

# Naveen Narayan Jagadish

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## SUMMARY OF QUALIFICATION

- More than 7 years of experience in the automotive industry including In-Vehicle infotainment including CAN
- Good understanding of Vehicle Electrical Architecture, ECUs, vehicle subsystems and features
- Proficient with in-vehicle debugging and testing using CAN based monitoring tools (CANoe, CANalyzer, NeoVi).
- Good experience in Python & C++ programming and debugging
- Experience with data science tools including Python scripting, numpy, SciPy, Matplotlib, Scikit-learn, Jupyter notebook, bash scripting, Linux environment.
- Ability to understand and solve complex mathematical problems in Calculus, Linear Algebra and Trigonometry.
- Strong fundamental knowledge of Physics, Neural Networks, Machine learning, Deep learning (convolutional neural networks) and Artificial Intelligence.
- Experience with Deep learning frameworks, including TensorFlow and Keras.
- Practical experience with projects in Computer Vision (OpenCV), Sensor Fusion (CAMERA, LIDAR & RADAR), Vehicle Detection, Localization (SLAM), Control and Path planning for self-driving cars.

## EDUCATIONAL QUALIFICATION

Master of Science in Electrical Engineering: Louisiana State University

**Aug 2009 ~ Dec 2011**

Bachelor of Engineering in Telecommunication: Visvesvaraya Technological University

**Sep 2003 ~ Jul 2007**

Nanodegree in Self-Driving Cars: Udacity - <https://confirm.udacity.com/PHGV2KYE>

**Sep 2017 ~ Oct 2018**

Nanodegree in Sensor Fusion: Udacity - <https://confirm.udacity.com/XDFYCKFA>

**Apr 2020 ~ Aug 2020**

## TECHNICAL SKILLS

<b>Languages</b>	: C++, Python, MATLAB
<b>Technologies</b>	: CAN, LIN, Ethernet, MOST, AUTOSAR
<b>Operating Systems</b>	: Windows, MAC OS, Linux
<b>Tools</b>	: CANoe, Vehicle Spy, PCAN, Neo VI, IBM-DOORS, RQM, Amazon Web Services (AWS)
<b>Lab Equipment</b>	: Spectrum Analyser, Network Analyser, Oscilloscope, Power meter, Signal Generator

## PROJECTS

### **LIDAR Obstacle Detection**

Implemented Random Sample Consensus (RANSAC), KD-Tree, and Euclidean clustering algorithms as part of the processing pipeline to detect vehicles & draw bounding boxes around objects using LIDAR's point cloud data (PCD).

### **Track an Object in 3D Space – CAMERA**

The Time-to-Collision (TTC) was calculated using LIDAR & CAMERA measurements using Bounding boxes and Keypoint correspondence. Several detector/descriptor combinations were used to compare the TTC estimations.

### **RADAR Target Generation & Detection**

Designed a Frequency-Modulated Continuous Wave (FMCW) in MATLAB. Simulated Target movement and calculated Beat/Mixed signal. Implemented FFT to generate peak at the correct range. 2D CFAR operations was used to suppress the noise and separate target signal.

### **Unscented Kalman Filters**

Implemented an Unscented Kalman Filter algorithm in C++ capable of accurately and performantly tracking a turning object. (Motion Models, Lidar and Radar Sensor Fusion)

### **Vehicle Detection and Tracking**

Created a vehicle detection and tracking pipeline with OpenCV, histogram of oriented gradients (HOG), and support vector machines (SVM). Optimized and evaluated the model on video data from an automotive camera taken during highway driving. Support Vector Machines, Computer Vision, OpenCV, Machine Learning, Histogram of Oriented Gradients (HOG)

### **Traffic Sign Classification**

Built and trained a deep neural network to classify traffic signs, using TensorFlow. Experimented with different network architectures. Performed image pre-processing and validation to guard against overfitting.

TensorFlow, Deep Learning, Computer Vision

GitHub Link: <https://github.com/NavJag/Traffic-Sign-Classifer>

### **Advanced Lane Finding**

Built an advanced lane-finding algorithm using distortion correction, image rectification, color transforms, and gradient thresholding. Identified lane curvature and vehicle displacement. Overcame environmental challenges such as shadows and pavement changes. Computer Vision, OpenCV

GitHub Link: [https://github.com/NavJag/Advance\\_Lane\\_Finding](https://github.com/NavJag/Advance_Lane_Finding)

## **PROFESSIONAL EXPERIENCE**

### **Harman International Industries, Novi, Michigan, USA** **Senior Engineer, Infotainment**

**May 2015 ~ Present**

- Work in a team of engineers to validate/qualify the software and hardware for In-vehicle Infotainment (IVI) electronic control units for various car manufacturers
- Work on Advanced Driver Assistance Systems (ADAS) and vehicle safety features like Active Park Assist, Blind Spot Detection, Lane Assistance and 360° Surround-view Camera Systems
- Create simulation for Controller Area Network (CAN) using Vehicle Spy to replicate the infotainment system behavior in an actual vehicle environment
- Develop and execute scripts using programming languages like Python to run automation on test setups comprising multiple electronic control units (ECUs) and perform HIL testing using test benches
- Perform functional validation on infotainment units for features like Multimedia, Connectivity (Bluetooth/Wi-Fi), Navigation, Voice Recognition (VR), Vehicle Diagnostics, Telematics & Over-the-air (OTA) updates
- Perform self-certification testing on phone projection features like CarPlay & Android Auto and validate tuner functionalities like AM, FM and SXM (Satellite Radio)
- Perform Sanity, KPI, Regression, analyze customer requirements, create test cases based on the specifications, execute test plans and comply with ASPICE and ISO26262 standards.
- Create test reports with supporting traces, log files and descriptions, create & maintain test documentation and perform Defect & Root-Cause Analysis
- Participate in vehicle test drives with customers to find critical issues before the SW launch.

### **Panasonic Automotive Systems, USA** **Test Engineer, Design Verification & Testing**

**Oct 2013 ~ Apr 2015**

- Testing and validation of tuner functionalities like AM, FM, DAB and SXM on infotainment systems.
- Created test environments using signal generators to generate/record waveforms at different frequencies.
- Gained good knowledge in RDS and Traffic messaging channel for European markets.
- Performed detailed test plan reviews to optimize the test cases.
- Developed automated scripts using a proprietary tool to perform system integrated testing.
- Analyzed metrics to determine areas of improvement in the test process, policies and procedures.