of the Conference on Computational Learning Theory (COLT), 1995, pages 301–310. A preliminary version of [16]

[43] R. Khardon and D. Roth. Defaults Reasoning with Models. In Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI), 1995, pages 319-325. A preliminary version of [20]

[44] A. Blum, R. Khardon, A. Kushilevitz, L. Pitt, and D. Roth. On learning read-k satisfy-j DNF. In Proceedings of the Conference on Computational Learning Theory (COLT), 1994, pages 110–117. A preliminary version of [18]

[45] R. Khardon and D. Roth. Learning to reason. In Proceedings of the National Conference on Artificial Intelligence (AAAI), 1994, pages 682–687. A preliminary version of [19]

[46] R. Khardon and D. Roth. Reasoning with models. In Proceedings of the National Conference on Artificial Intelligence (AAAI), 1994, pages 1148–1153. A preliminary version of [21]

[47] R. Khardon and S. Pinter. Choosing the right grains for data flow machines. In Proceedings of the International Conference on Parallel Processing (ICPP), 1991, pages I672–I673. A preliminary version of [22]