ADHEESH CHATTERJEE

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EDUCATION

M.Eng Robotics, *University of Maryland, College Park, MD* *Expected: May 2020*

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

B.Tech Mechanical Engineering, *Vellore Institute of Technology, India* *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, 3D Mapping, Motion Planning, Kalman Filters, Sensor Fusion, Controller Design
Engineering	SolidWorks, ANSYS Workbench, VREP, Raspberry Pi
Programming	Python, OpenCV, Numpy, Matplotlib, Pandas, Scikit-learn, TensorFlow, Keras, Pytorch (w/ CUDA), OpenAI Gym, ROS, Gazebo, Pygame, Tkinter, MATLAB, C/C++, HTML5+CSS

EXPERIENCE

Ashok Leyland LLC – *Research Intern* *Dubai, UAE* *Dec 17 – Jan 18*

- Worked under the Manufacturing and Quality Control Department and increased productivity by 6.5%

University of Maryland – *Research Assistant* *Maryland, USA* *Sep19 – Current*

- Developing a Multi-Agent Cooperative Reinforcement Learning solution to the frontier exploration problem using a decentralized system of drones and a mobile robot

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

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

TECHNICAL PROJECTS

SLAM (Simulataneous Localization and Mapping) | *Python, Numpy, Matplotlib, OpenCV, Scipy*

- Localization – Extended Kalman Filter,Unscented Kalman Filter and Particle Filter
- Mapping – 2D Gaussian grid, ray casting, K-means clustering and rectangle fitting for vehicle detection
- Complete Frameworks – Iterative Closest Point Matching, FastSLAM, GraphSLAM, Visual Monocular SLAM

Semantic Segmentation and Depth estimation | *Python, Numpy, OpenCV, Pytorch, GCP*

- Created encoder CNNs with parallel pipelines for semantic segmentation and depth estimation
- Trained depth network using stereo images, and then separately trained segmentation decoder

Visual Odometry | *Python, Numpy, OpenCV, Matplotlib, Scipy*

- Used Feature Detection to construct Optical Flow & track 3D motion of the car through city
- Used RANSAC based Outlier Rejection, PnP Estimation and Bundle Adjustment
- Compared Approach with Existing Built-in functions and Frameworks and achieved **84% accuracy**

Motion Planning Algorithms | C++/*Python, Numpy, Matplotlib, Scipy*

- Implemented BFS, DFS, Dijkstra, A*, RRT, RRT* and PRM on robot to find collision free path

Image Classification on Fashion-MNIST, CIFAR 10 Dataset | *Python, Numpy, TensorFlow*

- Implemented Maximum Likelihood Estimation and Bayes rule for classification.
- Applied PCA and LDA for dimensionality reduction using Scikit-learn, then applied KNN and SVM.
- Implemented LeNet, VGGNet and ResNet architectures using TensorFlow for classification

Controller Design | *Python, Numpy, MATLAB, Simulink*

- Developed LQR and LQG controller for the Gantry Crane System using Lagrangian Dynamics
- Implemented an LQR speed and steering control for path tracking
- Simulated Path tracking with iterative model predictive speed and steering control (MPC)

Path Planning for SLAM based maps | ROS, Python, OpenCV, Numpy

- Mapped out Robotics Lab with Turtlebot using ROS, used OpenCV to improve map features and planned obstacle free path with the A* algorithm