SHATAYU AVINASH MEHTA

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Summary

Robotics Engineer (M.S.) with a Mechanical Engineering background focused on the complete hardware life-cycle from CAD and analysis to hands-on prototyping, systems integration, and field-ready validation. I actively pursue the challenge of turning complex concepts into tangible, working hardware and robust robotic components.

Education

University of Minnesota Twin Cities **Sept. 2024-May 2026**
Master of Science in Robotics Technology. GPA: 3.5/4
Relevant Coursework: Robotics, Principles Wearable Technology, Machine Learning, Robot Vision, Linear Control Systems, Deep Learning, Computer Vision.

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

Technical Skills

CAD & Analysis Software: SolidWorks, ANSYS (Fluent & Workbench), SolidWorks Simulation, CREO, AutoCAD, XFLR5.

Design & Manufacturing Principles: Finite Element Analysis (FEA), Thermal Design & Analysis, Computational Fluid Dynamics (CFD), Design for Manufacturability (DFM), Design Failure Mode and Effect Analysis (DFMEA), Geometric Dimensioning & Tolerancing (GD&T), Bill of Materials (BOM), Rapid Prototyping (CNC, 3D Printing, Laser Cutting)

Programming & Software: Python, PyTorch, C, C++, TensorFlow, MATLAB, Docker container, Arduino IDE, RoboDK, Mujoco, Gazebo, Linux, mavSDK, ISSAC SIM, DJI OSDK, Mission Planner, QGroundcontrol.

Fundamentals: ROS2, Computer Vision, Machine Learning, convolutional neural networks Robot Manipulation, Feedback Control, 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.

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.
- Collaborated with the production team, applying Design for Manufacturability (DFM) principles to transition prototype systems into manufacturing, reducing assembly time by 1.5 weeks.
- Engineered and implemented a prototyping solution for EPP foam machining, successfully reducing manufacturing costs by 10%.
- 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.
- Designed and prototyped components (SOLIDWORKS, FUSION 300), trained manufacturing staff on 3D printing, and refined aerodynamics using CFD (ANSYS Fluent) and flight data (XFLR5, Mission Planner) to improve coefficient of lift to 0.428.

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.
- Engineered a self-gliding aircraft with a wingspan of 30cm that automatically landed after being dropped from the mother ship, with a flight controller for autonomous landing.
- Executed market research and testing to identify flexible, durable, and cost-efficient alternatives to Aero ply, reducing material costs by 45%.

Projects

Wearable Ring Mouse Development (Arduino, 3D printing, Sensor Integration, Python)

- Architected a wearable ring mouse powered by an Arduino Nano 33 BLE Sense Rev2, engineering the device with a push button for clicks, IMUs for swipe gestures (swipe-to-tab), and Hall effect sensors 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.
- Fabricated and 3D-printed purpose-built PLA modules, then assembled and wired the components (LiPo battery, step-up converter) with Vectran-based conductive thread and sewing techniques.
- Validated user testing with 3 volunteers, achieving an average System Usability Scale (SUS) score of 35.67, indicating ease of use.

Computer vision-based tool sorting and flashlight assembly (UR5 Cobot, OpenCV, Tensorflow, python, RoboDK)

- Built a full system for a UR5 Cobot to identify tools with a CNN (TensorFlow) and sort them into bins via OpenCV (ArUco markers) for 6DoF pose estimation.
- Specified and integrated purpose-built hardware, including a pneumatic chuck and 3D-printed pedestals, for a multi-step flashlight assembly task.
- Programmed the complete pick-and-place sequence, integrating the UR5, Robotiq Gripper, and force-torque sensors to achieve a specified 2Nm tightening torque.

Real-Time 3D Reconstruction with Custom Stereo Camera and OpenCV (Raspberry Pi, Stereo Camera, OpenCV, SGBM)

- Conceptualized and prototyped a custom stereo camera system using a Raspberry Pi Zero 2W and Arduino camera modules.
- Implemented a real-time 3D reconstruction pipeline with OpenCV, calibrating the system and generating depth maps (SGBM) to create 3D models.