Hossein Hajimirsadeghi

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Education

2011–2015 **Ph.D., Computing Science**, Simon Fraser University (SFU), Canada.
- **Thesis**: Multiple Instance Learning for Visual Recognition. **Supervisor: Dr. Greg Mori**.

2008–2010 **M.Sc., Electrical and Computer Engineering**, University of Tehran, Iran.
- **Thesis**: Conceptual Imitation Learning Based on Perceptual and Functional Characteristics of Action.

2004–2008 **B.Sc., Electrical and Computer Engineering**, University of Tehran, Iran.
- **BS Project**: Nash Equilibrium Search for Nonlinear Games, Using Evolutionary Algorithms.

Skills

Machine Learning: 11 years of experience and more than 15 publications in Kernel Learning, Multi-Instance & Structured Learning, Neural Networks, Boosting, Representation Learning, Generative Models.

Deep Learning: 5 years of experience and worked on supervised and unsupervised problems with different applications (e.g., computer vision, anomaly detection, tabular data analysis, representation learning, data imputation, relational learning, graph learning, time-series prediction). Familiar with different platforms such as Pytorch, Keras, TensorFlow, and Caffe.

Computer Vision: 4 years of experience and more than 5 publications in Image/Video Classification, Video Event Detection, Video Summarization, Human Activity Recognition.

Intrusion dtection: 3 years of experience in network data and log data analysis for security applications.

Optimization: Convex Optimization, Evolutionary Optimization, Multi-objective Optimization.

Robotics: Robot Programming by Demonstration (a.k.a. Imitation Learning), Robot Motion Pattern Learning and Control, Computational Perception and Action, Human-Robot Interaction.

Natural Language Processing: Information Extraction, Keyword Extraction, Python Natural Language Tool Kit (NLTK).

Market Analysis: Electricity Markets, Equilibrium in Games, Pareto Improvement Models, Time Series Prediction.

Control Systems: Optimal Control, Intelligent Control, Fuzzy Systems, Cooperative Control.

Programming: PYTHON (advanced), MATLAB (advanced), JAVA (solid), C++ (prior experience).

Technical Work Experience

2018-present **Senior Machine Learning Researcher**, *Borealis AI*, Vancouver, Canada.
Machine learning research on financial data, including representaiton learning, data imputation, relational learning, spatiotemporal prediction.

2018 **Principal Member of Technical Staff**, *Oarcle Labs*, Vancouver, Canada.
Deep learning research on intrusion detection, network data and log data analysis.

2016-2017 **Senior Member of Technical Staff**, *Oarcle Labs*, Vancouver, Canada.

2014–2015 **Research Engineer – Part Time Consultant**, *BroadBandTV Corp.*, Vancouver, Canada.
Textual information extraction.

Summer 2014 **Research and Development Intern**, *BroadBandTV Corp.*, Vancouver, Canada.
- Developed a keyword extraction system for English, Spanish, French, Portuguese, Dutch, and German.

Academic Research Experience

2011-2015 **Research Assistant/PhD Student**, *Simon Fraser University*, Burnaby, Canada.

Multiple Instance Learning – MIL, (Published 4 papers).

- Designed a novel and general framework for multiple instance learning.
- Applied the proposed methods to video event detection, video summarization, image categorization, cyclist's helmet recognition, and human activity recognition from videos captured by street cameras.

TRECVid Multimedia Event Detection evaluation, (Co-authored one paper and two technical reports).

- Developed a system based on computer vision and machine learning to retrieve videos of interest from more than 100K videos of TRECVid, sponsored by the National Institute of Standards and Technology.
- Collaborated with Genie team made up of research groups in Stanford University, Georgia Institute of Technology, SUNY-Buffalo and Honeywell led by Kitware Inc.

Learning Latent Structured Models, (Published one paper).

Designed a novel algorithm to learn high-capacity latent structured models based on Gradient Boosting.

2009–2010 **MS Thesis**, ***Conceptual Imitation Learning***, University of Tehran, Tehran, Iran, (Published 4 papers).

- Designed a bio-inspired conceptual model for robot programming by imitation and reinforcement to learn high-level concepts (e.g., social skills) based on perceptual or functional effects of actions.
- Developed a robotic system on the Aldebaran Robotics® Nao humanoid robot.
- Proposed an interactive reinforcement-based algorithm to incrementally learn, abstract, and generalize spatio-temporal demonstrations of the teacher in the robot's associative memory.
- Fusion of different modalities, including vision, motor, and audition in order to make the robot learn and associate different perceptual representations of an action.
- Learning emotional concepts based on the effects of robot's actions on a human facial expression.

2008–2010 **BS project**, ***Analysis of Electricity Markets, Using Computational Intelligence and Game Theory***, University of Tehran, Tehran, Iran, (Published 2 papers).

- Proposed novel algorithms to find Nash equilibrium in games with non-linear profit or demand functions.
- Proposed a multi-objective evolutionary algorithm to study the Pareto improvement model in an oligopolistic electricity market of nonlinear demand.
- Analyzed the IEEE 30-bus system with stochastic cost data in a risk management problem.

2008–2010 **Part of the BS project**, ***Bio-inspired Optimization for Intelligent Control and Decision Making***, University of Tehran, Tehran, Iran, (Published 4 papers).

