Zara Syed

Algorithms — Optimizations — Firmware
+1 647 284 5350 zara.syed@uwaterloo.ca linkedin.com/in/zara-syed-uw zsyed350.github.io/zarasyed

Skills

Languages: Python, C/C++, Matlab, HTML/CSS, SQL
Libraries: Tensorflow, Keras, PyTorch, Scikit-Learn, SciPy, Pandas, Numpy, Matplotlib
Tools: Simulink, vFlash, CANalyzer, Azure, Docker, Git, Regular Expressions, Jenkins, PTC

Experience

Magna Powertrain **September 2024 - Present**
Base Software Engineering Intern *Troy, MI*

- Revolutionized **requirements traceability** and achieved **100% audit readiness** by automating requirements linking of 4000 functions across 10 million lines of C code using **Python, Clang, LLVM, RegEx, and Excel**.
- Automated performance evaluation consolidation for customer updates, with **99% task completion time reduction**, parsing 130+ HTML Unit Test reports using Python, RegEx, Jenkins, and Excel **saving 8-10 hours** each release.
- Enhanced vehicle software reliability by developing CAN traffic analysis tool, using **Python, RegEx, and CANalyzer** to detect anomalies in millions of lines of diagnostic data in seconds.
- Conducted in-vehicle tests to **evaluate CPU load** across maneuvers, software versions, and vehicle types (PHEV and ICE) using **vFlash and CANalyzer**.

Magna Powertrain **Jan 2024 – Apr 2024**
Control Algorithms and Software Engineering Intern *St. Valentine, Austria*

- Developing **patent-eligible** deep learning solution for **motor control** systems, projected to **reduce costs** and free senior engineers for higher-value tasks, demonstrating **graduate-level research rigor** as an undergraduate.
- Developed and designed **reinforcement learning algorithm** and custom Gymnasium environment with engineered reward function.
- Developed a real-time Python-Matlab-Simulink synchronization interface for reinforcement learning, **optimizing 100+ hours of computation** for training workflows.

Magna Mechatronics, Mirrors, & Lighting **May 2023 – Sept 2023**
Machine Learning DevOps and Software Engineering Co-op *Newmarket, ON*

- Developed and deployed **machine learning web app** to advise engineers' automotive material choices by predicting stress-strain curves, using **Tensorflow, Flask, SQL, Docker, Azure DevOps, Azure App Services** and with **CI/CD**.
- Engaged in cross-functional and international collaboration, including colleagues in Italy, China, and India.
- Trained **machine learning model** to estimate friction coefficient in automotive part materials with **Tensorflow, Keras**.

Onsemi **Sep 2022 – Dec 2022**
Digital Signals Processing Algorithm Developer *Waterloo, ON*

- Developed **32-bit fixed-point firmware** functions for LPDSP32 using C, including signal windowing.
- **Reduced memory usage by 75% and cycle count by 45%** by leveraging conditional compilation and cyclical addressing in signal windowing function.
- **Profiled** cycle counts of 15+ functions using ChessDE and reported to customer facing documentation.

XSENSOR Technology Corporation **Jan 2022 – Apr 2022**
Machine Learning Intern *Calgary, ON*

- Developed **Human pose estimation (HPE)** pipeline which processed **2 million+** sensor inputs using **Tensorflow, Keras**, Pandas, Numpy, and Multiprocessing.
- Developed **85% accurate** Anthropometric meta data extraction functionality for HPE pipeline.
- Built **digital filter** tuner used to tune **FIR** parameters to **87% accuracy** for biosignal extraction.
- Prepared dataset report and augmentation and expansion strategy for **CEO** with 500k+ data points.

Projects

FashionMNIST Classication | *Python, PyTorch, Jupyter Notebook* | GitHub **Nov 2024 - present**

- Implementing GPU accelerated training of Convolutional Neural Network (CNN).

Real Time Operating System | *C, STM32* | GitHub **Sep 2023 – Dec 2023**

- Developed kernel and functionality for thread creation, thread scheduling, and multithreading.

Bluetooth Robotic Claw Arm | *Arduino Uno, Arduino mini* **Apr – June 2023**

- Robotic claw arm mimics real time human action using accelerometers, gyroscopes, flex sensors, DC & servo motors.

Autonomous Vehicle Simulation | *Python, Tensorflow* **Jan 2019 – Mar 2019**

- Built CNN to train self-driving car using end-to-end learning and computer vision on Udacity's self-driving car simulator.

Education

University of Waterloo **Sep. 2021 – April 2026**
Candidate for BASc, Honors Mechatronics Engineering *Waterloo, ON*

- **Relevant Courses:** Embedded Systems, Microprocessors, Computer Architecture, Real Time Operating Systems, Data Structures and Algorithms, Circuits, Power Electronics, Statistics