Abdul Rahman Mohamed Farharth

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Summary

I am a second-year Biomedical Engineering undergraduate with strong interests in biomedical instrumentation,physiological signal processing, and embedded systems for healthcare. I am particularly passionate about machine learning applications in healthcare and wearable health monitoring technologies.

Research Interests: Biomedical instrumentation, digital signal processing, computer vision and pattern recognition, medical image processing, embedded and wearable healthcare systems

Education

- **University of Moratuwa** Feb 2023 – Present
  B.Sc. Engineering (Hons.) in Biomedical Engineering,
  Department of Electronic and Telecommunication Engineering
  - CGPA: 3.79/4.00
  - Grade: First Class
  - Dean's List (Semesters 1 & 2)
  - Expected Graduation: 2028
- **Zahira College, Colombo** 2020 – 2023
  G.C.E Advanced Level Examination
  - 3 As, Island Rank: 407, Z-score: 2.3330
  - Distinction passes in Combined Mathematics, Physics, and Chemistry

Projects

Glove Rejection and Inspection Process (GRIP) Ongoing GitHub

- Developing a real-time computer vision pipeline for industrial glove inspection using Raspberry Pi 5 (group project)
- Implementing detection and classification system to identify glove orientation (left/right) and size (S/M/L/XL) using a custom-trained YOLO-based model
- Processing live conveyor belt video using USB camera and OpenCV for real-time inference and visualization
- Designing logic to detect defective gloves (label smudging and print errors) for automated rejection
- Generating structured JSON output for downstream SCARA robot control and pick-and-place operations

Smart Posture Monitoring Cushion (P.A.P.A.Y.A Project) Jul 2025 GitHub

- Developed a smart posture-correcting cushion using FSR pressure sensors and vibrotactile feedback
- Designed circuit and contributed to embedded implementation using Arduino for real-time posture detection
- Designed ergonomic enclosure using SolidWorks for practical deployment
- Project awarded 2nd Runners-Up at Brainstorm 2025

Large-Scale License Plate Detection with YOLOv11 Mar 2026 GitHub

- Built an end-to-end computer vision system for real-time license plate detection using YOLO11s
- Trained on a dataset of 27,900 images achieving mAP50 of 0.918 and precision of 0.956
- Implemented training pipeline including dataset preparation, configuration, and evaluation
- Deployed real-time inference using OpenCV on GPU hardware (RTX 4050)

Automatic Speaker Recognition System Mar 2026 GitHub

- Contributed to a speaker identification system by implementing FFT-based signal transformation in MATLAB (group project)
- Converted time-domain audio signals into frequency-domain representations for feature extraction
- Supported integration with MFCC-based feature extraction and classification pipeline

Heart Rate Estimation from Noisy PPG using GAN Ongoing GitHub

- Developing a personal project for heart rate estimation from noisy PPG signals
- Implementing signal preprocessing and noise reduction techniques
- Exploring GAN-based denoising prior to peak detection for improved accuracy
- Working towards real-time heart rate estimation and visualization

IoT Smart Energy Meter with MQTT and Alerts Jan 2025 GitHub

- Independently developed an ESP32-based energy monitoring system for real-time electrical parameter measurement
- Integrated PZEM-004T sensor for voltage, current, power, energy, frequency, and power factor acquisition
- Implemented MQTT-based communication and Telegram/SMS alerts for abnormal conditions
- Developed complete embedded firmware including sensor interfacing, communication, and LCD display

Temperature-Controlled Vaccine Cold Chain Monitoring System Nov 2025 GitHub

- Developed a low-cost temperature monitoring system for vaccine transportation (group project)
- Designed transmitter circuit and contributed to system integration and testing
- Designed enclosures for transmitter and receiver units using SolidWorks
- Implemented and validated real-time monitoring and alert mechanisms

Analog Automatic Solar Tracker Dec 2025 GitHub

- Developed a fully analog solar tracking system using LDR-based differential sensing (group project)
- Contributed to sensing and PWM control circuitry using analog components and op-amps
- Designed complete mechanical enclosure using SolidWorks

Skills and Interests

Technical Skills

- Programming: C, C++, Python, MATLAB
- Hardware: Arduino, ESP32, Raspberry Pi
- Frameworks / Tools: Pytorch
- Software: Altium Designer, SOLIDWORKS, LTSpice
- Data Science and AI: NumPy, Pandas, Matplotlib
- Biomedical and Signal Processing: ECG, EMG, EEG, Data Acquisition, Filtering Techniques

Soft Skills

Problem solving, analytical thinking, teamwork, communication skills, time management and adaptability.

Certificates

- Machine Learning Specialization (Coursera) 2025
  - Supervised Machine Learning: Regression and Classification
  - Advanced Learning Algorithms
  - Unsupervised Learning, Recommenders, Reinforcement Learning
- Medical Image Processing (MathWorks) 2025

Achievements

- Awarded 2nd Runners-Up at Brainstorm 2025 for an innovative biomedical engineering project
- Awarded Principal's Gold Medal for Best Performance in the G.C.E. AL Physical Science Stream
- Sri Lanka Mathematics Olympiad Competition 2018 – Distinction Award

Leadership and Volunteering

- IEEE EMBS Student Branch Chapter, University of Moratuwa
  - Finance Lead (Brainstorm 2026) 2025 – Present
  - Social Media Manager 2025 – Present
- IEEE Signal Processing Society Student Branch, University of Moratuwa
  - Social Media Manager 2026 – Present
  - 5-minute Video Clip Event Chair 2026 – Present
- Electronic Club, University of Moratuwa
  - IR Pillar Member 2025 – Present
  - Shuttle Fest 2026 Chairperson 2026
- Department of Electronic and Telecommunication Engineering
  - Department Representative 2025

References

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