ADHEESH CHATTERJEE

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EXPERIENCE

Computer Vision Engineer, Vidalign Inc. (characterfacegen.com) *Aug 2020 - Present*
- Developed a precise facial landmark detection and tracking module used for real-time 3D mesh generation.
- Designed a parametric model for facial wrinkles & tension maps to improve the 3D morphable model.
- Leading a team of engineers to implement, optimize, and deploy SLAM and vision pipelines for indoor 3D reconstruction with LIDARs and cameras.
- Primarily used Docker and Git to set up deployment of prototypes, maintain communication and ensure version control.

Research Assistant, Autonomous Robotics Group, University of Maryland *Jan 2020 - May 2020*
- Developed a ROS interface for localization on the motion capture workspace using raw sensor data (IMU, Camera, Magnetic Encoders) for tracking a non-holonomic differential drive robot using a Raspberry Pi and an Arduino Nano.
- Performed EKF-SLAM to map out the UMD Robotics Realization Lab on Rviz and Implemented A* graph traversal algorithm to find a collision-free path.
- Designed and optimized the object detection and classification algorithms for the real-time functioning of the robot.

Teaching Assistant, University of Maryland *Jan 2020 - May 2020*
- Provided course support and assisted in the development of new course material for the Robot Learning course covering topics focused on Reinforcement Learning, Control through Machine Learning, and Evolutionary Robotics.
- Performed all assistant teaching duties including mentoring, lecturing, researching, and evaluation help.

Research Assistant, University of Maryland *Sep 2019 - Jan 2020*
- Developed a Multi-Agent Cooperative Reinforcement Learning solution to the frontier exploration problem.
- Implemented a decentralized system of 4 drones and 1 mobile robot with Rainbow algorithm and achieved a 78% exploration of the simulated environment while maintaining drone charge.

Summer Research Assistant, University of Maryland *May 2019 - Sep 2019*
- Created an integrated Semantic Segmentation and Depth Estimation (RGB-D) network working primarily on the Cityscapes and Kitti datasets.
- Designed an encoder-decoder CNN architecture (VGG and Resnet backend) with skip connections for the Semantic Segmentation and Monocular Depth for Depth Estimation. Improved depth estimation by fusing LIDAR data.

PROJECTS

SLAM (Simulataneous Localization and Mapping) Projects
- Localization - Extended Kalman Filter, Unscented Kalman Filter, and Particle Filter (Monte Carlo).
- Mapping - 2D Occupancy grid, Ray Casting, K-means Clustering, and Rectangle Fitting using LIDARs.
- Complete Frameworks - FastSLAM, GraphSLAM, LSD-SLAM, RTab-SLAM.

Computer Vision Projects for Autonomous Driving
- 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

Structure From Motion
- Used RANSAC based Outlier Rejection, PnP Estimation and Bundle Adjustment to reconstruct a 3D point cloud of surrounding structures and environment and 6DOF camera pose calibration

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)

RNN and Debiasing
- Built a Recurrent Neural Network (LSTM) for music generation. Trained a model to learn the patterns in raw sheet music in ABC notation and then used this model to generate new music.
- Built a facial detection model (VAN) that learns the latent variables underlying face image datasets and used it to adaptively re-sample the training data, thus removing biasing in order to train a debiased model.

EDUCATION

Masters of Engineering, Robotics *Aug 2018 - May 2020*
University of Maryland GPA: 3.63

Bachelor of Technology, Mechanical Engineering w/ Minors in Computer Science *Aug 2014 - May 2018*
Vellore Institute of Technology GPA: 3.6

SKILLS

Interests: SLAM, Computer Vision, Sensor Fusion, 3D Mapping, 3D Reconstruction, Object Tracking, GANs, YOLO
Programming: Python, C/C++, ROS, Matlab, OpenCV, Open3D, OpenGL, Pytorch, Tensorflow, Eigen, Linux, CMake
Engineering: SolidWorks, Gazebo, VREP, Raspberry Pi, Arduino, ANSYS Workbench, ANSYS Mechanical
Certifications: Udacity Robot Software Engineer, Coursera Deep Learning Specialization