Mahdi Gilany

CONTACT Personal Page GitHub LinkedIn Email: mahdi.gilany@queensu.ca

SUMMARY

Extensive machine learning and deep learning background, both theoretical and practical

Experienced in designing and implementing deep learning models for real-world problems with most up-to-date software tools

Excellent writing, teamwork, and communication skills acquired from prior industrial and academic experience and research publications

RESEARCH EXPERIENCE

Research Assistant — Queen's University
Medical Informatics Laboratory — Winter 21–now

My primary research is to develop deep learning models for diagnosing prostate cancer on ultrasound images. In this real-world problem, we are dealing with many medical imaging challenges such as low labeled-data regime, weak labeling, distribution shift, and prediction uncertainty. My project involves in addressing different aspects of this problem.

- *Robust predictions and confident diagnoses* seeks to answer how not to learn spurious features which hurt generalizability on unseen data, and if learned to some extent how to avoid disastrous predictions with uncertainty quantification. Robust predictions are critical in healthcare.
- *Self-supervised ultrasound representation learning* deals with learning abstract representations from readily available unlabeled ultrasound images. It essentially helps alleviating the need for large amount of labeled data, and naturally opens up ways to address weak labeling when combined with Transformers.

Research Assistant — Rochester Institute of Technology
Lab of Use-inspired Computational Intelligence — Fall 19–Winter 21

My primary research was to develop deep learning models from using probabilistic view. I worked on two main projects, probabilistic neural model inference and probabilistic continual learning.

- *Probabilistic neural model inference* deals with finding the most plausible (model posterior distribution) neural architecture warranted by data. It essentially learns neural architecture, i.e., depth and width, with some assumption on the space of models.
- *Probabilistic continual learning* deals with teaching a neural model to continually learn new tasks without forgetting the past. The devised neural model, for each task, learns to update the posterior distribution on weights to not forget the past and neural architecture to increase the capacity of network.

EDUCATION

Queen's University — Ontario
PhD in School of Computing, GPA 4.0/4.0 — Winter 21–now
Supervisors: Dr. Parvin Mousavi, Co-supervisor: Dr. Purang Abolmaesumi

Rochester Institute of Technology(Transferred to Queen's) — New York
PhD in Computing and Information Sciences, GPA 4.0/4.0 — Fall 19–Winter 21
Supervisor: Dr. Rui Li

University of Tehran — Tehran
BSc in Electrical Engineering, GPA 3.73/4.0 — Fall 14–Fall 18

PUBLICATIONS

Google Scholar

KC, Kishan and Li, Rui and **Gilany**, **Mahdi**, "Joint Inference for Neural Network Depth and Dropout Regularization", *Advances in Neural Information Processing Systems (Neurips), 2021.*

Gilany, **Mahdi**, and Wilson, Paul and Jamzad, Amoon and Fooladgar, Fahimeh and To, Minh Nguyen Nhat and Wodlinger, Brian and Abolmaesumi, Purang and Mousavi, Parvin, "Towards Confident Detection of Prostate Cancer Using High Resolution Micro-ultrasound", *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2022.*

Wilson, Paul* and **Gilany**, **Mahdi*** and Jamzad, Amoon and Fooladgar, Fahimeh and To, Minh Nguyen Nhat and Wodlinger, Brian and Abolmaesumi, Purang and Mousavi, Parvin, "Self-Supervised Learning with Limited Labeled Data for Prostate Cancer Detection in High Frequency Ultrasound", *arXiv preprint arXiv:2211.00527, 2022.*

HONORS & AWARDS

Queen's Graduate Fellowship/Award	21–now
NSERC MedICREATE Training Award	21–now
Queen's Virtual Travel Award	22
RIT PhD Merit Full Scholarship	19–21

TECHNICAL SKILLS

Data Science Tools	NumPy, Pandas, Matplotlib, Scipy
Deep Learning Frameworks	PyTorch, TensorFlow/Keras
Programming Languages	Python, MATLAB, C/C++, Java

TEACHING ASSISTANCE

Introduction to Computing Science I, Linear Data Analysis, Engineering Probability and Statistics, Linear Control Systems

RELAVANT COURCES

- Deep Learning
- Statistical Machine Learning
- Reinforcement Learning
- Stochastic Processes
- Software Engineering Foundation
- Linear Algebra