MOHAMMAD HOSEIN ZAREI

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EDUCATION

B.Sc. of Computer Engineering — Tehran, Iran
Shahid Beheshti University — 2017 – Present

- **Current GPA:** 3.4/4 (16.53/20) — 3.8/4 (17.89) last year
- **Thesis Title:** Dynamic Precision Neural Computaion via Bit-Slice Architecture

RESEARCH EXPERIENCE

BitHAA: Hardware Assisted Arithmetic Support For BitSlice Computation — 2021
IPM — Tehran, Iran

- We proposed a hardware-assisted framework to provide computing infrastructure for BitSlice execution capable of single-bit SIMD operations.
- I developed some applications (LeNet-5 CNN, A Simple RNN, LSTM, Edge Detection, SHA-256) for the framework to evaluate our proposed method, which gained **2x** performance increase over the baseline method.
- The paper was submitted to the ASPLOS 2022 Conference (under review), under the supervision of Dr. Dara Rahmati and Dr. Saeid Gorgin.

Scalable Kernel Load-Balancing for Parallel SPH Simulation — 2020
IPM — Tehran, Iran

- Proposed a load-balancing method with a new thread assignment paradigm for implementation of SPH simulation, which could be scaled into multi-GPU real-time simulations.
- Our method focuses on internally balancing the computation load among GPU threads. Gaining 73% performance increase on RTX 2080 Ti for a dam break scenario with 1M particles.

Fault Prediction in Competitive Programming Codes — 2019
Shahid Beheshti University — Tehran, Iran

- Developed a machine learning model able to predict line-level faults in a dataset gathered from the CodeForces website.
- The model used different types of line-level features extracted from the codes to predict the faulty areas, gaining over 70% accuracy in predicting the faulty areas.
- This work was done under the supervision of Dr. Mojtaba Vahidi-Asl.

TEACHING EXPERIENCE

Teacher Assistant — SBU, Tehran, Iran

- Internet Engineering (Dr. Parham Alvani) — Spring 2021
- Fundamentals of Computer Vision (Dr. Yaser Esmaeili Salehani) — Spring 2021
- Computer Architecture (Dr. Dara Rahmati) — Fall 2019, Fall 2020
- Microprocessors and Assembly (Dr. Seyed-Hosein Attarzadeh-Niaki) — Fall 2020
- Microprocessors and Assembly (Dr. Dara Rahmati) — Spring 2020
- Specialized Language (Dr. Mojtaba Vahidi-Asl) — Fall 2019
- Computational Intelligence (Dr. Hamed Malek) — Fall 2019
- Introduction to Programming - C++ (Dr. Ali Akbari) — Fall 2019
- Discrete Mathematics (Dr. Farshad Safaei) — Fall 2018, Spring 2019

Teacher — SBU, Tehran, Iran

- Online AI course for Fall 2019 Freshmen (Link) — Oct 2020
- SBU AMC Online Deep Learning Course (Link) — Spring 2021

WORK EXPERIENCE

Research Assistant   Dec 2019 – Present
IPM   Tehran, Iran
- Founded in 1989, IPM is the greatest research center in Iran, compromised of
  9 schools in different areas of knowledge.
- As a member of the CS school (HPC Center), I was introduced into new fields of
  computer science and significantly enhanced my research capabilities.

Data Scientist   Aug 2021 – Present
Digikala   Tehran, Iran
- Founded in 2006, Digikala is the biggest e-commerce company in Iran, with 13 companies under
  its direct supervision, more than 8,000 employees, and a user-base of 40+ million people.
- Developed an **Image Embedding** system able to recognize the content-based features of
  near 6M product images and find similarities between them in the embedding space.
- Developed a **Color Detection** model using Deep Learning, which helps the customers
  filter their desired products with more ease.

SELECTED ACADEMIC PROJECTS

Elevator Controller System | C++, MATLAB Simulink, Arduino   June 2021
- Spring 2021 Embedded and Real Time Systems course project
- Developed an embedded system whose job was to control an elevator using MATLAB Simulink.
- Simulated the system on Arduino using the TinkerCAD website to ensure the system's functionality.

