

ROUHOLLAH RAHMANI

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SUMMARY

Doctoral Computer Science candidate working in Machine Learning research with applications to content-based image search, robotics, and medical domains. Began PhD as an undergraduate in 2003. Strengths include problem solving, algorithm development, team leadership, and negotiation skills.

U.S. Citizen. Available from July 2008. Can begin sooner, if required.

EDUCATION

Ph.D. in Computer Science

Washington University, St. Louis, Missouri

Advisor: Sally Goldman

Expected: Dec 2007

GPA: 4.00

B.S. in Computer Science

Washington University, St. Louis, Missouri

May 2005

GPA: 3.53

B.A. in Mathematics, Minor in Arabic

Washington University, St. Louis, Missouri

May 2005

GPA: 3.53

Graduate Coursework Selection:

- Learning and Robotics

Machine Learning, Data Mining, Mobile Robotics, Motion Planning

- Algorithms and Mathematics

Advanced Algorithms, Advanced Calculus I (Intro to Real Analysis), Probability, Numerical Methods, Intro to Formal Languages & Automata

- Computer Systems and Architecture

Translation of Comp Languages, Comp Systems Organization (Architecture), Operating Systems Organization, Programming Systems & Languages

- Law School

Negotiation

LANGUAGES

Human Languages: English (native), Persian (native), Arabic, Japanese

Computer Languages: C++, C, Java, Matlab, Java Assembly, Visual Basic, Lisp, VHDL, Intel 80x86 Assembly, Windows API, Windows Pocket PC API

PUBLICATIONS

- **MISSL: Multiple Instance Semi-Supervised Learning** 2006
Rouhollah Rahmani, Sally A. Goldman
23rd International Conference on Machine Learning (25.5% acceptance rate)
<http://www.cs.wustl.edu/~sg/final-missl.pdf>
- **Localized Content-Based Image Retrieval** 2005
Rouhollah Rahmani, Sally A. Goldman, Hui Zhang, John Krettek, Jason E. Fritts
7th ACM International Workshop on Multimedia Information Retrieval (invited paper)
<http://www.cs.wustl.edu/~sg/accio/mir162ss-rahmani.ps> , Demo: <http://www.cs.wustl.edu/accio>
- **Local Image Representations Using Pruned Salient Points with Applications to CBIR** 2006
Hui Zhang, Rouhollah Rahmani, Sharath Cholleti, Sally Goldman
14th ACM International Conference on Multimedia (17% acceptance rate)
<http://www.cs.wustl.edu/~sg/ACM-Multimedia06.pdf>
- **MI-Winnow: A New Multiple-Instance Learning Algorithm** 2006
Sharath Cholleti, Sally Goldman, Rouhollah Rahmani
18th IEEE International Conference on Tools with Artificial Intelligence (35% acceptance rate)
<http://www.cs.wustl.edu/~sg/MI-Winnow.pdf>

RESEARCH

- **Multiple Instance Learning**, Doctoral Research Assistant 2002-Present
Computer Science Department, Washington University, St. Louis, Missouri
 - Conducted research and development in Multiple Instance learning, a division of Artificial Intelligence
 - Developed algorithms with applications to image retrieval (CBIR) and pharmaceutical drug discovery
 - Developed GEM-DD algorithm. Results compete with the top Multiple Instance algorithms
 - Developed MISSL, one of the first algorithms to combine Multiple Instance and semi-supervised learning
 - Developed new image representation to significantly improve retrieval accuracy in CBIR systems
 - Independently designed and implemented Accio! CBIR system code base, now among the top image retrieval systems in the world
 - Coordinated with 2 advisors and 7 students

- **Computer Aided Diagnosis, Medical Image Search**, Doctoral Research Assistant 2005-Present
Electronic Radiology Lab, School of Medicine, Washington University, St. Louis, Missouri
 - Conducted joint project between machine learning lab and Electronic Radiology Lab to develop algorithms for computer aided diagnosis.
 - Analyzed and worked to develop image representations appropriate for general diagnosis on MRI images.
 - Worked on project to combine a set of experts, both human and computer, to better segment disease nodules.
 - Participated in weekly joint lab journal club.

- **Protein-Protein Binding Simulation**, Doctoral Research Assistant 2006-Present
Computer Science Department, Washington University, St. Louis, Missouri
 - Developed learning algorithm for clustering protein-protein binding paths.
 - Combined and extended work from molecular biology, and robotic path planning
 - The path clusters aid biologists to determine biological similarities and visualize a large set of paths.
 - Project serves as base for developing algorithms to simulate high dimensional protein-protein binding.

- **Reinforcement Learning**, Undergraduate Researcher 2001-2002
Computer Science Department, Washington University, St. Louis, Missouri
 - Performed research and development in Reinforcement Learning, a division of Artificial Intelligence, with specific focus on convergent value function approximation in continuous state spaces
 - Conducted applied research enabling robots to learn in complex state spaces, such as real world environment, using feasible computational power and memory footprint
 - Explored function approximation techniques for interpolation of discrete points in a continuous state space
 - Developed and tested heuristic methodology for safe interpolation of data points in reinforcement learning

- **MPEG-2 Compression for Internet-2**, Research Intern 2000-2001
Computer Science Department, Kent State University, Kent, Ohio
 - Served as member of project team developing advanced video streaming algorithms and their corresponding applications for active networks on the Internet-2 as part of a greater project for DAARPA
 - Rewrote existing MPEG decoder in C++
 - Wrote client-side interface: Windows 9x/NT environment, C++ Windows API programming
 - Redesigned and implemented client-side for WinCE PDA
 - Designed and implemented wireless video streaming for WinCE PDA
 - Coordinated with project team to determine system needs, interfaces, and possible hardware implementation

- **Project Aria: Mars Rover**, Vision Manager; Electronics Manager 2000-2001
Washington University, St. Louis, Missouri
 - Served as part of student engineering team at Washington University working with the deputy science PI for NASA's Mars 2003 Rover program to build a full-scale working prototype.
 - Developed 3-dimensional vision system for the rover
 - Formulated and coded vision algorithms
 - Coordinated with team of 20 students, 3 advisors. Lead sub-group of 3 students.

