

SHATAYU AVINASH MEHTA

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PROFESSIONAL SUMMARY

Master of Science in Robotics candidate with hands-on experience in the end-to-end design, prototyping, and testing of autonomous aerial vehicles. Proficient in Python, C++, Computer Vision (OpenCV), and Machine Learning for developing complex robotic systems. Seeking to apply integrated skills in hardware, software, and control systems to solve challenging robotics engineering problems.

EDUCATION

University of Minnesota Twin Cities- Master of Science in Robotics Technology. GPA: 3.5/4 Sept. 2024-May 2026
Relevant Coursework: Robotics, Principles Wearable Technology, Machine Learning, Robot Vision, Linear Control Systems, Deep Learning, Optimal Estimation, Introduction to Nonlinear Optimization with ML & AI.

K.J. Somaia College of Engineering- BTech in Mechanical Engineering. GPA: 3.4/4 July. 2018-May 2022

TECHNICAL SKILLS

- CAD & Design: SolidWorks, Fusion 360, AutoCAD, ANSYS, Rapid Prototyping, CREO, ANSYS fluent & workbench, CURA, Prusa Slicer, chitubox, XFLR5, E-calc, AutoCAD, Design verification.
- Programming & Software: Python, PyTorch, C, C++ , TensorFlow, MATLAB, Docker container, Arduino IDE, RoboDK, Mujoco, Gazebo, Linux, mavSDK.
- Fundamentals: Computer Vision, Machine Learning, convolutional neural networks Robot Manipulation, Feedback Control, CNC Milling, Laser Cutting, Fundamentals of Design, FEA, Stereo Vision, PID control, Digital Control, Visual Servoing, Reinforcement learning, Deep learning, forward & Inverse Kinematics, Mechanical Sensing, Biometric sensing, Sewing & Soft Goods, E-textile Fabrication, GD&T.
- Hardware: Arduino, Raspberry Pi, Ardupilot, UR5e Cobot, px4.

EXPERIENCE

Research & Development Engineer- Indrones Solution PVT. LTD. Nov. 2022 –Nov. 2023

- Spearheaded FUJIN VTOL project from inception to testing of second prototype. Established a streamlined process for manufacturing of the VTOL aircraft reducing the time from prototype design to completion by 1.5 weeks.
- Engineering a Prototyping solution for EPP foam machining, reducing the manufacturing costs by 10%. Achieved optimized aerodynamic calculations, improving the coefficient of lift from MVP stage to near-prototype values, reaching 0.428 for enhanced aircraft performance.
- Evaluated and tested powerhouse options using E-CALC for both VTOL and UAVs achieving a Time-of-flight increase by 25% for FUJIN VTOL, also established parameters for the aircraft prior to testing. Conducted aircraft testing and refined aerodynamics, and design based on results using XFLR5 and ANSYS fluent and analyzed flight data to document the design improvements.

Team Onyx India | Design team Lead

May.2019–August.2021

- Fronted the design team for TEAM ONYX INDIA in SAE Aero Design 2021. Fostered and advised the design team during SAE Aero design 2022.
- Developed a self-gliding aircraft with a wingspan of 30cm that automatically landed after being dropped from the mothership, utilizing a flight controller for autonomous landing. Conducted market research and testing to identify flexible, durable, and cost-efficient alternatives to Aero ply, reducing material costs by 45%.

PROJECTS

1. Wearable Ring Mouse Device Development

(Arduino, 3D printing, Sensor Integration, Python)

- Developed a wearable ring mouse using an Arduino Nano 33 BLE Sense Rev2, enabling click, cursor movement (swipe-to-tab), and scroll functionalities. Engineered the device with a push button for clicks, IMUs for swipe gestures, and Hall effect sensors with magnets for scrolling.
- Created firmware (Wearable Mouse Controller.ino) to process sensor data and send BLE messages, and a Python script (wearable mouse receiver.py) to interpret messages and execute actions using pynput. Designed and 3D-printed custom PLA ring and wrist modules to house components, including a 3.7V LiPo battery and step-up converter; assembled and wired components using Vectran-based conductive thread and sewing techniques for the wrist strap.
- Conducted user testing with 3 volunteers, achieving an average System Usability Scale (SUS) score of 35.67, indicating ease of use.

2. Computer vision based tool sorting and flashlight assembly

(UR5 Cobot, OpenCV, Tensorflow, python, RoboDK)

- Developed a Python program to enable a UR5 robot to identify and sort tools into designated bins whose locations were dynamically estimated at runtime. Implemented computer vision techniques using OpenCV and its ArUco module for 6DoF pose estimation of tool bins. Trained and deployed a Convolutional Neural Network (CNN) using TensorFlow/Keras for tool identification from images captured by a Robotiq Wrist Camera.
- Integrated control of the UR5 arm (via RoboDK API), Robotiq Gripper (via Python library and Modbus), and camera image processing within a unified Python script. Programmed pick-and-place operations, applying homogeneous transformations for precise tool handling and camera positioning, simulated in RoboDK.
- Utilized Object-Oriented Programming (OOP) principles and developed custom modules within an Anaconda environment.
- Integrated and controlled a pneumatic chuck (via custom post-processor and URScript commands) to hold flashlight components during assembly, ensuring safe operation with a photoelectric sensor to detect part presence.
- Developed pick-and-place sequences for all parts, including endcap rotation and placement onto a 3D-printed pedestal, and precise battery insertion considering polarity.
- Implemented a screwing operation to attach the endcap to the flashlight head, utilizing custom code for initial rotations and a provided tighten torque() function (monitoring the Robotiq Force Torque sensor) to achieve a specified 2Nm torque.

3. Real-Time 3D Reconstruction with Custom Stereo Camera and OpenCV

(Raspberry Pi, Stereo Camera, OpenCV, SGBM)

- Designed and tested a custom stereo camera using Raspberry pi zero 2W and Arduino camera module 3. Implemented a Stereo camera-based 3D reconstruction system to generate 3D models of real world environment in real time within a acceptable time of 3 milliseconds.
- Calibrated the camera using checkerboard patterns using OpenCV with a 0.2 RMSE Error. Developed Disparity maps using Semi-global Block Matching(SGBM) for depth estimation.
- Utilized Open3D library to create 3D reconstruction from Depth Data.