

# JITESH SONKUSARE

 Danvers, MA

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## EXPERIENCE

### forREAL, inc, Danvers, MA

Robotics Software Engineer - **2 PATENTS**

April 2025 - Dec 2025

- Built a unified 3D reconstruction pipeline based on **graph-based multi-sensor SLAM**, fusing RGB (1x, 0.5x), LiDAR, and IMU to produce globally consistent state estimation and real-time mesh reconstruction, while generating Gaussian Splatting virtual tours and RoomPlan-based 3D layouts and 2D floor plans in parallel
- Implemented a spatial anchoring pipeline that lifts 2D semantic detections into 3D by combining multi-view segmentation and masking with sparse-point back-projection, enabling reliable object localization without relying on ARKit depth
- Developed a **motion planning** system over a continuous 3D reconstructed scene (Gaussian Splatting), leveraging graph-based planning strategies- RRT/PRM to generate smooth, geometry-aware, collision-free trajectories
- Designed LLM, VLM-powered AI agents** for scene understanding, task automation, and content generation, including on-device optimization via quantization for efficient inference pipelines, enabling fine-grained unit understanding and presentation that is typically unavailable on large-scale listing platforms such as Zillow or Apartments.com

### Field Robotics Lab - Institute for Experimental Robotics, Boston, MA

Jan 2025 - April 2025

Graduate Robotics Researcher - UAV

- Designed and deployed in python an autonomous UAV supporting real-time **perception, obstacle avoidance, motion planning**, and closed-loop control, initially validated in **Isaac Sim** and later verified through real-world flight tests
- Integrated an autonomous UAV system using an ARKv6X flight controller and Jetson Orin Nano (Boson-22 carrier), incorporating ESCs, ArkFlow, GPS, telemetry radio, Nomad transmitter-receiver, power distribution, and secondary Wi-Fi, with a ROS 2-based onboard software stack enabling real-time perception, autonomy, and sensor processing

### Noah Medical, Pleasanton, CA

Jan - Aug 2024

Robotics Software and Controls Co-op - Research and Innovation - **1 PATENT**

- Project 1 - Augmented Reality System:** Developed AR in C++ and Python for autonomous robot guidance, integrating real-time camera and raw sensor data for virtual marker placement, improving surgical precision and product safety
- Project 2 - IMU-based Shape Sensing:** Build a high-precision shape estimation exoskeleton for Bronchoscope in C++ and Python using IMUs as control points for cubic spline interpolation thereby improving the current system by replacing expensive optical sensors with IMUs, resulting in cost savings of several **hundred thousand dollars** for the company
- Project 3 - Object Recognition using Computer Vision and Deep Learning:** Developed bronchoscope tip detection and angle estimation using color segmentation and deep learning in real-time, improving surgical precision and replacing costly EM sensors, leading to significant cost savings

## TECHNICAL SKILLS

**Languages:** Python, C++ (Data Structures and Algorithms, Solved 500+ Problems of Leetcode), C, XML, Swift

**Developer Tools:** ROS, ROS2, RViz, Docker, Simulation Softwares-(Isaac Sim, Gazebo, V-rep, MATLAB, Simulink)

**Algorithms:** SLAM (VSlam, Lidar Slam, RGBD Slam), Path/Motion Planning- (RRT\*, PRM), RL Algorithms

**Hardware Skills:** IMU, GPS, RTK GPS, Lidar, Cameras, Jetson Nano, Jetson Orin, Raspberry Pi, Arduino, ESP-32

## PROJECTS

### Sensor Fusion-Based Vehicle Localization System, Northeastern University, Boston, MA

Dec - Dec 2022

- Designed and implemented a sensor fusion system using an Extended Kalman Filter (EKF) to estimate vehicle trajectory by fusing GPS, RTK-GPS, and IMU data. Developed modular **ROS2** sensor processing modules in Python for each sensor and used MATLAB to analyze dead reckoning and velocity estimation to improve navigation during GPS outages

### Autonomous Mobile Robot for Disaster Management, Northeastern University, Boston, MA

Jan - April 2023

- Utilized Cartographer\_ROS, move\_base, explore\_lite, RViz and **ROS2** in python for SLAM, motion planning, obstacle avoidance, and feature extraction for empowering TurtleBot3 (Raspberry Pi, camera, and Lidar on-board) to navigate unexplored environments autonomously, create comprehensive maps, and precisely locate AprilTags (simulate victims)

### Quadruped, Veermata Jijabai Technological Institute, India

May - Aug 2019

- Led a 3-member team to design and build an autonomous quadrupedal robot using C++ and **ROS** on Jetson Nano and Raspberry Pi; implemented creep and trot gait controllers and 3-DOF leg kinematics for odometry, validated in **V-REP + Gazebo** and replicated on hardware, achieving 50% improvement in locomotion accuracy

## EDUCATION

### Northeastern University, Boston, MA

Sept 2022 - Dec 2024

Master of Science in Robotics, **GPA 4.0/4.0**

**Courses** - Advanced Computer Vision, Autonomous Field Robotics, Reinforcement Learning, Foundations of Artificial Intelligence, Robot Sensing and Navigation, Mobile Robotics, Robot Mechanics and Control, Legged Robotics

### Veermata Jijabai Technological Institute, Mumbai, India

Aug 2018 - May 2022

Bachelor of Technology in Electrical Engineering, **CGPA 9.12/10**, **Rank- 5/75**