MohammadReza Ebrahimi

Department of Electrical and Computer Eng.
University of Toronto
Toronto, ON, Canada

Email: mr.ebrahimi@mail.utoronto.ca
Website: mamaj.github.io
Phone: +1 (647) 778 2964

Education

University of Toronto, Toronto, Canada — Sep. 2018 - Present
PhD Candidate at ECE Department
- Advisor: Ashish Khisti, PhD.

University of Tehran, Tehran, Iran — Sep. 2014 - Sep. 2017
Master of Science in Communication Systems
- **Average: 18.85/20 (4.00/4.00) - Ranked first**
- Thesis title: *Joint channel coding and medium access control in machine-to-machine communication.* Defended (20/20)
- Advisors: Farshad Lahouti, PhD.
  Maryam Sabbaghian, PhD

University of Tehran, Tehran, Iran — Sep. 2010 - Sep. 2014
Bachelor of Science in Electrical Engineering - Telecommunications
- **Average: 17.94/20 (3.86/4.00)**
- Thesis title: *Indoor Positioning System Using Wi-Fi Fingerprinting Method.*
- Advisor: Farshad Lahouti, PhD.

Research Interests

- Out of Distribution (OOD) Detection/Robustness for High Dimensional Spaces
- Probabilistic Machine Learning, and Applications in High Dimensional Time Series Analysis
- Graph Neural Networks and Graph Signal Processing
- Computational Cognition and fMRI Data Analysis

Publications

- **M. Ebrahimi**, N. Calarco, K. Campbell, C. Hawco, A. Voineskos, and A. Khisti, "Time-Resolved fMRI Shared Response Model using Gaussian Process Factor Analysis." arXiv preprint arXiv:2006.05572 (2020).

- **M. Ebrahimi**, F. Lahouti, and V. Kostina, "Two-layer Coded Channel Access with Collision Resolution: Design and Analysis." *arXiv preprint*, arXiv:1909.00065, (2020). [*Accepted in IEEE Transaction of Wireless Communications*]

- **M. Ebrahimi**, F. Lahouti and V. Kostina, "Coded random access design for constrained outage," *2017 IEEE International Symposium on Information Theory (ISIT)*, Aachen, 2017, pp. 2732-2736

- F. Lahouti, V. Kostina, and **M. Ebrahimi**, "Coded Random Access Mechanism for Communication Networks." *U.S. Patent Application No. 16/362,567.*

Research Experience

Centre for Addiction and Mental Health (CAMH) — Jan. 2019 - Present
The Kimel Family Translational Imaging-Genetics Laboratory (TIGRlab)
Student Researcher

Project: *Learning Bio-Markers of Social Cognition in Schizophrenia using fMRI (SPINS study)*
Adviosrs: *Prof. Ashish Khisti and Dr. Aristotle Voineskos*
Applying Bayesian machine learning and graph signal processing to delineate the neural pathophysiology underlying impaired social cognition in people with Schizophrenia Spectrum Disorders (SSD) with the belief that this will inform therapeutic discovery.

Center for Wireless Multimedia Communications (WMC) — Sep. 2013 - Sep. 2016
University of Tehran, Tehran, Iran
Research Assistant

Under the supervision of Dr. Lahouti, I conducted research on two general fields: indoor positioning and joint channel coding and random access scheme design using factor graphs. During the *Digital Venture Design* course in WMC, we defined the business plan of a location-aware marketing tool for shopping malls, which later incorporated into a business product (*InJust*).

Work Experience

Sarveen Technologies Inc. Sep. 2016
Science and Technology Park, Tehran, Iran - 2018
Head of Indoor Positioning Team

Sarveen Technologies Inc. is a young but well-funded innovative company specializing in indoor positioning, activity recognition, and IoT technologies. As the head of Indoor Positioning Team, I lead the development of core algorithms to create a robust and adaptive positioning solution used in a wide range of location-aware Sarveen products.

Presentation and Talks

The First Toronto Workshop on Graph Spectral Machine Learning
Invited Talk, Ryerson University, Toronto, Canada (August 2019)
2017 IEEE International Symposium on Information Theory (ISIT)
Oral Presentation, Achen, Germany (June 2017)

Software

Programming Languages:
Python(*proficient*), Matlab(*proficient*), Java(*familiar*), C/C++(*familiar*), Verilog(*familiar*)

Professional Software and Toolboxes:
TensorFlow 2/1.x, TF.Keras, TensorFlow Probability, TensorBoard, Pandas/Numpy/Matplotlib, Android programming (Android Studio), Matlab GUIDE, CodeVisionAVR, FL Studio (music production), LaTeX

Teaching

CSC412: Probabilistic Learning and Reasoning, University of Toronto Winter2021
Teacher Assistant
Instructors: Jesse Bettencourt

ECE421: Introduction to Machine Learning, University of Toronto Winter 2021, Fall 2020
Head Teacher Assistant Winter 2020, Fall 2019
Instructors: Nicolas Papernot, Ashish Khisti, PhD

ECE1504: Statistical Learning, University of Toronto Winter 2020
Teacher Assistant
Instructor: Ashish Khisti, PhD

CSC458H1F: Computer Networking Systems, University of Toronto Fall 2018, 2019
Teacher Assistant
Instructor: Sajad Shirali-Shahreza, PhD, Yashar Ganjali, PhD

Advanced Theory of Communications, University of Tehran Spring 2017
Chief Teacher Assistant
Instructor: Maryam Sabbaghian, PhD

Communication Systems II, University of Tehran Fall 2016
Chief Teacher Assistant
Instructor: Amir Masoud Rabiei, PhD

Wireless Communication, University of Tehran Spring 2016
Chief Teacher Assistant
Instructor: Ali Azam Abbasfar, PhD

Mathematics I, University of Tehran Fall 2012
Teacher Assistant
Instructor: Mohammadreza Kolahdouz, PhD

Selected Courses

CSC412 Probabilistic Learning: A+
ECE1504 Statistical Learning: A+
STA4273 Research Topics in Statistical ML: A+
ECE1762 Algorithms and DS: A+
Pattern Recognition: 19/20
Information Theory: 18.5/20
ECE1505H Convex Optimization: A
Digital Signal Processing: 18.3/20
Stochastic Processes: 17.04/20
Detection and Estimation Theory: 16.5/20
Advance Theory of Communications: 19.9/20
Wireless Communication: 20/20

Honors and Awards

Ranked 1st among all communication system students
M.Sc. degree, University of Tehran

M.Sc. thesis nominated for the ECE school best dissertation award
University of Tehran, Tehran, Iran. (Winners TBA)

Excellent Student M.Sc. Admission Award
B.Sc. degree, University of Tehran
Entrance examination waived as an award for being among the top-10% students (Ranked 6^{th} among 123).

Ranked 194th among 277,814 participants
In the nationwide university entrance examination in Mathematics and Physics fields for B.Sc.

References

Farshad Lahouti, PhD.
Electrical Engineering Department
California Institute of Technology
lahouti@caltech.edu, +1(626) 395-3474

Maryam Sabbaghian, PhD.
School of Electrical and Computer Engineering
University of Tehran
msabbaghian@ut.ac.ir, +98(21) 6111-9725

Ashish Khisti, PhD.
Electrical and Computer Engineering Department
University of Toronto
akhisti@comm.utoronto.ca, +1(416) 978-7215