Sina Mahdipour Saravani

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INTERESTS & EXPERTISE

- Efficient and High-Performance Deep Learning
- Distributed/Multi-GPU Deep Learning and Natural Language Processing (NLP)

EDUCATION

University of Utah, Salt Lake City, United States

- Ph.D., Computer Science, In Progress, GPA: **4.0/4.0** 2022 - Present
  - ◇ Courses are finished. Research is focused on Efficient and High-Performance Deep Learning.

Colorado State University, Fort Collins, United States

- M.S., Computer Science, GPA: **4.0/4.0** 2020 - 2022
  - ◇ Thesis: *Redundant Complexity in Deep Learning: An Efficacy Analysis of NeXtVLAD in NLP*

Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

- B.Sc., Computer Engineering, GPA: **16.61/20.0** 2014 - 2019
  - ◇ Thesis: *Implementation of FPGA Accelerators for Convolutional and Pooling Layers of a Convolutional Neural Network (CNN)*

PUBLICATIONS & MANUSCRIPTS

Google Scholar Link: https://scholar.google.com/citations?user=-32OFf8AAAAJ&hl=en

- *[Under Review]* Accelerated Auto-tuning of GPU Kernels for Tensor Computations. *ICS 2024*.
  Chendi Li*, Yufan Xu*, **Sina Mahdipour Saravani**, Saday Sadayappan
- *[Under Review]* Empirical Analysis of Matrix Factorization Methods for Pre-trained Transformers. *NAACL 2024*
  Ashim Gupta, **Sina Mahdipour Saravani**, Saday Sadayappan, Vivek Srikumar
- An Investigation into the Contribution of Locally Aggregated Descriptors to Figurative Language Identification. 2021. *EMNLP 2021 Workshop*.
  Sina Mahdipour Saravani, Ritwik Banerjee, and Indrakshi Ray
- Automated Identification of Social Media Bots using Deepfake Text Detection. *ICISS 2021*.
  Sina Mahdipour Saravani, Indrajit Ray, and Indrakshi Ray
- A Generalized Method for Automated Multilingual Loanword Detection. *COLING 2022*.
  A. Nath*, **Sina Mahdipour Saravani***, I. Khebour, S. Mannan, Z. Li, and N. Krishnaswamy.
- Automated Code Extraction from Discussion Board Text Dataset. *ICQE 2022*.
  Sina Mahdipour Saravani, Sadaf Ghaffari, Yanye Luther, James Folkestad, and Marcia Moraes.

RESEARCH & WORK EXPERIENCES

- **Research Assistant, University of Utah, USA** 2022 - Present
  - ⋆ *Supervisor:* **Dr. Saday Sadayappan**
  - ◇ **Fast Auto-tuning for Matmul and Convolution GPU Kernels for Deep Learning**
    Worked on designing a coordinate descent search algorithm for fast auto-tuning with proxy performance modeling.
  - ◇ **Snake-Pattern Developement of Multiple Matmul Blocks in Cerebras CS-2 Chip**
    Developed in Cerebras SDK language and achieved performance improvements compared to SUMMA in simulations.
  - ◇ **Low-Rank Factorization Methods for Distributed Large Language Models (LLMs)**
    Empirically evaluated low-rank factorization methods and investigated the effect of Monarch matrices compared to simple SVD.
- **Research Assistant, Colorado State University, USA** 2020 - 2022
  - ⋆ *Supervisors:* **Dr. Ritwik Banerjee, Dr. Indrakshi Ray, Dr. Nikhil Krishnaswamy**
  - ◇ **Machine Translation for Similar Low-Resource Language Pairs with Loan Words**
    Studied the potential benefits of using loan words, both as a knowledge base and as insights to architecture design, for automated machine translation between similar language pairs.

◇ **An Investigation into the Contribution of VLAD to Figurative Language Identification**
Investigated the application and effectiveness of vector of locally aggregated descriptors on top of Transformer layers. Studied sarcasm detection in Twitter as a use case.

◇ **Deepfake Text Detection for Social Media Bot Identification**
Implemented Transformer-based models to detect bot-generated text on a deepfake dataset resulting in performance improvements by using domain-specific pre-trained models.

◇ **Automated Code Extraction from Discussion Board Text Dataset**
Developed algorithms to extract topic codes from course discussion datasets.

- **Research Assistant, Amirkabir University of Technology, Iran** 2018 - 2019
  - ⋆ *Supervisor:* **Dr. Reza Safabakhsh**
  - ◇ **FPGA Accelerators for Convolutional and Pooling Layers of a CNN**
    Researched and implemented an FPGA accelerator for the convolutional and max pooling functions of CNNs using High-Level Synthesis. It was deployed on a ZYBO SoC board and achieved up to 30× speedup compared to the equivalent software code on a CPU.

- **NLP R&D Intern, CommentMiner, Iran** 2017 - 2018
  - ⋆ *Supervisor:* **Mr. Ahmad Asadi**
  - ◇ **NLP Microservices for the Persian Language**
    Implemented text-processing microservices (topic classification, profanity detection, NER, and sentiment analysis) and a question-answering chat bot for the Persian language.

Teaching & Mentoring Experiences

- **Temporary Teaching Faculty**, University of Nevada, Las Vegas — Summer 2020
  - ◇ Computer Science II (CS 202) course, Primary Instructor
- **Teaching Assistant**
  - ◇ Fault-Tolerant Computing (CS 530) course, Colorado State University — Spring 2022
  - ◇ Data Mining (CS 458/658) course, University of Nevada, Las Vegas — Spring 2020
  - ◇ Embedded & Real-Time Systems course, Amirkabir University of Technology — Fall 2018
- **Mentor**, Colorado State University — 2020 - 2021
  - ◇ Mentored 2 graduate, 5 undergraduate and 2 high school students for research in NLP.
  - ◇ Mentored a 1st generation low-income underrepresented student for i-STEM Scholars program.

Professional Services

- **Reviewer** for the following conferences:
  - ◇ LREC-COLING 2023
  - ◇ WebConf 2021 & 2022
  - ◇ ICQE 2022
  - ◇ ICDCS 2021
  - ◇ ACISP 2021
  - ◇ IEEE TPS 2021 & 2020
  - ◇ IEEE S&P 2020
- **Industry Relations Officer**, Scientific Association and Olympiad Affairs Office of AUT — 2015

Honors & Awards

- **Entering Ph.D. Student Fellowship**, University of Utah — 2022
- **Fully-funded Research Assistantship**, Colorado State University — 2020
- **UNLV Access Grant**, University of Nevada, Las Vegas — 2020
- **Fully-funded Graduate Assistantship**, University of Nevada, Las Vegas — 2019
- **Top 50 start-ups** in GITEX start-ups competition, UAE (CommentMiner) — 2017
- **3rd place** in ElecomStars start-ups competition, Iran (CommentMiner) — 2017
- **1st place grant** in Sharif VC Cup start-ups competition, Iran (CommentMiner) — 2017
- Ranked top **0.2**% in Nationwide University Entrance Exam in Math. & Physics, Iran — 2014

Relevant Skills

- Programming: Python, C/C++, Java, C#
- Tools and Frameworks: PyTorch, DeepSpeed, HuggingFace Transformers, TensorFlow, spaCy, scikit-learn, MALLET, Stanford NLP, polyglot, NLTK, OpenMP, CUDA, Docker
- Others: LaTeX, Bash, Vivado and Hardware Design Softwares, Basic Web Programming