Mona Hajimomeni

Contact Information

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Education

2010–2016 **PhD, Electrical Engineering**, *Amirkabir University of Technology*, Tehran, Iran.
2014–2015 **Visiting PhD Student**, *Queen's University*, Kingston, ON, Canada.
2006–2009 **MSc, Electrical Engineering**, *Amirkabir University of Technology*, Tehran, Iran.
2001–2006 **BSc, Electrical Engineering**, *K.N.Toosi University of Technology*, Tehran, Iran.

Research Interests

- **Current research interest**
  - General areas in machine learning
  - Reinforcement learning
  - Probabilistic graphical models
- **Previous research experience**
  - Wireless physical-layer security
  - Statistical signal processing
  - Variational Bayesian inference

Professional Skills

- Problem-solving
- Analytical thinking
- Project management
- Excellent written communication
- Fast learner
- Self-motivated
- Flexible/Cooperative/Appreciates team work
- Independent researcher

Software skills

AI and ML Python(e.g. scikit-learn, matplotlib, deep learning frameworks: Keras), MATLAB, R
Programming Borland C/C++, Visual Basic, Assembley
Engineeing Arduino IDE, LabView, MATLAB, Xilinx ISE, MPLAB Microchip, Protel DXP

Key Courses

- Machine Learning
  - Python for data science (UCSD, Edx)
  - Convolutional neural networks for visual recognition (Stanford University, Python)
  - Machine learning (Andrew Ng's, Coursera)
  - The Analytics Edge (MIT, Edx)
  - Probabilistic graphical models (Coursera)
- Signal Processing
  - Statistical pattern recognition
  - Statistical signal processing
  - Digital image processing
  - Detection and estimation theory
  - Stochastic and random processes
  - Advanced digital signal processing
- Communication theory
  - MIMO wireless communication
  - Spread spectrum communication
  - Advanced digital communication
  - Broadband access communication
- Digital Design
  - Microcontrollers
  - Interfacing circuits

Key Projects

▶ **Project: Bayesian model for word style classification of typographic text**
- Proposed and applied 2D Gabor filters on binary text images used in feature pre-processing.
- Proposed and simulated an approximate variational Bayesian variant of EM algorithm on the generalized Dirichlet mixture model.

▶ **Project: Bayesian model for video-segmentation**
- Simulated results for segmentation of image sequences (using mixture models).

▶ **Project: Speaker identification with neural network**
- Trained an RNN neural network (Hopfield net) for speaker recognition

Research Experience

Fall 2010-Spring 2016 **Graduate Research Assistant**, Tehran Polytechnic, Visitor at Queen's University.

▶ **Title of PhD thesis: Resource allocation for physical-layer security**
- Created/explored a database of conditional probability data structures for coding design.
- Proposed polar coding schemes to maximize sum-secrecy-rate in m-user MACW channel.
- Wrote a vectorized MATLAB code for efficient speed/memory handling to simulate an intensive secure polar coding/decoding for 2-user G-MACW channel.
- Proposed a suboptimal iterative power control algorithm to find the best achievable secrecy level in spatially correlated MISOW channel.

Fall 2006-Winter 2009 **Graduate Research Assistant**, *Statistical Signal Processing*, Tehran Polytechnic.

▶ **Title of MSc thesis: Word style classification using variational bayesian mixture models**
- Created a database of binary images of Persian fonts in MATLAB
- Researched probabilistic modeling and Bayesian inference for classification of image data

Publications

[J1] M. Hajimomeni, H. Aghaeinia, I.-M. Kim, K. Kim "Cooperative Jamming Polar Codes for Multiple-Access Wiretap Channel," *IET Communications*, Vol. 10, No. 4, pp. 407-415, Mar. 2016.

[J2] M. Hajimomeni, H. Aghaeinia "Linear Precoder for Spatially Correlated Multiple-Input Single-Output Wiretap Channel," *IET Communications*, Vol. 9, No. 5, pp. 719-727, Apr. 2015.

[C3] M. Hajimomeni, H. Aghaeinia "Opportunistic Transmission of Secret Data Through Randomized Parallel Subcarriers," *Int. Symp. on Telecomm. (IST)*, Nov. 2012, Tehran.

[C4] M. Hajimomeni, H. Amindavar "A Varitional Bayesian Style Classification for Typographic Persian Text Using Gabor Features," *Int. Conf. Signal and Image Proc. App. (ICSIPA)*, Feb. 2009, Kuala Lumpur.

[TR5] M. Hajimomeni, "Video Segmentation based on Bayesian mixture models," Graduate Seminar at Amirkabir University of Technology, 2006.

Teaching Experience

2010 – 2014 **Signals and Systems**, *TA*, Amirkabir University of Technology.

2012 – 2013 **Communication Systems I**, *TA*, Amirkabir University of Technology.

Fall 2007 **Differential Equations**, *TA*, Amirkabir International Branch.

Spring 2007 **DSP I**, *Instructor for computer laboratory*, Amirkabir International Branch.

Industry Experience

2015-2017 **R&D System Engineer**, *Wired/Wireless Networks*, Persia Rasamodje.

▶ **Project: Innovative smart home solutions for energy saving**

- Led a research group in the area of wired/wireless smart home protocols and solutions.
- Proposed novel smart home solutions by programming KNX and Z-Wave smart devices.
- Reported research and development results in technical language directly to CEO.
- Collaboratively designed and conducted a statistical survey to find about the popularity of smart home technologies in the country.

2013-2014 **Embedded Design Engineer**, Persia Rasamodje.

▶ **Project: Design and implementation of auto deploy VSAT antenna**

- Implemented a 12-bit magnetic encoder for precise mechanical feedback.
- Wrote an interactive interface using MATLAB to calibrate a magnetic accelerometer.

▶ **Project: Railway control system**

- Diagnosed top-level functioning in ISA-based system-on-a-chip (SoC) devices

2010-2011 **Embedded Design Engineer**, Niroo Research Institute.

▶ **Project: Design & implementation of a teleprotection system**

- Designed the hardware and wrote VHDL code for 64Kbps digital interface of TPS
- Collaborated in devising a clock synchronization algorithm for independent 64Kbps units
- Wrote detailed technical reports of both hardware and software design of the project.

Languages

English **Advanced** *TOEFL (as of 2012) 96, R: 28, L: 21, S: 22, W: 25*
GRE (as of 2010), Q: 160, V:148, AW: 4

Persian **Native**

Extracurricular Activites

Art I have been playing Santoor (a traditional Persian musical instrument) for 10 years, do Persian calligraphy, and enjoy drawing cartoons.

Sports I've been doing Nearu martial arts for a couple of months, and I also enjoy hiking in the nature.

Volunteering

▶ I have been a volunteer for organizing several sessions in 27th QBSC (Biennial Symposium on Communications) conference, June 2014. It is sponsored by Queen's University and Kingston IEEE section.

▶ I have been a teaching volunteer at Youth Diversion, Kingston, Canada, for 3 months where I practiced math with two students.

▶ I have been a volunteer member of the team who planned and organized the Industry Exhibition at the ISCEE 2004 conference, held by KNToosi University of Technology.

▶ I have been a volunteer for organizing several sessions in 7th ISCEE (Iranian Student Conference on Electrical Engineering), September 2004.

References

Available upon request.