Mohamad Amin Mohamadi

+1 (773) 427-8284 ◇ mohamadamin@ttic.edu ◇ mohamad-amin.github.io ◇ lemohamadamin

RESEARCH INTERESTS

- I am interested in leveraging our theoretical understanding of neural networks to challenge existing beliefs in the field and help make deep learning practice more compute-efficient and lift its current limitations.
  In particular, I like to work on identifying and lifting limitations of sequence to sequence modeling ranging from topics like training and inference efficiency, length generalization, analyzing and improving transformers, and also reasoning in Large Language Models.

PUBLICATIONS

ICML'24-HiDL Workshop **Adam Exploits ℓ_∞-geometry of Loss Landscape via Coordinate-wise Adaptivity**
Shuo Xie, Mohamad Amin Mohamadi, Zhiyuan Li

ICML'24 **Why Do You Grok? A Theoretical Analysis on Grokking Modular Addition**
Mohamad Amin Mohamadi, Zhiyuan Li, Lei Wu, Danica J. Sutherland

ICML'23 **A Fast, Well-Founded Approximation to the Empirical NTK**
Mohamad Amin Mohamadi, Wonho Bae, Danica J. Sutherland

NeurIPS'22 **Making Look-Ahead Active Learning Strategies Feasible with NTK**
Mohamad Amin Mohamadi, Wonho Bae*, Danica J. Sutherland*

SELECTED EXPERIENCES

Toyota Technical Institute at Chicago ❖ *PhD Student* *Chicago, IL* ◆ Sep. 2023 – Present

· Working under supervision of Prof. **Zhiyuan Li** on large scale training of deep learning models and analyzing the training dynamics from a theoretical standpoint with the aim of making deep learning more resource efficient.

University of British Columbia ❖ *MSc Student* *Vanouver, BC* ◆ Sep. 2020 – Apr. 2023

· Advised by **Danica J. Sutherland**
· Research Areas: Theoretical and empirical investigation of training dynamics of neural networks trained with Stochastic Gradient Descent. Published my work at top-venues for deep learning research like **NeurIPS** and **ICML** conferences.

Oracle Labs ❖ *Machine Learning Intern* *Vancouver, Canada* ◆ Nov. 2021 – May 2022

· **AutoML for Time Series**: As a research intern in the AutoMLx team, successfully implemented, tested and deployed a forecasting model for general time series data based on the LightGBM model that improved the overall performance of the forecasting pipeline by more than 10%.

University Of British Columbia ❖ *Teaching Assistant* *Vanouver, BC* ◆ Jan. 2021 – Jan. 2022

· **Masters of Data Science Program:** Preparing course material, holding office hours and assisting students in labs for different courses such as: Machine learning for Data Science, Statistical Inference (I) and (II), Advanced Probability and Statistics, Introduction to Probability and Statistics.
· **Computer Science Program:** Responsible for holding office hours and assisting students in labs for different courses such as: Machine Learning (CPSC 340).

CafeBazaar ❖ *Data Scientist* *Tehran, Iran* ◆ May 2019 – Sep. 2020

· **User Profiling**: Designed and implemented services to collect data from more than 40 million users, and organized them using PySpark and services for analyzing the basic behaviors of the users like funnels, show watch-time duration, user behaviour analysis and user segmentation for targeted promotions.
· **Online Scalable Recommender System for Applications**: Re-implemented model trainer and hyper-parameter tuning using implicit-als algorithm as being a member of the team based on data collected from more than 40 million users on more than 300,000 applications. Final output could handle over 500 requests per second.

EDUCATION

Ph.D. in Computer Science Sep'23 – Present
Toyota Technical Institute at Chicago

M.Sc. in Computer Science GPA: A^+ Sep'20 – Apr'23
University of British Columbia

B.Sc. in Computer Engineering Sep'15 – Jun'20
Amirkabir University of Technology GPA: A^+

TECHNOLOGIES

Auto-diff & ML/DL Frameworks

- JAX, PyTorch
- Flax, Haiku, CUDA
- NumPy, Pandas, Numba, XGBoost

Everything Data

- Apache Spark, SparkSQL, Apache Kafka
- HDFS, YARN
- PostgreSQL, MySQL

Main Programming Languages

• Python • C/C++ • Java • Kotlin • JS • Scala
• R • SQL

Miscellaneous

- Git, Docker, Kubernetes, Django, Linux
- AWS Cloud, Google Cloud, Microsoft Azure
- 10+ years experience with Linux systems
- English, Farsi

HONORS & AWARDS

- Recipient of the NeurIPS 2022 Scholar Award.
- Internal Student Award, UBC.
- Ranked in top 0.1% among all students in nationwide university entrance exam (∼250,000 applicants).

INVITED TALKS

- Provable Approximation of Neural Tangent Kernel with Applications in Active Learning - Google Brain (Plaid Team), 2023

SELECTED PROJECTS

Variance-Reduced-Optimization-For-NeuralNets

MuliAgent-DRQN-with-Communication

KM-Epsilon **DTExtract** **CUDA-Shazam**

GPS-Segments **PyConstrainedOptimization**

NUMEX-Interpreter **NTK-ActiveLearning**