AI-bot contest | Python, Keras, BERT models, Scrapy, Selenium, Pandas, Hazm   Feb 2021
- Developed a model able to recognize and answer 4 types of questions
  (date, time, religious times, and calendar occasions).
- The goal was to create a virtual assistance, but constrained to the mentioned question types.
  The contest consisted of two parts: Classification and Entity Recognition.
- Different ideas were developed to overcome the difficulty of Persian language NLP.
- Our model achieved 76% accuracy and was ranked 6th among all the participants.

BitTorrent-Python | Python, Threading   Jan 2021
- Fall 2020 Computer Networks course project.
- Developed a BitTorrent-like network and its logic using pure python.

A Twitter-like website | GoLang, MongoDB, React Framework   Jan 2021
- Fall 2020 Internet Engineering course project.
- Built a website similar to Twitter, where I developed the website's backend using GoLang and MongoDB.
- Awarded as the best project in the class.

Social Distancing Detector | Python, OpenCV, Keras   Dec 2020
- Fall 2020 Fundamentals of Computer Vision course project.
- Developed a real-time model able to identify the distance between people walking in open spaces.
- The goal was to eventually build an alerting system to be used in those areas.

Netusage | Python, Linux Socket, Process-Management, Threading   Dec 2020
- A Unix-specific tool capable of monitoring the process-level network traffic usage
  by tracking the network sockets' activities.

TECHNICAL SKILLS

Programming Languages
Python, Java, C/C++, GoLang, CUDA, x86 and Arm Assembly, SystemVerilog, Verilog, VHDL, MATLAB
Frameworks/Libraries
Keras, FastAI, Tensorflow 2, OpenCV, Pandas, NumPy, Scikit-Learn, Thrust, Scrapy, Selenium, and Hazm
Tools
MATLAB Simulink, Webots, Modelsim, Keil, Proteus, Jupyter Notebook, JetBrains IDEs, and Microsoft Office
Others
Experienced Linux user, Git, MongoDB, and ARM Cortex-M4 Architecture

Volunteer Experience

Member of the SBU AMC Club   May 2019 - Present
- Active AI-related group with 20+ members.
- Contributed to the club in various ways, such as holding knowledge-sharing sessions,
  teaching, and participating in various online contests with a team (mostly Kaggle).

Board Member of the Scientific Association of the CES Department of SBU   Nov 2018 - Nov 2021
- The board consisted of 12 members managing the Association and its activities.
  I held the "Vice President of the Board" title for 2 out of 3 years.
- Did various non-academic university-related activities such as organizing academic events,
  and helping the students connect to the academic and the industrial scene easier.

Honors & Awards

13th Sharif University of Technology AI Challenge   April 2021
Ranked **3rd** in the largest AI Challenge in Iran held online by SUT.

3rd IUST AI Challenge "Chillin Wars" - Senior Section   Sep 2020
Ranked **1st** in an online nationwide competition held by IUST.

Various Online Nationwide Data Science Contests   Nov 2019 - Jan 2021
Ranked within the top **1%** in each of them. (Link to Contests)

Selected Courses

Embedded and Real Time Systems | 19/20   Spring 2021
Hardware-Software Codesign | 18.6/20   Spring 2021
Fundamentals of Robotics | 19.92/20   Spring 2021
Fundamentals of Cryptography | 18.63/20   Fall 2020
Internet Engineering | 20/20   Fall 2020
Computer Architecture | 18.5/20   Spring 2019

Online Courses

Introduction to Parallel Programming (CUDA) | Udacity 458   Jan 2020
Python for Data Science and Machine Learning Bootcamp | Udemy   Dec 2019
CS224n (Winter 2019) | Stanford University   Aug 2019
Part 2: Deep Learning from the foundations | fast.ai   June 2019
Practical Deep Learning for Coders | fast.ai   July 2019
Deep Learning Specialization | Andrew NG, Coursera   Jan 2019

Languages

Persian: Native
English: Fluent (TOEFL iBT exam will be taken on December 11th, 2021)

Hobbies

Dota 2 - Ranked Divine 1 (top 5% worldwide) • Music (Newbie at Electric Guitar) • Chess • Walking • Foods

References

Dr. Dara Rahmati
Computer Science Department
Institute for Research in Fundamental Sciences (IPM)
dara.rahmati@ipm.ir

Dr. Saeid Gorgin
Electrical Engineering and Information Technology Department
Iranian Research Organization for Science and Technology (IROST)
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