Mahdi Gilany

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Education

Queen's University — Kingston, Ontario
PhD in Computer Science — Winter 2021–current
School of Computing
GPA:4.0/4.0, Advisor: Dr. Parvin Mousavi

Rochester Institute of Technology(Transferred to Queen's) — Rochester, New York
MSc in Computer Science — Fall 2019–Winter 2021
Golisano College of Computing and Information Sciences
GPA:4.0/4.0, Advisor: Dr. Rui Li

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

Research Interests

- Medical Image Analysis
- Bayesian Deep Learning
- Deep Generative Modeling and Inference
- Biomedical Computing
- Statistical Inference
- Computer Vision

Research Experience

Research Assistant — RIT
MSc 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. 2019–2021
- 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, 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

Publications

[1] K. KC, R. Li, and M. **Gilany**, "Joint inference for neural network depth and dropout regularization", *Accepted in Advances in Neural Information Processing Systems*, 2021.

PDF file will be provided upon request.

References

Upon request.