PROFESSIONAL ACTIVITIES

- **Journal of Machine Learning Research** 2005
Co-reviewed 2 articles submitted for publication.
- **IEEE Transactions on Neural Networks** 2005
Co-reviewed article submitted for publication.

GRANT PROPOSALS (CO-AUTHOR)

- **Improving CBIR Accuracy through Semi-Supervised Learning** 2007
Principle Investigators: Sally Goldman
Proposal, National Science Foundation (recommended for funding)
- **Knowledge-Based Image Segmentation through Machine Learning** 2007
Principle Investigators: Sally Goldman, Jason Fritts
Proposal, National Science Foundation (recommended for funding)
- **Applying Multiple-Instance Learning to Content-Based Image Retrieval** 2005
Principle Investigator: Sally Goldman
Annual Report 0329241, National Science Foundation

TALKS, DEMONSTRATIONS

- Talk & Demo: “MISSL: Multiple Instance Semi Supervised Learning”
 - **23rd International Conference on Machine Learning (Pittsburgh, Pennsylvania)** 2006
- Talk & Demo: “Accio! Localized Content Based Image Retrieval”
 - **Waseda University (Tokyo, Japan)** 2005
 - **University of Electro-Communications (Tokyo, Japan)** 2005
 - **National University of Singapore (Singapore)** 2005
 - **7th ACM SIGMM International Workshop on Multimedia (Singapore)** 2005

TEACHING EXPERIENCE

- **Advanced Algorithms, Department of Computer Science** Fall, 2006
Washington University, St. Louis, Missouri
 - Graduate level course.
 - Prepared and taught weekly recitation section - 3 hours/week class time
 - Held weekly office hours and helped run grading sessions
 - Received high evaluation scores from students
- **Engineering and Scientific Computing, Department of Computer Science** Fall, 2007
Washington University, St. Louis, Missouri
 - Conducted weekly MATLAB laboratory section – 1.5 hours/week.
 - Held weekly office hours and helped run grading sessions
- **Beginning Persian I, Department of Near Eastern Languages** Fall, 2005
Washington University, St. Louis, Missouri
 - Prepared and taught cultural section on Persian culture and language - 1 hour/week class time
 - Received high evaluation scores from students

DESIGN PROJECTS

Mobile Robot, Washington University, Fall 2005

- Designed, implemented working mobile robot
- Robot tasks include obstacle avoidance, and simple path planning towards a given goal
- Implemented on Motorola 68HC1 Handyboard

Central Processor, Washington University, Fall 2003

- Designed unified 32-bit and 16-bit instruction set
- Designed dual threaded hardware program controller
- Incorporated super-computer vector processing
- Designed full hardware architecture with novel memory registers to aid vector computing
- Implemented working subset of design in VHDL
- Wrote assembler for instruction set

Compiler, Washington University, Spring 2002

- Designed, implemented working compiler for custom language using Java assembly
- Incorporated symbol table management, callable function blocks, scope.

Interpreter, Washington University, Summer 2003

- Designed custom post-fixed language to perform mathematical operations
- Designed, implemented parser and interpreter in Lisp
- Wrote and ran programs in custom language

Operating System Shell, Washington University, Fall 2004

- Designed, wrote working command-line shell for Linux
- Shell incorporated concurrent program execution, dynamic environment, and server-client pipes

Learning Algorithms, Washington University, Fall 2003

- Designed, implemented machine learning systems
- Neural Network, Decision Trees, Genetic Algorithm
- Analyzed learning methods on sample data from CMU Machine Learning Repository

Internet Pager system, Kent, Ohio, Summer 2001

- Designed novel physical mobile pager system to interface with Windows internet messaging programs such as AIM at a base station
- Hardware designed in XiLinx, partially implemented on bread board using TTL components

HONORS

- Dean's Honorary Scholarship
- I.E. & Goldie G. Millstone Scholarship
- Dean's List
- Bausch and Lomb Award
- AP Scholar with Honors

INTERESTS, HOBBIES

- Poetry writing
- Martial Arts: Karate, Jujitsu, Judo
- Photography
- Philosophy: 11th-18th century

REFERENCES

• Sally Goldman, Ph.D.

Edwin H. Murty Professor of Eng
Associate Chair
Dept of Computer Science & Eng

Washington University in St. Louis
Campus Box 1045
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Relation: Research Advisor,
Professor

• Bill Smart, Ph.D.

Assistant Professor
Dept of Computer Science & Eng

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Relation: Research Advisor,
Professor

• Burchan Bayazit, Ph.D.

Assistant Professor
Dept of Computer Science & Eng

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Relation: Professor, Research
Collaborator