

Mukul Yadav

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Professional Summary

Mechatronics engineer specializing in robotics, UAVs, and embedded systems, with industry experience at Tata Motors and a research internship at IISc Bangalore. Skilled at integrating hardware and software through hands-on design, control systems, and PCB development. Passionate about advancing intelligent robotic platforms, focusing on UAV vision reliability and physical AI research. Experienced in leading product development, embedded systems programming, and cross-functional collaboration to drive innovation and performance.

Education

Manipal Institute of Technology, B.Tech in Mechatronics July 2019 – July 2023

- GPA: 8.75/10
- Batch Rank: 15/104
- Minor: Robotics and Automation
- Relevant Coursework: Microcontroller Based System Design, Linear Control Theory, Electric Drives, Robot Dynamics and Control, Artificial Intelligence, Robot Path Planning and Mobile Robots, Soft Robotics
- Bachelor's Thesis: Implementing Sensor Fusion On a Custom Flight Controller

Jayshree Periwal High School (Physics, Chemistry, Math) April 2017 – April 2019

- Grade 12 CBSE Board Exams: 82%

Professional Experience

Independent Research/Freelance Contributor, Open Horizon Robotics – Remote June 2025 – Present
[\[Website\]](#)

- Authoring open-source robotics education projects ([Embedded Systems From Source](#)).
- Engaging in advanced study and preparation for graduate-level research in robotics and mechatronics engineering. Presently conducting research in aerial robotics and computer vision.

Senior Manager - Product Development, Tata Motors – Pune, India July 2024 – June 2025

Graduate Engineer Trainee - Product Development, Tata Motors – Pune, India July 2023 – July 2024
[\[Website\]](#)

- Supported the engineering, design and manufacturing teams in end-to-end product development, bridging design, manufacturing, and customer-focused engineering improvements.
- Contributed to the productionization of Nexon at TPDM's Sanand plant, engaging in beta build troubleshooting, on-ground quality assessments, and test vehicle dispatch coordination.
- Managed the implementation of the FE/E20 fuel pack for the Tiago/Tigor MY25 refresh, ensuring integration of new subsystems and compliance with evolving standards.
- Conducted nationwide product surveys, synthesizing user insights and field data into actionable design and performance feedback for engineering teams.
- Drove cost optimization, re-varianting, and feature package strategies, balancing manufacturability, performance, and customer needs in large-scale vehicle programs.

Research Intern, Artificial Intelligence & Robotics Laboratory, IISc Bangalore December 2022 – April 2023
[\[Website\]](#)

- Developed custom STM32-based UAV flight controllers, including PCB design and ESP32 firmware, implementing PPM signal decoding and closed-loop PID motor control.
- Advanced UAV perception by integrating LiDAR and IMU sensors, designing complementary filters for robust roll and pitch estimation in flight.

- Executed sensor integration experiments by interpreting datasheets/reference manuals, enabling activation and calibration of commercial LiDAR modules for autonomous navigation.
- Designed and prototyped UAV augmentations (landing gear, camera fixtures) with Fusion 360 and 3D printing, enhancing modularity and test capabilities.
- Investigated embedded systems reliability through experiments on GPS, SD logging, and RTOS; results were documented and maintained in an internal GitHub repository.

Publications

Aerodock (A Smart, Autonomous Charging and Docking Station for Unmanned Aerial Vehicles) March 2022

Laaboni Mukerjee, *Mukul Yadav*, Amit Choraria, Atharv Tendolkar, Arjun Hariharan, M M Manohara Pai
[10.1088/1742-6596/2161/1/012058](https://doi.org/10.1088/1742-6596/2161/1/012058)

Projects

Embedded Systems From Source [\[GitHub\]](#)

- Authored a guided GitHub course on STM32 Discovery covering interrupts, UART, SPI, I²C, and ADC experiments.
- Tools Used: STM32 Discovery, STM32CubeIDE, C, GitHub.

MAVROS Quadcopter [\[Webpage\]](#)

- Built and flown a PX4-based quadcopter with onboard Raspberry Pi as flight computer, integrating MAVROS for ROS-based autonomy.
- Tools Used: PX4, ROS, MAVROS, Raspberry Pi, GPS, telemetry radio, Mission Planner.

Mini Injection Molding Machine [\[Webpage\]](#)

- Developed the mechatronic system for a 5-ton molding machine with NEMA 34 steppers, PID temperature control, and PySimpleGUI interface.
- Tools Used: Raspberry Pi, Arduino, PySimpleGUI, stepper drivers, thermocouples, Fusion 360.

Intelligent Unmanned Ground Vehicle (IUGV) [\[Webpage\]](#)

- Built an autonomous UGV with Intel RealSense on a stepper gimbal and Raspberry Pi + Arduino control pipeline.
- Tools Used: Raspberry Pi, Intel RealSense, Arduino, L293D, Python (OpenCV), stepper drivers.

Additional Education

BITS Pilani Hyderabad, M.Tech in AI/ML (Work Integrated, Company Sponsored) October 2024 – March 2025

- Gained exposure to foundational AI/ML concepts including supervised learning, deep learning frameworks, and data-driven model evaluation.
- Discontinued to realign focus toward full-time graduate research in robotics and mechatronics, aligning academic efforts with long-term goals.

Skills

Robotics & Control: ROS, MAVROS, Robot Path Planning • **Embedded Systems:** STM32, UAV Flight Controllers, Sensor Fusion • **Simulation/Design:** Fusion, SolidWorks, MATLAB

Additional Roles

[RoboManipal \(Electronics & Motor Control\)](#) • [Allskier Solutions \(IoT Prototypes & Aerodock\)](#) • [NEXAMS \(Injection Molding Machine\)](#) • [IE MCT Student Chapter \(Mentorship & Projects\)](#)

Awards and Honors

Semi-Finalist, eYRC 2022-23 • 1st Place, Disenyo PCB Challenge • Winner, MIT Ideation Competition • Received multiple certificates of appreciation from Tata Motors leadership. ([Portfolio Link](#))