Tejaswini Dilip Deore

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EDUCATION

Master of Science in Robotics, Computer Science Concentration Dec 2024
Northeastern University, Boston, MA **GPA**: 4.0/4.0
Courses: Robotic Sensing and Navigation, Computer Vision, Reinforcement Learning, Artificial Intelligence

Bachelor of Technology in Electronics and Telecommunication Nov 2020
Cummins College of Engineering, Pune, India **GPA:** 8.89/10

TECHNICAL SKILLS

Programming: C++, Python

Robotics Stack: ROS/ROS2, OpenCV, PyTorch, PCL, SLAM, Visual Odometry, Sensor Fusion

Tools: Git, Ubuntu, Docker, Gazebo (basic), Rviz

PROJECTS

Open Vocabulary 3D Scene Understanding Dec 2024

- Developed a pipeline for open-vocabulary 3D **scene graph construction**, enabling **multi-modal queries**
- Integrated vision foundation models (RAM, Grounding DINO, SAM, CLIP) to **extract and encode semantic features** from 2D images onto 3D point clouds
- Constructed hierarchical scene graphs capturing object-room relationships, **enhancing natural language object retrieval accuracy by 95%** on the Replica dataset

Monocular Visual Odometry System [code] Aug 2024

- Designed a **f**eature-based visual odometry pipeline for vehicle trajectory estimation using the **KITTI dataset**, incorporating Shi-Tomasi **feature detection** and Lucas-Kanade **tracking**
- Integrated **GPS scale correction**, refining trajectory estimation for real-world applicability
- Containerized the system with **Docker** for reproducible deployment and visualization

Image Caption Generator [code] Apr 2024

- Built an image captioning system using **CNN-LSTM** and **ViT-GPT2** models to generate descriptive text from images
- Trained and evaluated models on Flickr8k dataset with BLEU, ROUGE, METEOR, and CIDEr metrics

3D Object Classification from Partial Point Cloud [code] Apr 2023

- Engineered GRNet-PointNet architecture, enabling high-accuracy object classification from partial point cloud data
- Achieved **93.8% accuracy**, surpassing PointNet++'s **70% baseline performance**

Robust Sensor Fusion System for State Estimation in Complex Environments [code] Dec 2022

- Implemented visual-inertial odometry using ORB-SLAM3 on custom multi-sensor data collected with a **stereo camera, IMU,** and **RTK-GPS** to analyze state estimation performance across outdoor, urban, and indoor environments
- Evaluated failure modes of individual sensors by comparing ORB-SLAM3 trajectories against RTK-GPS ground truth
- Tested GVINS algorithm demonstrating tightly coupled GPS-VINS fusion achieves drift-free, consistent trajectories

WORK EXPERIENCE

Graduate Teaching Assistant Jan 2024 - Apr 2024
Northeastern University, Boston, MA

- Mentored **120+ students**, guiding **C++, Python,** and **OpenCV**-based projects for the **Pattern Recognition and Computer Vision** course
- Conducted **code reviews**, offering actionable feedback to enhance algorithm efficiency and implementation accuracy

Mechatronics Engineering Co-op Jul 2023 - Dec 2023
Festo Corporation, Marlborough, MA

- Designed IEC 61010-1 compliant safety circuitry for a high-voltage liquid handling system, ensuring operational safety
- Engineered, assembled, and deployed control cabinet for a **3-axis gantry system** used by internal test team, ensuring reliable and safe operation under real-world testing conditions
- Performed **hardware validation, DAQ analysis, and troubleshooting** to verify system reliability and performance

European Train Control System Application Engineer Oct 2020 - Jun 2022
Alstom, Bangalore, India

- Led data curation for Radio Block Centre, ensuring **on-time delivery** of critical train control data
- Analyzed and optimized technical documents and design tools, enabling **streamlined decision-making**
- Conducted **training sessions** for **20+ engineers**, enhancing team proficiency in ETCS data design tools and processes