Zara Syed

Algorithms — Optimizations — Firmware
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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, demonstrating graduate-level research rigor as an undergraduate.
- Eliminated time-intensive PID controller tuning process by replacing controller with reinforcement learning agent.
- Implemented real-time Python-MATLAB-Simulink synchronization interface for over 100+ hours of model training.
- Designed and implemented reinforcement learning algorithm and engineered mathematical reward function for motor control optimization within custom Gymnasium environment.

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 Python, 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 Python, 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