ADHEESH CHATTERJEE

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EDUCATION

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

- **Concentration** – Autonomous Systems Development: Perception, Planning & 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)

Robotics Software Engineer, *Udacity* Mar 2020

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

SKILLS

Interests	SLAM, Computer Vision, Multiview 3D Geometry, Motion Planning, Sensor Fusion, Reinforcement Learning, Controller Design
Applied Architectures	Mask R-CNN, Inception V3, YOLO v3, OpenPose
Engineering	SolidWorks, ANSYS Workbench, VREP, Raspberry Pi, Arduino
Programming	Python, ROS, Gazebo, C/C++, Rust, Matlab, Git, OpenCV, OpenGL, Numpy, Matplotlib, Scikit-learn, TensorFlow, Pytorch (w/CUDA), STL Library, Eigen

WOEK EXPERIENCE

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

- Created an integrated Semantic Segmentation and Depth Estimation (RGB-D) network using encoder-decoder CNN architecture (*VGG and Resnet backend*) 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 PPO/Rainbow algorithm

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

- Mentored students and provided course support to the 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) Projects

- Localization – Extended Kalman Filter,Unscented Kalman Filter and Particle Filter (Monte Carlo)
- Mapping – 2D Gaussian grid, Ray Casting, K-means Clustering and Rectangle Fitting using LIDARs
- Complete Frameworks – FastSLAM, GraphSLAM, V-SLAM, LSD-SLAM,RTab-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 EKF-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 ROS Packages

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

- Visual Odometry, Lane Detection, Traffic Sign Recognition and Classification using HOG feature descriptors and SVM, Lucas Kanade Object Tracker, RCNN object detector using Selective Search and Region Proposal.