

# Madhav Lodha

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## 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

- Delivered 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 Intern | Ayurhythm | 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**.
- Constructed 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

### MATE ROV Competition | CEO/Team Leader | (~180 Hours)

July 2021 - June 2022

#### 2<sup>nd</sup> Place Overall Among 200 Teams and 1<sup>st</sup> 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.

### Together 4 Good Challenge | Team Leader | (~60 Hours)

November 2021 - December 2021

#### Demonstrated project impact to over 300+ exhibition attendees

- Engineered cost-effective micro audio playback tags (**PCB Designed**) for the visually impaired to identify objects and message family, enabling a community member to **live independently** with over 400 monthly uses.

### 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**.
- Deployed 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

**Design and Prototyping:** Fusion 360, SolidWorks, Keyshot, 3D Printing, CNC, Sheet Metal, FEM/FEA, Altium, ANSYS