Guhan S

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Objective

M.Tech student in Artificial Intelligence Engineering with demonstrated expertise in machine learning, deep learning, and scalable system design. Proficient in Python, advanced algorithms, and distributed computing with hands-on experience building AI-powered applications, recommendation systems, and computer vision solutions. Passionate about leveraging artificial intelligence and data-driven approaches to solve complex engineering problems and build high-performance, scalable software systems.

Education

Amrita School of Engineering **2025-Present**
M.Tech - Artificial Intelligence Engineering *Coimbatore, Tamil Nadu*

Amrita School of Engineering **2021-2025**
B.Tech - Automation and Robotics Engineering *Coimbatore, Tamil Nadu*

- CGPA: 7.48/10

Amrita Vidyalayam **2019-2021**
Higher Secondary Education - CBSE *Coimbatore, Tamil Nadu*

- Stream: Physics, Chemistry, Mathematics, Computer Science
- Score: 415/500 (83%)

Amrita Vidyalayam **2018-2019**
Secondary Education - CBSE *Coimbatore, Tamil Nadu*

- Score: 457/500 (91.4%)
- Leadership: School Pupil Leader

Area of Technical Interest

- **Machine Learning**
- **Computer Vision and Perception**
- **Intelligent Robotics**

Technical Skills

Programming Languages: Python, C++, MATLAB
AI/ML Frameworks: TensorFlow, Scikit-learn, OpenCV, PyTorch
Development Tools: ROS2, Gazebo, Git, Flask, Docker, Linux
Cloud & Infrastructure: AWS (EC2, Lambda, S3, SageMaker), Microservices
Technical Domains: Machine Learning, Computer Vision, SLAM, Autonomous Systems
Hardware & Integration: Pixhawk Flight Controllers, Raspberry Pi, Jetson Orin Nano
Leadership Skills: Team Management, Project Coordination, Problem Solving

Experience

Moto Amrita - MotoStudent Competition Team **Dec 2023 – Feb 2025**
Powertrain Lead *Coimbatore, Tamil Nadu*

- Led powertrain system design and development for FMAE MotoStudent India competition vehicles, managing both electric and internal combustion engine categories
- Engineered a custom 5-liter fuel tank optimizing weight distribution and aerodynamics, achieving 5% performance improvement in fuel efficiency and lap times
- Developed battery cooling solutions and test bench systems for performance validation, enhancing efficiency and reliability testing capabilities

Amrita School of Engineering **Summer 2024**
Research Intern - Autonomous Systems *Coimbatore, Tamil Nadu*

- Designed autonomous UAV system for SAE Aerothon 2024 competition with real-time navigation algorithms and precision target detection capabilities
- Integrated Pixhawk 6X flight controller with Raspberry Pi 4, implementing computer vision algorithms for object detection and tracking
- Achieved successful autonomous navigation and target acquisition with 95% accuracy through extensive simulation and testing

Projects

Multi-Agent AgriTech Platform for Indian Farmers | *AWS, Python, Flask*

- Architected cloud-native multi-agent system on AWS integrating weather forecasting, crop advisory, market intelligence, and pest detection agents serving Indian farmers
- Deployed scalable microservices architecture using AWS EC2, Lambda, and S3 with ML models achieving 92% accuracy in crop disease identification

3D Object Classification using ShapeNet | *PyTorch, PointNet, Deep Learning*

- Implemented deep learning architecture for 3D point cloud classification using ShapeNet dataset with multiple object categories
- Developed PointNet-based neural network achieving high classification accuracy on 3D geometric data for object recognition tasks

Car Collision Avoidance System | *Arduino Uno, HR-SR04 Sensor*

- Designed an innovative collision avoidance system for automobiles, incorporating cutting-edge sensor technologies to detect obstacles and prevent collisions

Autonomous Drone for Cotton Crop Health Monitoring | *Pixhawk 6X, Jetson Orin Nano*

- Developed an autonomous drone system capable of detecting and localizing nutrient deficiencies in cotton crops
- Utilized advanced sensors and image processing techniques to provide farmers with real-time insights for enhanced crop management and improved yield

Li-Ion Battery RUL Prediction Model | *Python, SciPy, NumPy*

- Built a model to predict the Remaining Useful Life (RUL) of lithium-ion batteries using machine learning algorithms

2D SDF SLAM in ROS 2 | *ROS2, Gazebo, Extended Kalman Filter, C++*

- Architected robust SLAM system using Signed Distance Field representation with Extended Kalman Filter for sensor fusion
- Integrated multi-sensor data (LiDAR, IMU, odometry) reducing memory footprint by 60% vs traditional occupancy grids

PLC-Based Smart Conveyor Sorting System | *PLC, Sensors, Actuators, Ladder Logic*

- Developed an automated conveyor system utilizing Programmable Logic Controllers (PLC) to sort products based on predefined criteria such as size, weight, or color
- Integrated sensors to detect product attributes and actuators to divert items accordingly, enhancing sorting efficiency and accuracy

Publications

Real-Time Vibration Isolation Strategies for Vision-Based Agricultural Drones Using Optical Flow and Spectral Analysis - Developed two-stage vibration dampers achieving 88% reduction in peak vibration amplitude and improving YOLOv10s detection accuracy from 35.5% to 88.5% mAP@50 for nutrient deficiency identification in cotton crops. Evaluated five mounting configurations using Lucas-Kanade optical flow and FFT spectral analysis through real-world flight testing. DOI: 10.55041/IJSREM53258

Drone-Based Cotton Plant Health Dataset - Contributed annotated aerial imagery dataset to IEEE DataPort for binary classification of cotton plant health status, supporting machine learning research in precision agriculture and computer vision applications. Available at: IEEE DataPort

Achievements and Contributions

AIR 01 in FMAE MotoStudent 2024 (EV category)

AIR 7747 in GATE DA 2025

Member, SAE India

Pre-finalist, ThingQbator Cohort 6 (Innovation Program)

Second runner-up, Amrita National Science Olympiad 2019

Runner-up, Glider and Bridge Building, Tempestas 2023

Captain, Amrita Aquatics; Individual Champion, Inter-University Swimming Meet 2023

Member, Tamil Nadu State Junior Water Polo Team (2019); Participant, All India Inter-University Games 2023