Lavanya Suresh Kannan

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Domain skills: Perception for Self driving cars , Sensor fusion, Object detection and tracking, Mapping and Localization.

EDUCATION

The University of Maryland, A. James Clark School of Engineering — **College Park, MD**
Masters of Engineering in Robotics. — Jan-2021 - Dec- 2022

SRM Institute of Science and Technology — **Chennai, India**
Bachelor of Technology- Electrical and Electronics Engineering — July-2016 - July2020

WORK EXPERIENCE

Perception Intern : Aeye, Inc - Dublin, California — **June 2022 - Sep 2022**

- Fused data from multiple lidar sensors, radar modules, global shutter cameras, IMU, and GPS modules.
- Visualized the point cloud performances of camera vs Lidar vs radar using Foxglove.
- Developed multiple point cloud based perception algorithms using various datas from multiple sensors including monocular and stereo cameras, Static lidars, radar.
- Created maps of the parking lot using the open source ROS package HDL graph SLAM.

Research Assistant: GAMMA LAB - Under the guidance of Dr. Dinesh Manocha — **Jan 2022 - May 2022**

- Used Google's pre-trained mediapipe architecture for detection of the hand gestures and trained a LSTM classifier from scratch to classify the hand gestures in real time and implemented it on the food delivery robot.

Research Assistant: National Institute of Technology Calicut, India — **June 2018- July 2018**

- Developed stereo Visual Odometry pipeline to estimate 3D pose for badminton playing mobile Robot.

TECHNICAL SKILLS

- **Programming Languages:** C++, python
- **Tools and Libraries:** Cmake, version control with git, gtest, Docker, OpenCV, Open3D, PCL, Solidworks, ROS1, ROS2, Tensorflow, Foxglove, Jira, confluence.
- **Operating system:** LINUX (ubuntu), Windows.
- **DL networks and Architectures: VGG-16, ResNet, R-CNN, Fast R-CNN, Faster R-CNN, YOLO, SSD.**
- **Udacity Nanodegree program**: Self Driving cars (ongoing).

ACADEMIC AND SELF- PROJECTS

2D Object Detection in Urban environment for self driving cars: *(Docker, TensorflowAPI, waymo dataset)*

- Used Tensorflow API and performed object detection for three classes including vehicles, pedestrian, and cycles. Used a pre-trained SSD Resnet model to train and evaluate the dataset.

Deep Q-Learning based controller for self driving cars:(*python, CARLA***)**

- Proposed a strategy for controlling autonomous vehicles using DQN from the real time RGB images obtained from the camera mounted on the vehicle using CARLA simulator.

Object Detection and tracking for self driving cars: *(Yolo v3, KITTI driving stereo dataset, stereo vision)*

- Detected the vehicles and its 2D bounding boxes using YOLO V3 detection network.
- Calculated disparity and depth using stereo vision techniques for 3D re-projection.
- Implemented a simple kalman filter to estimate the location of the vehicle.

Sensor fusion: 3D object Detection for self driving cars: *(OpenCV, open3D, waymo dataset)*

- Performed Object detection based on a birds-eye view perspective using LiDAR data and camera data.
- Implemented complex YOLO algorithm for real-time 3D Object Detection on Point Clouds.
- Implemented Extended Kalman filter to track the moving vehicles over the time.

Monocular Visual Odometry for Self Driving Cars: *(c++, OpenCV)*

- Implemented and benchmarked various feature detection and descriptor algorithms.
- Developed VO pipeline to estimate 3D pose of a self-driving car from the sequence of monocular images.

Lane detection for self driving cars: *(Python, OpenCV)*

- Designed an algorithm that can detect lanes and turns using Bird-eye view method to mimic lane departure warning for self driving cars.