Saikiran Juttu

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Education

Northeastern University, Boston, MA Dec 2025
Master of Science in Robotics — GPA: 3.98/4.0
Relevant Coursework: Pattern Recognition and Computer Vision, Control Systems, Robotics Sensing and Navigation, Mobile Robotics, Autonomous Field Robotics, Robot Mechanics and Control, Reinforcement Learning

Dr. B.R. Ambedkar National Institute of Technology, Jalandhar, India May 2020
Bachelor of Technology in Mechanical Engineering
Relevant Coursework: Mechatronics, CAD, Material Science, Industrial Automation, Machine Design, Operations Research, Electronics

Skills

- **Languages**: C++, Python, C
- **Tools**: MATLAB, Simulink, ROS/ROS2, Linux, Gazebo, MuJoCo, Git, SOLIDWORKS, CATIA, CAD, Gymnasium, ArduPilot
- **Libraries & Frameworks**: OpenCV, NumPy, PyTorch, PCL, TensorFlow, AWS
- **Hardware Proficiencies**: 3D Printing, PCB Designing, Hardware Testing, Arduino Uno, Raspberry Pi, Jetson, PLC Programming

Experience

Graduate Research Assistant, Northeastern University — Boston, MA Jan 2024 – Present
- Engineered MATLAB-based control algorithms for robotic arms, integrating camera-based object detection to plan and execute precise, collision-free manipulation.
- Refined path planning algorithms and deployed EKF and map merging techniques for seamless multi-robot exploration.
- Integrated energy-constrained UAVs and UGVs as mobile charging stations to facilitate prolonged surveillance missions.

Design Engineer, Technip Energies — Noida, India Feb 2021 – Jul 2023
- Designed and streamlined piping systems for process plants, ensuring operational efficiency, safety, and regulatory compliance.
- Pioneered a Load Monitoring System with predictive analytics, reducing unplanned downtime and enhancing maintenance schedules.
- Developed remote-controlled surveillance robots, facilitating real-time fault detection in hazardous areas.
- Spearheaded RPA-based workflow automation, collaborating with stakeholders to reduce operational man-hours by 4%.

Product Development Intern, Robic Rufarm India Pvt Ltd — Hyderabad, India Jun 2019 – Aug 2019
- Headed team in building an automated device for measurement of edge band tape lengths, using Rotary encoders and Arduino Uno.
- Designed "Camaron," a water pH sensing product for pisciculture, enabling data analysis to enhance aquatic farming practices.

Projects

Photo Mosaicking of Low-Contrast Underwater Images — OpenCV, Python, GTSAM
- Developed a robust image registration pipeline using SIFT, RANSAC, and Levenberg-Marquardt algorithms, enabling accurate feature matching and homography estimation for low-contrast underwater datasets.
- Constructed and optimized factor graphs in GTSAM to detect loop closure, improve odometry accuracy, and refine covariance estimates.

Sparse 3D Reconstruction and Bundle Adjustment — Python, OpenCV, GTSAM
- Built a custom pipeline consisting of algorithms to compute Fundamental and Essential Matrices, triangulate 3D points using Epipolar Geometry, solve Perspective-n-Point (PnP) problems, and perform Bundle Adjustment for sparse reconstruction.
- Performed bundle adjustment on 3D points and camera positions using GTSAM, improving accuracy and optimizing camera poses.

Automated Insect Leg Labeling — C++, OpenCV, Python, PyTorch
- Developed an automated labeling pipeline for insect legs using image processing, feature detection, and clustering within DeepLabCut.
- Reduced labeling time by over 70% while maintaining high precision and accuracy, accelerating data preparation for research.

Pattern Recognition and Computer Vision — C++, OpenCV, Python, PyTorch
- Developed a real-time 2D object recognition system, evaluated performance, and implemented KNN matching for improved accuracy.
- Built a high-accuracy CNN for digit recognition and enhanced performance on Greek letter recognition through transfer learning.

Sensor Integration and Navigation — Python, ROS, NumPy, MATLAB, Linux
- Programmed ROS drivers for RTK-GPS, VectorNav IMU sensors, enhancing navigation accuracy and reliability in robotic systems.
- Implemented sensor fusion of IMU/GPS for dead reckoning, applying calibration, filtering, and trajectory analysis against ground truth.

Semantic and Geometric SLAM — Python, ROS, Gazebo, C++, OpenCV, PyTorch
- Implemented SG-SLAM algorithm, integrating object detection, semantic mapping, and dynamic feature rejection strategies.
- Evaluated the performance of SG-SLAM on TUM-RGB-D and Bonn RGB-D datasets, achieving significant improvements over ORB-SLAM2.