Abhinav Reddy Kowkuntla

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Availability – January 2025 to August 2025

**EDUCATION**

**Northeastern University, Boston, MA**  Dec 2025

Master of Science in Robotics, Concentration: Electrical and Computer Engineering

**Coursework**: Robotics Sensing and Navigation, Robot Mechanics and Control, Autonomous Field Robotics, Computer Vision

**Amrita Vishwa Vidyapeetham, India** Jun 2020

Bachelor of Technology in Electronics and Communications Engineering

**Coursework**: Computer System Architecture, Linear Algebra, VLSI Design, Signal Processing, Human Centered Design

**Leadership**: Secretary of Student Club, Executive Officer in Toastmasters College Club.

**TECHNICAL SKILLS**

**Computer Vision:** Homography, Segmentation, Classification, Factor Graphs, Low contrast imaging, Perspective-n-point, Convolutional Neural Networks.

**Robotics:** Dead-Reckoning, SLAM, ROS data logging (Bag files), Sensor Fusion.

**Programming and OS:** Python, C, C++, Windows, Linux, Data Structures and Algorithms.

**Libraries:** NumPy, Pandas, SciPy, Scikit-learn, Pytorch.

**Software:** MATLAB Simulink, SolidWorks, ROS, AUTOSAR, Gazebo, GitHub, Jenkins, Azure, CICD, CANoe, CANape.

**Hardware Skills:** Arduino, Raspberry Pi, NVIDIA Jetson Orin Nano, NVIDIA GTX 2080/4070.

**WORK EXPERIENCE**

**Northeastern Field Robotics Lab, Boston, MA** Oct 2024 – Present

Designation: **Graduate Research Assistant**

* Implementing **ORB-SLAM** on **Boston Dynamics Spot** using LiDAR and camera data for multi-map generation and enhanced localization.
* Conducted research on rectified stereo and disparity concepts to generate depth maps on edge devices like NVIDIA Jetson Orin Nano.

**Robert Bosch** Jan 2021 – Dec 2023

Locations: India, Hungary.

Designation: **Function Owner/** **Lead System Developer**

Client Name: Honda, Nissan and Mazda.

* Designed and developed **Model-Based Software** using **Simulink** and **Base Software** modules in C++ for ADAS applications, including Automatic Parking Systems, adhering to AUTOSAR standards for Failure Management and Communication.
* Administered **GitHub** and **Jenkins** workflows for a 20-member team, streamlining development pipelines and ensuring code quality.
* Directed the **Software Development Life Cycle (SDLC)**, from requirements analysis to testing, ensuring successful delivery of solutions.
* Collaborated with international clients and stakeholders across **Asia-Pacific** and **Europe**, aligning technical requirements with customer expectations.
* Improved team efficiency by implementing code reusability and automating redundant tasks, reducing project timelines by an average of one week.

**PROJECTS**

**Large-Scale Underwater Images Mosaicing** Fall 2024

* Used **homography** and **GTSAM factor graph optimization** to create mosaics from 200 underwater images.
* Performed feature extraction and loop closure for accurate placement of overlapping images.

**Multi-view 3D Reconstruction using Bundle Adjustment** Fall 2024

* Reconstructed 3D point clouds from 24 images using **GTSAM** with **bundle adjustment** for pose optimization. Reconstructed 3D point clouds from 24 images using **GTSAM** with **bundle adjustment** for pose optimization.
* Enhanced reconstruction accuracy through camera pose optimization.

**Self-Supervised Pre-trained model for Underwater Image Segmentation** Fall 2024

* Pretrained using **SimCLR** on the **UFO dataset** with advanced data augmentation for underwater image features.
* Fine-tuned **U-Net** on the **SUIM dataset**, achieving 0.70 pixel accuracy (baseline: 0.67) using a hybrid loss function.

**Efficient Depth Estimation Using RAFT-Stereo and NEUFlow-V2** Fall 2024

* Generated depth maps by integrating **disparity-based estimation** into the **NEUFlow-V2 framework**, optimizing for edge devices.
* Achieved an **End-Point Error (EPE)** of 3.8 on the **FlyingThings dataset** using RAFT-Stereo’s **correlation pyramid framework**.