Madhav Lodha

Worcester, MA | madhavlodha2503@gmail.com | linkedin.com/in/madhavlodha/ | https://madhavlodha.com/

EDUCATION

Worcester Polytechnic Institute **Expected Graduation: May 2027**

Bachelor of Science in Robotics Engineering & Computer Science

Relevant Coursework: Data Struct & Algos, Operating Systems, Software Engineering, Intro to Robotics, Embedded Systems

EXPERIENCE

Embedded Systems and Software Intern | Liger Mobility | Mumbai, India **May 2024 – July 2024**

- Developed a Flutter-based **scooter testing app** with Firebase, capturing **1.7M+** weekly data points from 20+ test riders, enabling real-time analytics and performance insights.
- Integrated a Bluetooth module into the Liger Scooter for real-time data transmission, **reducing errors by 90%** with cyclic redundancy checks and **compressing data by 60%** using run-length encoding.
- Designed an **electrically assisted steering system** using a PID-controlled motor with an encoder, reducing rider effort by 90% and enhancing precise control for sharp turns.
- Optimized scooter teleoperation via AWS IoT Core and a web dashboard, **reducing steering latency** from 500ms to 50ms.
- Prototyped a Raspberry Pi-based Flask server with OpenOCD, **cutting wireless software update** times from 10s to 1s.

Test Design Engineer | Ayurythm | Bangalore, India **April 2022 – July 2022**

- Crafted a health sensor testing platform for 30 developers, enabling **real-time algorithm testing** and data collection, which improved performance for over **750,000 app users**.
- Designed a compact PCB with sensors, microcontroller, and display using Altium Designer, and created a small 3D-printed chassis—**reducing costs by 40%** compared to V1.
- Programmed Arduino functions with **Kalman Filter signal processing** to enhance the accuracy of heart rate and oxygen sensor data, enabling developers to rapidly integrate these improvements into their algorithms.

LEADERSHIP & COMPETITIONS

University of Massachusetts Hackathon | Programmer | *(~24 Hours)* **November 2024**

2nd Place Finish out of 500+ Participants

- *Problem Addressed:* Traditional games lack adaptability, requiring AI-driven, self-evolving gameplay to make it interesting.
- Launched Tomo, a Space Invaders-inspired game featuring a **self-evolving LLM-driven codebase** and 3D hand-tracking controls using computer vision, achieving 99.7% grip strength accuracy for adaptive shooting.

MATE ROV Competition | CEO/Team Leader | *(~180 Hours)* **July 2021 - June 2022**

2nd Place Overall Among 200 Teams and 1st Place in Engineering Presentation

- Led a team of **15** to build an underwater robot for **cable repair** and **marine surveying** in two months, integrating modular components, waterproof systems, and custom electronics.
- Directed software development using Ardupilot, implementing **color grading, contour detection**, and a fish vitality model with **YOLO v5 and OpenCV**.
- Overhauled robot architecture to **increase reliability by 80%**, incorporating a Raspberry Pi, optimizing wiring, and creating a modular housing to significantly reduce downtime.

In Code We Trust & Owl Hacks | Programmer/Designer | *(~24 Hours)* **June 2021**

Won 1st place (€1000) at "Code We Trust" and Best Executed Hack ($50) at "Owl Hack."

- *Problem Addressed:* Poor fridge organization causes food waste and expired groceries, requiring automated tracking.
- Built an **AI-powered fridge management system** using TensorFlow, OpenCV, and COCO model, achieving **98% accuracy**.
- Developed a Flutter app with Firebase for **expiry tracking & recipe suggestions** and engineered a 3D-printed frame with embedded magnets for easy installation.

FIRST Robotics Competition | Team Leader/CAD | *(~ 350 Hours)* **October 2019 - May 2021**

Dean's List Semi-Finalist; Innovation Challenge Semi-Finalist; Rookie Game Changer among 200+ participants

- Led a CAD team of 10 to design a 6-wheel-drive, hooded shooter robot, evolving from a 50kg-capacity scissor lift to **a 90kg-capacity** spring-loaded **telescoping lift**.
- Implemented autonomous navigation with encoders and an OpenCV targeting system, achieving 80% shooting accuracy.

TECHNICAL SKILLS

Software/Tools: Python, C/C++, MATLAB, Git, Docker, OpenOCD, AWS, STM32, Raspberry Pi, ESP32, Flutter, Firebase, Flask

Frameworks and Libraries: TensorFlow, YOLO, OpenCV, Arduino, REST APIs, PID Control, Signal Processing, IMUs