ADHEESH CHATTERJEE

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EXPERIENCE

Sr. 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.
- Implemented Trust Region Reflective algorithm for Least Squares fitting to optimize the 3D Model parameters.
- Implemented self-occlusion detection and Iterative Closest Edge Fitting to improve the final 3D mesh.
- Designed a parametric model for facial wrinkles & tension maps to improve the 3D morphable model.
- Leading a team of 6 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.

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.

Summer Research Assistant, University of Maryland *May 2019 - Sep 2019*
- Created integrated encoder-decoder CNN architectures for Semantic Segmentation and Depth Estimation (RGB-D) networks working primarily on the Cityscapes and Kitti datasets.

PROJECTS

SLAM (Simulataneous Localization and Mapping) Projects
- Implemented FastSLAM algorithm to track dead reckoning and estimated path based on obstacles in the environment
- Deployed the RTAB-Map ROS package on a robot to create a 3D map of the environment
- Localization - Extended Kalman Filter, Unscented Kalman Filter, and Particle Filter (Monte Carlo).

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, Color segmentation using Gaussian Mixture Models

Object Detection, Classification and Tracking
- Implemented an RCNN object detector using Selective Search and Region Proposal
- Expanded the Object detector to Multi-class object detection and Bounding Box Regression algorithm
- Performed Image Classification with the object detector on the ImageNet Dataset
- Implemented Centroid Trackers and Correlation trackers to track multiple objects in the scene

Sensor Fusion (Collision Avoidance System)
- 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)

Deep Learning Computer VIsion Projects
- 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 (VAE) 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.

Structure from Motion (SfM)
- 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

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, Object Detection and Tracking, 3D Reconstruction, 3D Mapping, Sensor Fusion, GANs, Optimization
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