Abhinav Reddy Kowkuntla

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LinkedIn — Portfolio
Availability: May 2025 - December 2025

Education

Northeastern University, Boston, MA Dec 2025
Master of Science in Robotics, Concentration: Electrical and Computer Engineering
Relevant Coursework: Robotics Sensing and Navigation, Mobile Robotics, Autonomous Field Robotics, Computer Vision

Amrita Vishwa Vidyapeetham, India Jun 2020
Bachelor of Technology in Electronics and Communications Engineering
Relevant Coursework: Computer System Architecture, Linear Algebra, 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, Bundle Adjustment, CLAHE.
Deep Learning: Convolutional Neural Networks, Transformers, Self-Attention and Multi-head Attention Models, Recurrent Neural Networks, Gated Recurrent Units, Long Short Term Memory Networks.
Robotics: Dead-Reckoning, SLAM, ROS Bag Files, Sensor Fusion, Model Predictive Path Integral Controller, Localization, Navigation, Kalman Filter and Extended Kalman Filter, Particle Filter.
Programming and OS: Python, C, C++, Windows, Linux, Data Structures and Algorithms, Machine Learning.
Libraries: NumPy, Pandas, SciPy, Scikit-learn, PyTorch
Software: MATLAB Simulink, SolidWorks, ROS2, AUTOSAR, Gazebo, GitHub, Jenkins, Azure, CICD, CANoe, CANape.
Hardware: Arduino, Raspberry Pi, NVIDIA Jetson Orin Nano, NVIDIA GPUs.

Work Experience

Northeastern Field Robotics Lab, Boston, MA Oct 2024 - Present
Graduate Research Assistant

- Implementing ORB-SLAM on Boston Dynamics Spot using LiDAR and camera data for multi-map generation and enhanced localization.
- Develop algorithms on optical flow, disparity and depth using Transformers with Pytorch on edge devices like NVIDIA Jetson Orin Nano.

Robert Bosch Jan 2021 - Dec 2023
Locations: India, Hungary — Function Owner/Lead System Developer
Clients: Honda, Nissan, Mazda

- Designed Model-Based Software using Simulink and Base Software modules in C++ for ADAS applications, including Automatic Parking Systems, adhering to AUTOSAR standards.
- 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 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 CLAHE, homography and GTSAM factor graph optimization to create mosaics from 200 underwater images.
- Performed SIFT feature extraction and utilized concepts of Bundle Adjustment with loop closures for accurate pose estimation.

Multi-view 3D Reconstruction using Bundle Adjustment Fall 2024

- Reconstructed 3D point clouds from 24 images using GTSAM with bundle adjustment for pose optimization.
- Enhanced pose estimation 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 on PyTorch
- 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 1.24 on the FlyingThings dataset using RAFT-Stereo's correlation pyramid framework.