- Applied bio-inspired optimization in adaptive control of a surge tank.
- Applied bio-inspired optimization for cooperative multi-task assignment of drones.
- Designed novel extensions of Invasive Weed Optimization (IWO) such as IWO/PSO, discrete IWO, co-evolutionary IWO, and multi-objective IWO.

2007–2008 **Research Externship**, *RAISE Institute*, University of Tehran, Iran.

Research on models of household electricity consumers' behaviour.

2005–2006 **R&D Intern**, *E-health dept. at Telecommunication Research Center*, Tehran, Iran.

Computational Intelligence for optimization of intensity modulated radio therapy (IMRT).

Other Experience

2011–2016 **Peer Reviewer**.

T-PAMI 2016, BMVC 2015, CVPR 2015, ACCV 2014, ICCV 2013, BMVC 2013, ACCV 2011.

2014 **Volunteer Math Tutor**, *National Education College*, Vancouver, Canada.

2012–2013 **Teaching Assistant**, *Simon Fraser University*, Burnaby, Canada.

- **Data Structures and Programming** (Spring 2012 and Spring 2013).
- **Introduction to Computing Science** (Spring 2013).

2009–2010 **Lecturer**, *IEEE Student Branch at University of Tehran*, Tehran, Iran.

- **Introduction to programming in MATLAB**.

2006–2009 **Teaching Assistant**, *University of Tehran*, Tehran, Iran.

- **Optimal Control** (Spring 2009).
- **Signals and Systems** (2007).
- **Engineering Mathematics** (2006).

Selected Publications

The full list of publications is available at http://www.cs.sfu.ca/~hosseinh/personal

My google scholar page is here

2019 S. Su, **H. Hajimirsadeghi**, and G. Mori, "Graph Generation with Variational Recurrent Neural Network," Workshop on Graph Representation Learning (at NeurIPS), 2019.

2016 **H. Hajimirsadeghi** and G. Mori, "Multi-Instance Classification by Max-Margin Training of Cardinality-Based Markov Networks," IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2016.

2015 **H. Hajimirsadeghi** and G. Mori, "Learning Ensemble Latent Strucutred Models in Functional Space by Gradient Boosting," IEEE International Conference on Computer Vision (**ICCV**), Dec 2015.

2015 **H. Hajimirsadeghi**, W. Yan, A. Vahdat, and G. Mori, "Visual Recognition by Counting Instances: A Multi-Instance Cardinality Potential Kernel," IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), June 2015.

2013 **H. Hajimirsadeghi**, J. Li, G. Mori, M. Zaki, and T. Sayed, "Multiple Instance Learning by Discriminative Training of Markov Networks," Proc. 29th Conference on Uncertainty in Artificial Intelligence (**UAI**), pp. 262–271, July 2013.

2013 **H. Hajimirsadeghi**, M. Nili Ahmadabadi, and B. Nadjar Araabi, "Conceptual imitation Learning based on perceptual and functional characteristics of action," IEEE Transactions on Autonomous Mental Development (**TAMD**), vol. 5, no. 4, pp. 311–325, 2013.

2012 **H. Hajimirsadeghi** and G. Mori, "Multiple Instance Real Boosting with Aggregation Functions," Proc. 21st IAPR International Conference on Pattern Recognition (**ICPR**), Tsukuba Science City, Japan, pp. 2706–2710, Nov. 2012.

2012 **H. Hajimirsadeghi**, M. Nili Ahmadabadi, B. Nadjar Araabi, H. Moradi, "Conceptual imitation learning in a human-robot interaction paradigm," ACM Transactions on Intelligent Systems and Technology (**TIST**), vol. 3, no. 2, 2012.

2012 A. Nikoofard, **H. Hajimirsadeghi**, A. Rahimi-Kian, C. Lucas, "Multi-objective Invasive Weed Optimization: Application to Analysis of Pareto Improvement Models in Electricity Markets," Applied Soft Computing, vol. 12, no. 1, pp. 100–112, 2012.

2010 **H. Hajimirsadeghi**, M. Nili Ahmadabadi, M. Ajallooeian, B. Nadjar Araabi, H. Moradi, "Conceptual Imitation Learning: Application to Human-Robot Interaction," Journal of Machine Learning Research: Workshop and Conference Proceedings (**ACML**), vol. 13, pp. 341–356, 2010

2009 **H. Hajimirsadeghi**, C. Lucas, "A hybrid IWO/PSO algorithm for fast and global optimization," Proc. EUROCON 2009 (Finalist in IEEE R8 student paper contest 2009).

Honors and Awards

2013–2015 Simon Fraser University Graduate Fellowship.

2013–2015 Ebco/Eppich Graduate Scholarships in Intelligent Systems.

2014 Simon Fraser University President's PhD Scholarship.

2011 Finalist in IEEE R8 Student Paper Contest 2011.

2010 3rd place among all Masters students of Electrical Engineering in the 70th graduation anniversary of University of Tehran.

2010 1st and 2nd place in the local student paper contest among ECE graduate students at University of Tehran.

2009 2nd place in the local student paper contest among ECE graduate students at University of Tehran.

2009 Finalist in IEEE R8 Student Paper Contest 2009.