MOHAMMAD HOSEIN ZAREI

(+98) 921 546 5415 | Gmail | Linkedin | Github

EDUCATION

B.Sc. of Computer Engineering   Tehran, Iran
Shahid Beheshti University   2017 – Present
- **Current GPA:** 3.4/4 (16.54/20), 3.5/4 last two years
- **Thesis Title:** Dynamic Precision Neural Computaion via Bit-Slice Architecture
- **Supervisor:** Dr. Dara Rahmati

RESEARCH INTERESTS

Artificial Intelligence • Machine Learning • Deep Learning • NLP • Computer Vision • Image Processing

RESEARCH EXPERIENCE

BitHAA: Hardware Assisted Arithmetic Support For Bit-Slice 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 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.
- 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.

SELECTED ACADEMIC PROJECTS

Elevator Controller System | C++, MATLAB Simulink, Arduino Simulation   June 2021
- Spring 2021 Embedded and Real Time Systems course project
- Developed an embedded system whose job was to control an elevator.
  Everything from the system requirements until production was done via 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 assistant (like Alexa), but only responding to the mentioned question types.
  The challenge consisted of two parts: Classification and Entity Recognition.
- Different ideas were developed to overcome the difficulty of Persian language NLP.
- Our proposed model achieved 76% accuracy and was ranked 6th among 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 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

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

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).

Main Board Member of the Scientific Association of the CES Department of SBU
Nov 2018 - Nov 2021
- The main 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, assisting students receive fundings for their projects, and helping them connect to the academic and the industrial scene easier.

Honors & Awards

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

3rd IUST AI Challenge "Chillin Wars" - Senior Section
July 2020 - 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

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

Hobbies

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