

Mohammadreza Tayaranian Hosseini

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Research Interests ----- Efficient Fine-tuning - Dataset Pruning - Quantization

Education

- **Ph.D. in Electrical Engineering** Sep 2021 – Ongoing
McGill University Supervisor: Prof. Warren Gross
Research Title: Data Efficient and Parameter Efficient Fine-tuning of LLMs
- **M.Sc. in Electrical Engineering** Sep 2020 – Sep 2021
McGill University **GPA: 3.75 / 4**
Program fast-tracked to PhD
- **B.Sc. in Software Engineering** Sep 2015 – Feb 2020
University of Tehran **GPA: 3.42 / 4**
Final Project Title: Service Migration in Mobile Edge Computing

Work Experience

- **Research Assistant** Sep 2020 – Ongoing
McGill University, Montreal Supervisor: Prof. Warren Gross
Working as a research assistant during my masters and Ph.D. program
Notable Experience: Parameter efficient fine-tuning, data efficient fine-tuning, and post-training quantization
- **Research Intern** Mar 2021 – Jun 2023
Huawei Noah's Ark Lab, Montreal Team Leader: Prof. Vahid Partovi Nia
Worked as a part-time researcher on projects focused on deep learning model compression
Notable Experience: CUDA development and model quantization
- **Research Assistant** Jul 2018 – Feb 2020
Institute for Research in Fundamental Sciences, Tehran Supervisor: Prof. Ahmad Khonsari
Worked as an undergraduate research assistant along with graduate and post-doc researchers
Notable Experience: Design of a low-level hardware accelerator based on stochastic computing methods
- **Head Teaching Assistant and Teaching Assistant**
McGill University and University of Tehran
Notable Courses: Microprocessors, Compiler Design, Intro to A.I., Realtime-Embedded Systems

Publications

1. **M Tayaranian**, S Mozafari, J Clark, B Meyer, W Gross. *Parameter Efficient Fine-tuning of Transformer-based Language Models using Dataset Pruning*. 57th Asilomar Conference on Signals, Systems and Computers, 2024.
2. **M Tayaranian**, S Mozafari, B Meyer, J Clark, W Gross. *Automatic Pruning of Fine-tuning Datasets for Transformer-based Language Models*. Third Conference on Lifelong Learning Agents: CoLLAs, 2024.
3. **M Tayaranian**, S Mozafari, J Clark, B Meyer, W Gross. *Faster Inference of Integer SWIN Transformer by Removing the GELU Activation*. AAAI Edge Intelligence Workshop, 2024.
4. **M Tayaranian**, A Ghaffari, MS Tahaei, M Rezagholizadeh, M Asgharian, V Partovi Nia. *Towards Fine-tuning Pre-trained Language Models with Integer Forward and Backward Propagation*. Findings of the Association for Computational Linguistics: EACL, 2023.
5. A Ghaffari, MS Tahaei, **M Tayaranian**, M Asgharian, V Partovi Nia. *Is Integer Arithmetic Enough for Deep Learning Training?*. Advances in Neural Information Processing Systems, 2022.
6. D Vucetic, **M Tayaranian**, M Ziaefard, J Clark, B Meyer, W Gross. *Efficient Fine-Tuning of Compressed Language Models with Learners*. ICML Hardware Aware Efficient Training Workshop, 2022.
7. **M Tayaranian**, D Vucetic, M Ziaefard, J Clark, B Meyer, W Gross. *Efficient Fine-Tuning of BERT models on the Edge*. IEEE International Symposium on Circuits and Systems: ISCAS, 2022.
8. K Givaki, B Salami, R Hojabr, **SM Tayaranian**, A Khonsari, D Rahmati, S Gorgin, A Cristal, O Unsal. *On the Resilience of Deep Learning for Reduced-voltage FPGAs*. Euromicro International Conference on Parallel, Distributed and Network-Based Processing: PDP, 2020
9. R Hojabr, K Givaki, **SM Tayaranian**, P Esfahanian, A Khonsari, D Rahmati, M Najafi. *Skippynn: An embedded stochastic-computing accelerator for convolutional neural networks*. Design Automation Conference: DAC, 2019.

Skills

- **PyTorch** (*Advanced*): Implementing various research projects
- **CUDA** (*Intermediate*): Develop custom CUDA kernels and incorporate them to PyTorch
- **Android Development** (*Intermediate*): Native Android development using Java at an intermediate level

Volunteer Experience

- **Reviewer**
 - ACL rolling review 2024
 - AAAI Edge Intelligence Workshop 2024
 - The 2nd Edge Intelligence Workshop 2023
 - The 3rd Neurips Workshop on Efficient Natural Language and Speech Processing 2023
 - International Conference on Computer-Aided Design: ICCAD 2022
- **Student Committee Member**
 - The 2nd Edge Intelligence Workshop 2023
 - The 8th International Conference on Fundamentals of Software Engineering 2019
 - The 2nd CSI International Symposium on Real-Time and Embedded Systems 2018

Languages

- **English**: Fluent
- **French**: Beginner (A1)
- **Persian**: Mother Tongue