ADITYA RAMAKRISHNAN

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EDUCATION

Master of Science in Mechanical Engineering – Research (Specialization - Robotics) | 3.97 / 4.0 GPA
Carnegie Mellon University, Pittsburgh, PA | Expected Graduation Date: May 2023

Bachelor of Engineering in Mechanical Engineering | 9.04 / 10.0 CGPA
R V College of Engineering, Bangalore, India | Graduation Date: May 2019

SKILLS

Programming Languages:	C++ (Advanced), Python (Advanced), Matlab (Beginner), C (Advanced)
Programming Libraries:	NumPy (Intermediate), PyTorch (Intermediate), OpenCV (Beginner), OpenGL (Intermediate)
Software & Tools:	ROS (Intermediate), Move-It/Gazebo (Intermediate), Raspberry Pi (Intermediate), Simulink (Intermediate), AWS (Beginner), Linux (Beginner), Git (Intermediate), SolidWorks (Advanced)

EXPERIENCE

GRADUATE RESEARCH STUDENT – ROBOTICS: Computational Engineering & Robotics Lab, CMU
Pittsburgh, PA | Aug 2021 – Present

Mobile Welding and Concrete 3D Printing Robotic Platform

- Exploring heuristic learning-based motion planning methodologies for end-effector objective-function optimization in 3D concrete printing – conducted a comparative case study using qualitative/quantitative performance evaluation.
- Designed navigation stack modules for non-holonomic rover motion with a focus on optimized path and trajectory planning using fiducial-marker-based navigation and Machine Learning based LiDAR-camera sensor fusion.
- Compiled and refactored robust system code and ROS interface for mobile platform path planning and localization.

SUMMER RESEARCH FELLOWSHIP: Department of Mechanical Engineering (Computational Engineering & Robotics Lab), CMU
Pittsburgh, PA | Jun 2022 – Aug 2022

- Deployed working demo of localization and control algorithms for CERLab's fully autonomous mobile welding robot.

ASSOCIATE SOFTWARE ENGINEER - Robert Bosch Engineering & Business Solutions Limited
Bangalore, India | Aug 2019 – Nov 2020

- Led integration of Battery Management System (BMS) and Engine Control Unit (ECU) base-software modules for year-long Plug-In Hybrid electric vehicle project in adherence with AUTOSAR standards using Agile methodology.
- Validated system-level OEM requirements for commercial hybrid electric vehicles with simulation setups utilizing Software-in-loop and Hardware-in-loop verification strategies for over 20 product lines and 3 OEMs.
- Enabled efficient run-time optimization of resource consumption, ensuring prudent use of memory resources, and prevention of ECU loading across product lines beyond 75%.

PROJECTS

ACADEMIC PROJECTS: Carnegie Mellon University

Exploring High Resolution Video Frame Interpolation (Course Project – Introduction to Deep Learning):

- Adapted an IFRNet neural architecture for video frame interpolation using optical flow techniques and contemporary deep learning structures to improve video compression and reconstruction quality.

Automatic Eye-in-Hand Calibration using EKF (Course Project – Robot Localization & Mapping):

- Employed a Kalman Filter-based approach to accurately calibrate and position a robot-mounted camera via landmark key-point detection, depth estimation, camera projection, and transformation matrix methodologies.

Computer Vision for Traffic Density Estimation (Course Project – Computer Vision for Engineers):

- Deployed a Machine Learning-based traffic density estimator applying ORB feature matching for traffic density estimation with an accuracy of 83% and occupancy heatmap generation for intuitive traffic visualization.

Monocular SLAM in C++ (Course Project – Advanced Engineering Computation):

- Implemented a small-scale monocular SLAM system for static environments operating on the T.U. Munich-RGBD dataset. Leveraged C++ tools and libraries for feature detection, tracking, camera pose estimation and mapping.

Retro 3D Arcade Game in C++ (Course Project - Engineering Computation):

- Constructed an engaging fun interactive 3D GUI and game engine with scalable retro-game environments, in collaboration with peers, using OpenGL geometric libraries and object-oriented programming.

RESEARCH PROJECTS: Indian Space Research Organization (ISRO-ISTRAC)
Bangalore, India | Jan 2019 – Apr 2019

Dynamic analysis of ground station antenna using a robotic approach

- Identified, evaluated, and eliminated critical errors in dynamic planning and trajectory control to enhance satellite tracking efficiency of a ground station antenna.
- Achieved implementation of a successful and robust mathematical model in MATLAB with 92% accuracy to improve satellite tracking performance by 13%, accounting for external dynamic perturbations and flexible body characteristics.