

Sohail Zafar

Profile

Electrical Engineering student passionate about data-driven solutions, embedded systems, and machine learning. Skilled in Python, C++, MATLAB, and currently exploring GPU programming with CUDA. A good problem-solving mindset with a balance of independent learning and teamwork. Passionate about working on AI powered systems with software and hardware intergration.

Education

- 2022–2026 **Bachelors of Electrical Engineering in Electronics (Ongoing)**, *Air University*, Islamabad
CGPA: 3.61
- Coursework Digital Signal Processing, Control Systems, Microcontrollers and Microprocessors, Signals and Systems, Digital Logic Design, Object Oriented Programming, Computer Programming
- 2020–2022 **Intermediate, Pre-Engineering**, *Fazaia Degree College, ARF Kamra*, Marks: 932/1100
- 2018–2020 **Matric, Science**, *Fazaia Degree College, ARF Kamra*, Marks: 948/1100

Skills

- Languages C++, Python, MATLAB, LaTeX
- Libraries TensorFlow & Keras (Deep Learning), Scikit-learn (Machine Learning), Pandas, NumPy, Matplotlib, OpenCV (Learning)
- Tools Microcontrollers (PIC & Arduino), KiCad (PCB Designing), Proteus & LTSpice (Simulation),
- Concepts Machine Learning, Deep Learning, GPU Programming, Microcontrollers & Microprocessors Digital Image Processing, Digital Signal Processing, Object Oriented Programming, Electronics Design

Projects

- 2025 **GPU Parallelism, Parallel Computing**, (C++ / CUDA), Learning (In Progress)
Tested large matrix multiplication as part of my FYP in parallel computing, with plans to extend to image processing and deep learning tasks. By optimizing memory and kernel code to reduce latency and get the best GPU througput.
- 05/2025 **Bird Voice Recognition using Machine Learning on DSP Kit**, *Digital Signal Processing*
Developed a real-time bird species recognition system on a DSP board using machine learning. Preprocessed audio, extracted MFCC and other features, and trained a classifier. Optimized and deployed the model in C, tested it with test samples.
- 08/2024 **Handwritten Digit Recognition (TensorFlow)**, *Deep Learning*
Built a digit classification model on MNIST using softmax regression and sigmoid activation. Evaluated model performance with metrics including accuracy and mean squared error.

- 10/2024 **Machine Learning Algorithms from Scratch (C++ & Python)**
Implemented core ML models (linear regression, logistic regression) and gradient descent from scratch in Python, focusing on algorithmic understanding and performance optimization.
- 05/2025 **Design of an Inverted Pendulum, MATLAB, Control Systems**
Modeled an inverted pendulum and derived its equations of motion. Designed and tuned P, PD, and PID controllers using MATLAB to meet time-domain specifications via root locus and step response.
- 10/2024 **Arduino Elementary Trainer, Microcontrollers**
Designed a modular Arduino-based educational trainer to demonstrate embedded systems, robotics, and automation concepts. Integrated LEDs, sensors, motors, and displays with real-time control logic. Gained hands-on experience in microcontroller programming, interfacing, power management, hardware debugging, and PCB design.
- 09/2023 **4 Way Traffic Signals, Digital Logic Design, Microcontrollers**
Designed a 4-way traffic signal system using logic gates and flip-flops, with oscilloscope-generated timing instead of timer ICs. Integrated pedestrian crossing and validated functionality via Proteus and hardware testing. Replicated the system using the 8051 microcontroller (AT89C51) in embedded C for real-time control, applying core Digital Logic Design principles
- 05/2023 **Teachers Portal (C++)**
Developed a CSV-based academic portal in pure C++ to read, analyze, and calculate student grades without third-party libraries. Implemented generic logic to handle variable CSV formats and scale with new data effortlessly.

Hackathons

- 05/2025 **Air ML X, Machine Learning Hackathon**
Problem was on a car parking prediction problem during a hackathon involving a large-scale regression task. Cleaned and preprocessed extensive data from a SQL file using SQLite and regex to extract key information like coordinates. Merged and refined the dataset, then applied Decision Tree Regression. Due to the dataset size and RAM constraints, full model training couldn't complete within the given time.

Certifications

- 01/2025 GPU Programming (Ongoing)
- 07/2024 Machine Learning - Supervised/Unsupervised, Recommenders, Reinforcement Learning
- 04/2024 Python Crash Course - Data Structures, OOP
- 09/2023 Crash Course Electronics and PCB Design
- 08/2023 Arduino Step-by-Step (Beginner to Advanced)
- 09/2023 AI For Everyone - AI Project Workflow, Terminology, Strategy