HAMID KAMKARI

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EDUCATION

University of Toronto *2022 - 2024*
Master of Science in Applied Computing (MScAC)
Department of Computer Science
Ongoing Courses: *(CSC2541)* Topics in Machine Learning: Introduction to Causality (A+), *(CSC2240)* Graphs, Matrices, and Continuous Optimization, *(CSC2701)* Communication for Computer Scientists, *(CSC2541)* Advanced Topics in ML: Causal-aware Representation Learning, *(CSC2130)* Empirical Research Methods in Software Engineering

Sharif University of Technology *2018 - 2022*
Bachelor of Science Overall GPA 19.22/20
Department of Computer Engineering Ranked Among the Top 10
Courses: *(CE695)* Stochastic Processes, *(CE417)* Artificial Intelligence, *(CE494)* Introduction to Computational Biology, *(CE282)* Linear Algebra, *(CE181)* Fundamentals of Probability and Statistics, *(CE354)* Algorithm Design, *(CE415)* Theory of Formal Languages and Automata, *(MAT034)* Differential Equations

RESEARCH AND PUBLICATION

University of Toronto **Toronto, Canada**
Causal Discovery based on Normalizing Flows *November 2022 - Ongoing*

- `(Preparing manuscript)`
- Used foundations in graph theory to come up with a new method of learning structures on directed acyclic graphs. Implemented a normalizing flow-based causal discovery and inference structure under the supervision of Rahul Krishnan, used the
- Pytorch Lightning framework for reproducibility, and within 3 months came up with an ICML2023 submission.

Sharif University of Technology **Tehran, Iran**
Predicting Drug Combination Effects by Utilizing Multi-Omics Data *January 2022 - September 2022*

- Used Graph Neural Networks and Attention mechanisms to create a general state-of-the-art framework, named DeepDDR, for predicting drug dose response using SMILES representation of drugs.

Maxplanck Institute of Informatics (MPI-INF) **Saarbrücken, Germany**
Convex Optimization - Algorithmic Perspective of Training Neural Networks *August 2020 - February 2022*

- Using foundations in linear algebra, curated ideas that led to a creative dynamic system for a set of convex optimization problems. This led to a paper under review (STACS) on novel algorithms for tackling Semi-Definite programs using nature-inspired dynamics.
- Undertook a second internship on the fundamentals of fine-grained bounds for fine-tuning simple overparameterized perceptrons. Using reduction from core algorithmic problems, proved fine-tuning problem on perceptrons is exponential w.r.t the dimension of the hidden units.

Aalto University **Espoo, Finland**
RNA sequence design using Graph Neural Networks *July 2021 - September 2021*

- Created a data-driven method to find RNA sequences that can fold into a certain secondary structure.
- Modeled the problem as a Markov decision process and used Monte-Carlo Tree Search to speed up the search.

- Helped improve the rollout phase using GNNs. Inspired by notions of connectivity in graph theory, obtained a suitable GNN with smart skip connections that autoregressively assigns molecules to nodes and obtains state-of-the-art results on a class of RNA structures.

WORK EXPERIENCE

Fanap IT Company *January 2022 - August 2022*

- Research and development on deep learning methods to help restore poorly taken photos of dental panoramic images that prevents reshooting and additional x-ray exposure, and additionally, help with the tooth disease detection pipeline of dentists.
- Implemented a novel U-Net for dynamic range unification using Pytorch that can help panoramic image restoration.
- Detectron2 Mask-RCNN for instance segmentation of teeth and treatments that can help computer-aided disease detection. Created Demo using Docker and FastAPI for proof of concept and sold MVP to a client with three active radiology clinics in Tehran; all in approximately three months.

National Olympiad in Informatics Committee *September 2020 - December 2021*

- Curated and organized nation-wide competitive contests for talented students all across Iran; helped with the technical infrastructure of the online code judging system using CMS online judge.

TEACHING

Academic Teaching Assistance **University of Toronto - Sharif University of technology**

- Introduction to Artificial Intelligence (CSC236) Alice Gao *January 2023 - Ongoing*
- Introduction to the theory of Computation (CSC236) François Pitt *September 2022 - December 2022*
- Artificial Intelligence course (CE40417) Mohammad Hossein Rohban *September 2021 - January 2022*
- **Head** of Data Structure and Algorithms course (CE40254) - Mohammad Ghodsi *January 2021 - June 2021*
- Artificial Intelligence course (CE40417) Mohammad Hossein Rohban *January 2021 - June 2021*
- Probability and Statistics course (CE40181) Ali Sharifi-Zarchi *September 2020 - January 2021*
- Discrete Structures course (CE40115) Mohammad Ali Abam *January 2020 - June 2020*
- Advanced Algorithm design course (CE40354) Ali Sharifi-Zarchi *January 2020 - June 2020*
- Data structure and Algorithms course (CE40254)

Mentor-ship

- Worked as Computer Olympiad Teacher in well-known Iranian high schools as well as a mentor at International Olympiad in Informatics (IOI) preparation camp for International Olympiad in Informatics held in Baku, Azarbaijan. *January 2019 February 2019*

HONORS AND AWARDS

ACM-ICPC
Regional gold medal
team ranked 3rd
December 2018

APIO
Asia-Pacific Informatics
bronze medal
May 2018

INFO-Cup
World-wide contests
gold medal
March 2018

Computer Olympiad
Ranked 5th in
national contests
September of 2016 & 2017

SKILLS

Programming Skills:

Python, Pytorch, Sklearn, Docker, C++ (for competetive programming), Java, MATLAB, LaTeX.

Languages:

Persian (Native) - English (Fluent) TOEFL iBT 116/120
Speaking: 28/30 - Writing: 29/30 - Reading: 30/30 - Listening: 29/30