ADHEESH CHATTERJEE

3405 Tulane Drive, College Park, MD 20783
adheeshchat@gmail.com
Portfolio: https://adheeshc.github.io/ +1 (240) 784 7779

EDUCATION

M.Eng Robotics, *University of Maryland, College Park, MD* *GPA – 3.63* *May 2020*

- **Concentration** – Autonomous Systems Development: Perception, Planning, Control & Decision Making

B.Tech Mechanical Engineering, *Vellore Institute of Technology, India* *GPA – 8.91/10* *May 2018*

- **Merit Certificate** – Academic Excellence and Scholarship, VIT University (2015)

Deep Learning Specialization, *deeplearning.ai, Coursera* *Dec 2019*

SKILLS

Interests	SLAM, Reinforcement Learning, Computer Vision, Motion Planning, Sensor Fusion, Controller Design, 3D Mapping
Engineering	SolidWorks, ANSYS Workbench, VREP, Raspberry Pi, Arduino
Programming	Python, ROS, Gazebo, C/C++, Rust, Matlab, Git, OpenCV, OpenGL, Numpy, Matplotlib, Pandas, Scikit-learn, TensorFlow, Pytorch (w/CUDA), OpenAI Gym, HTML5+CSS, Javascript

RESEARCH EXPERIENCE

University of Maryland – *Summer Research Assistant* *Maryland, USA* *May 19 – Sep 19*

- Created an integrated Semantic Segmentation and Depth Estimation network using encoder-decoder CNN architecture (VGGnet and Resnet) by performing sensor fusion of image and LIDAR data

University of Maryland – *Research Assistant* *Maryland, USA* *Sep 19 – May 20*

- Developed a Multi-Agent Cooperative Reinforcement Learning solution to the frontier exploration problem using a decentralized system of drones and a mobile robot. Worked with a modified Rainbow algorithm

University of Maryland – *Teaching Assistant* *Maryland, USA* *Jan 20 – May 20*

- Assisted students and aided professor for the Robot Learning course covering topics focused on Reinforcement Learning, Control through Machine Learning and Evolutionary Robotics

TECHNICAL PROJECTS

SLAM (Simulataneous Localization and Mapping)

- Localization – Extended Kalman Filter,Unscented Kalman Filter and Particle Filter
- Mapping – 2D Gaussian grid, ray casting, K-means clustering and rectangle fitting using LIDARs
- Complete Frameworks – Iterative Closest Point Matching, FastSLAM, GraphSLAM, V-SLAM

Motion Planning Algorithms

- BFS, DFS, Dijkstra, A*, RRT, RRT*, PRM, B-Spline, CubicSpline, Dubins Path to find collision free path
- Kruskal, Prim, Boruvka and Nearest Neighbour algorithm to form a Minimum Spanning Tree to solve the Travelling Salesman Problem

ROS Projects

- Built an autonomous robot using a Raspberry Pi microcontroller. Performed UKF-SLAM to map out the UMD Robotics Realization Lab while using ROS packages MoveIt and Rviz
- Simulated an assembly line of Pick and Place robots to sift through objects and seperate out individual components using find_object_2d ROS package

Controller Design

- Implemented an LQR speed and steering control for path tracking
- Simulated Path tracking with iterative model predictive speed and steering control (MPC)

Sensor Fusion

- Processed Lidar point cloud, Radar and Camera data to calculate total time to collision from preceding vehicles and 3D object tracking in C++ (using Point Cloud Library)

Structure From Motion

- Used RANSAC based Outlier Rejection, PnP Estimation and Bundle Adjustment to reconstruct a 3D point cloud of surrounding structures and environment in C++ using OpenGL and 6DOF camera pose calibration on The ApolloScape Open Data set

Computer vision applications for Self-Driving Cars

- Visual Odometry, Lane Detection, Traffic Sign Recognition and Classification using HOG feature descriptors and SVM, Lucas Kanade Object Tracker