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, Statics, Embedded Systems, Intro to Robotics, Software Eng

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.

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.

Product Design Engineer | Design Flyover | Mumbai, India **September 2021 – October 2021**

- Upgraded Vitrum India's window lock using Fusion 360 and FEA, integrating a `pinion` mechanism with telescoping rods to create a robust snap-fit solution that **prevents window shattering**.
- Rapidly prototyped the design in 3 weeks using 3D printing, applied DFM principles to **reduce costs by 15%**, and presented findings to company founders.

LEADERSHIP & COMPETITIONS

Singapore Flying Challenge | Team Leader/CAD Specialist **|** *(~40 Hours)* **August 2022 - September 2022**

3rd Place Competition Finish

- Engineered a lightweight, stable, and maneuverable indoor RC plane with an easy-to-repair bi-wing structure, using Fusion 360's generative design and ANSYS Fluent simulations.

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.
- Overhauled robot architecture to **increase reliability by 80%**, incorporating a Raspberry Pi, optimizing wiring, and creating a modular housing to significantly reduce downtime.
- Designed a **rotatable claw** with high-torque servos and CNC-machined parts, and developed a six-thruster propulsion system for complex underwater maneuvers.

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.

DIY Ventilator | Personal Project **|** *(~ 80 Hours)* **June 2020 - July 2020**

- Developed a low-cost, 3D-printed ventilator with a motorized Ambu-Bag mechanism for rapid manufacturing and deployment during **critical COVID-19 situations**.
- Prototyped a ventilator with adjustable airflow and oxygen levels, integrating temperature and humidity sensors for data logging, and **implemented a Raspberry Pi server** for hospitals to monitor performance.

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