Yogesh Gajjar

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Experience

Qualcomm, Inc *Systems Engineer - Localization and Mapping — Novi, MI* **July 2022-Present**

- Devised and implemented an improved Kalman Filter motion model to assist the transition from **3DoF** to **6DoF**, thereby enhancing pose estimation accuracy.
- Developed an extractor module to integrate lane boundary, traffic signs, traffic lights, road symbols, and visual landmark features from the camera, serving as a crucial pre-processing component for the measurement model.
- Executed the implementation of a projection-based measurement model to establish a correspondence between camera-detected lane boundaries and map data.

Arriver Software, Inc, *Algorithm Engineer - Localization and Mapping — Novi, MI* **March 2021-July 2022**

- Designed algorithm to utilize the extracted **ODD** information from the HDMap to enable prediction of future events in downstream localization modules for activation/deactivation of **L2+, L3** features.
- Implemented health-status faults bits for multiple localization and mapping components to ensure feature availability is maximized using **test-driven development**.
- Accelerated development, simulation, integration, testing of localization and mapping algorithms and deploying it in safety critical autonomous vehicle system to achieve production level performance using **C++**.
- Illustrated **agile way** of working for feature development, requirements, JIRA for tracking and Gerrit for code reviews and commits.

USC CPS-VIDA Group, *Graduate Researcher — Los Angeles, CA* **August 2019-March 2021**

- Lead the development, build, and bring-up execution of USC's first autonomous delivery robot prototype from start to finish.
- Developed perception **DNN** algorithms for object detection and multi-object tracking with vision and point cloud inputs.
- Established ROS infrastructure for SLAM, mapping, localization and real-time perception using stereo camera, IMU and LiDAR.
- Utilized local servers and cloud **GPU** for perception data model training and optimization.
- Spearheaded research on developing Signal Temporal (**STL**) monitors, and vision-based Timed Quality Temporal (**TQTL**) monitors for ROS to track, and quantify perception robustness, thus ensuring safe autonomy.

Frenzy Labs, Inc *Computer Vision Intern — Santa Monica, CA* **May 2020-August 2020**

- Proposed and developed a network architecture by integrating state-of-the-art R-CNN **RetinaNet** object detection and H-CNN **EfficientNet** classification network that improved apparel classification/detection performance by **5%**.
- Devised end-to-end testing pipeline with **RESTful API** service to accelerate DNN production model evaluation & deployment.
- Trained numerous scalable models on the **Azure** virtual machines with ∼1 terabytes of data(images) and optimized backbone CNN and R-CNN network with an increased **2%** accuracy.

Projects

ROS Multi-Object Tracking **2020**

- Developed the first **open-source ROS wrapper** for multi-object tracking algorithm using **Yolov3** and **DeepSORT**. Optimized tracking latency to make it work in real-time (20 fps) and published unique object ID's on **Jetson Xavier** platform.
- Deployed it alongside ROS Yolov3 object detector on the AV delivery robot for a real-time road object detection and tracking.

YOLOv3 2D Objects Detection **2020**

- Trained independent YOLOv3 object detection algorithm to detect road objects including traffic signs, and traffic lights on **Berkeley DeepDrive(BDD)** 1M images and **Bosch Traffic Light** dataset to achieve a loss of 4.8% and 2.7% respectively.
- Deployed trained weights on AV delivery robot for a real-time road object detection using stereo RGBD camera on public roads.

3D LiDAR Obstacle Detection **2020**

- Implemented a C++ pipeline for 3D LiDAR obstacle detection, involving point cloud processing, RANSAC-based 3D segmentation, Euclidean clustering using K-D Tree, and 3D bounding box placement around clusters.

Technical Skills

Programming	C++, Python, MATLAB, C, Java
Applications & Libraries	ROS, OpenCV, Keras, TensorFlow, PyTorch, GTest, PCL, FoxGlove, RViz, Gazebo Git/GitHub, Latex
Hardware	Zed 3D Camera, Hokuyo LiDAR, Vecternav IMU, Nvidia Jetson Devkits

Education

Master of Science in Electrical and Computer Engineering **January 2019-December 2020**
University of Southern California GPA: 3.64/4.0
Coursework: *Machine Learning, Intro to Self-Driving, Pattern Recognition, Computer Vision, Image Processing, Robotics*

Bachelor of Technology in Instrumentation and Control Engineering **June 2011-May 2015**
Institute of Technology, Nirma University GPA: 8.02/10.0