Mahdi Gilany

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Education

Rochester Institute of Technology (RIT) — Rochester, New York
Ph.D. in Computer Science — Fall 2019–Current
Golisano College of Computing and Information Sciences
GPA:4.0/4.0, Advisor: Dr. Rui Li

University of Tehran — Tehran, Iran
B.S. in Electrical Engineering (Communication) — 2014–2018
School of Electrical and Computer Engineering
GPA: 3.73/4.00, Advisor: Dr. Mohammad Ali Akhaee

Research Interests

- Bayesian Deep Learning
- Continual Learning
- Deep Generative Modeling and Inference
- Machine Learning
- Statistical Inference
- Computer Vision

Research Experience

Research Assistant — RIT
PhD research, *Lab of Use-inspired Computational Intelligence* — Fall 2019–Current

- **Neural Architecture Inference using Beta-Bernoulli Processes:** Inferring the posterior distribution over architectural hyper-parameters (number of layers and neurons) using stochastic variational inference methods.
- **Variational Continual Learning with a dynamic network:** Dynamically growing a neural network architecture in VCL setting to overcome neural capacity problem.

Research Assistant — University of Tehran
Undergraduate Thesis, *Secure Communication Lab* — Spring and Summer 2018

- **Hand Gesture Detection:** Developing a CNN for recognizing different hand gestures by Keras and extracted skin pixels as features

Work Experience

Research Scientist — Tehran, Iran
Habibi Crypto-currency Trading Group — Fall 2018–Spring 2019

- **Crypto-currency Price Forcasting:** Predicting different crypto-coins' prices using time series analysis and RNNs

Electrical Engineering Intern — Tehran, Iran
Mataab Company — Spring and Summer 2016

- **Wind Speedometer:** Designing a wind speedometer by ultrasonic transceiver sensors and microcontrollers.

Scholarships and Awards

- RIT Ph.D. Merit Full Scholarship. 2019–Current
- Exempted from M.Sc. entrance exam in University of Tehran as an exceptional talented student. 2017
- Ranked among top 0.1% in Iran's National University Entrance Exam with more than 220,000 participants. 2013
- Passed in the first-round of both 26^{th} Iranain National Mathematics and Informatics Olympiads. 2013

Relevant Courses

Graduate courses are indicated by † and audited are indicated by $*$

- **Machine Learning Courses:** Statistical Machine Learning†, Deep Learning†, Quantitative Foundation†, Pattern recognition†* | UCB Deep Learning (online)†*, Deep Learning Summer School at University of Tehran.
- **Math, Probability, and Statistics Courses:** Stochastic Processes†*, Statistical Inference†*, Linear Algebra*, Engineering Probabilities and Statistics, Calculus I-II, Engineering Mathematics.
- **Programming and Software Engineering Courses:** Software Engineering†, Cyberinfrastructure Foundations†, Advanced Programming (C++)*, Introduction to Computer and Programming (C) | Python Programming (SoloLearn).
- **Others:** Computer Networks, Digital Signal Processing, System Analysis.

Selected Projects

- Implementing **Bayesian neural networks** for both classification and regression using PyTorch.
- Implementing a **Convolutional neural network with various regularization techniques, e.g. Dropout and L2-norm,** for MNIST and FashionMNIST Classification using PyTorch.
- Implementing **Gradient Descent, Newton, and Quasi-Newton optimizers** using backtracking linesearch with MATLAB.
- Implementing dimentionality reduction algorithms such as **Neural Autoencoder, PCA, LDA, and Forward Feature construction** using PyTorch and Numpy.
- Implementing **Expectation-Maximization (EM)** algorithm for Gaussian Mixture Model using Numpy.
- Implementing various clustering algorithms such as **Agglomerative Hierarchical and k-means** using NumPy.
- Implementing various classifiers such as **SVM, KNN, and Linear with Basis Expansion** using NumPy.
- Implementing various pdf estimators such as **K-means, Parzen Window, and Histogram** using NumPy.
- **Multi-thread programming** for displaying Mandelbrot function with manual load balancing.
- Running a 3D Random Walk in multi-processing setting using **Master-Worker with Massage Passing Interface (MPI)**.
- Designing and Implementing an hand-held remote controller with a screen for Persian Ghazal solar car using DRF wireless transceiver modules.
- Implementing a multi-functional module for text sending and receiving via sim card, GPS location finding, and server communication using microcontrollers and Sim808 module.
- FPGA implementation of a digital oscilloscope and a signal generator.
- FPGA implementation of analog signals' envelope detector using FIR/IIR filters and MATLAB Simulink.

Skills

- **Programming:** Python, MATLAB, Java, R, C/C++ | Verilog, VHDL | LaTeX
- **Deep Learning Frameworks:** Pytorch, Tensorflow, Keras
- **Data Science Libraries/Packages:** NumPy, Pandas, SciPy, Scikit-learn, Matplotlib, IPython, GPyTorch
- **Operating Systems:** Linux, Windows
- **Applications/Programs:** Pycharm, Visual Studio, R studio | Code Vision, Xilinx ISE, Quartus, Multisim, Modelsim
- **Others:** Cuda, GitHub, Conda, Microsoft Office, Trello, Slack

Teaching Assistant

- **University of Tehran**: Engineering Probability and Statistics, Linear Control Systems.
- **Amir High School**: Discrete Mathematics, Analytic Geometry for National University Entrance exam.

Languages

- **Farsi:** Native
- **English:** Fluent
  - **TOEFL iBT:** (Nov. 2018): 81/120 (Reading: 25/30, Listening: 18/30, Speaking: 18/30, Writing: 20/30)
  - **GRE:** (Nov. 2018): Quantitative Reasoning: 162/170, Verbal Reasoning: 142/170, Analytical Writing: 3/6

Publications

[1] K. KC*, M. **Gilany***, and R. Li, "Scalable neural architecture inference with bayesian nonparametrics", *Under review in Advances in Neural Information Processing Systems*, 2020.

Equal contribution is indicated by $*$.
PDF file will be provided upon request.

References

Dr. Rui Li
Assistant professor, Golisano College of Computing and Information Sciences at RIT

Dr. Linwei Wang
Professor, Golisano College of Computing and Information Sciences at RIT