Krishna Varadarajan

in LinkedIn | ⌽ github | 🐦 Twitter | Bē Behance | ✉ krishna2014vit@gmail.com | ☎ (+1) xxx-xxx-xxxx | ⌂ Milpitas, CA

EDUCATION

The Pennsylvania State University, M.S. in Mechanical Engineering (3.96/4.00) — 2016-2019, University Park, PA
Specialization: Robotics, State estimation, Controls
Awards: Graduate Teaching, and Research Assistantships

Vellore Institute of Technology, B.Tech. in Mechanical Engineering (9.20/10.00 – *top 2%*) — 2010-2014, Vellore, India
Specialization: Dynamics
Awards: MIT-Harvard Medical Hackathon Winner, Special Achievers' Award, Merit Award

Indian Institute of Technology, Madras, Visiting Summer Scholar — Summer 2013, Chennai, India
Area: Dynamics

EXPERIENCE

Rivian Automotive LLC — 2019-Present
Perception Engineer, Self-Driving — San Jose, CA

- **Lane Change Feature:** Developing multi-object tracker for camera-based lane change feature
- **Lane Confidence Estimation:** Developing algorithm to estimate confidence of lane coefficients obtained from HD Map, and front and wing cameras
- **Camera Out-of-Focus Detection:** Developing fail-safe algorithm to detect when the vehicle-mounted camera goes out-of-focus
- **Overpass Detection:** Developed algorithm to mitigate detect overpasses using HD Map and RADAR data. The algorithm helped reduce false positives, improving the sensor fusion stack
- **Regression Testing Framework:** Developed an efficient end-to-end platform-agnostic regression testing framework in C++ – that replaced ECU-Test and Synopsis Silver – to test the L2 self-driving algorithms. The framework, also integrated with Jenkins, uses different sources of ground truth and sensor measurements to calculate and log key performance indicators for the algorithms. The framework is capable of running on cloud as well on a local machine, publishing the test results on a cloud-based visualization dashboard.

NIO USA Inc. — 2018-2019
Perception Engineer, Autonomous Driving — San Jose, CA

- **Multi-Object Tracking and Data Association** : Developed multi-object tracking and data-association algorithms for L4 autonomous driving perception stack using RADAR, LiDAR, and vision sensors
- **Regression Testing** : Developed the KPI (Key Performance Indicators) pipeline for testing, and tuning the sensor fusion algorithms; KPIs used for regression testing
- **Multiple Hypothesis Tracking** : Developed track-to-track association logic (track labeling) across hypotheses for MHT-based object fusion
- **DNN-Based Combined Detection & Tracking** : Led the sensor fusion team's efforts on using low-level features from DNN object detection model to perform data association and object tracking
- **Additional Contributions:** : Robust, time and space-optimized Intersection Over Union (IOU) algorithm; Parser for KITTI and Scale AI annotation datasets; Simulation environment development for tracker validation

Volvo Group Trucks Technology — Fall 2017
Advanced Technology and Research Co-Op, Connected Vehicles — Hagerstown, MD

- **Algorithm Design** : Developed algorithms to calculate trip parameters, driving behavior, hotel mode, and stop-start analysis parameters for Volvo customer trucks for energy management operations with teams in Greensboro, and Lyon (France)
- **App development** : Developed an application in C# for engine dynamometer test cell to run vehicle duty-cycles through a Simulink model
- **Road Topology Estimation** : Developed an algorithm to estimate the road topology distribution of a route using log-vehicle, and simulation data validation

Intelligent Vehicles and Systems Group, Penn State   2016-2018
Graduate Student Researcher, Connected Vehicles   University Park, PA

- **Hardware Instrumentation** : Instrumented an experimental truck with ADAS sensors for HIL, SIL, and on-road testing
- **On-Road Data Collection** : Collected test data on the experimental truck on multiple routes in the states of PA and MD
- **Traffic Modeling and Simulation** : Set-up traffic modeling and simulation capabilities in the research lab, and performed microscopic traffic simulations on AIMSUN to analyze control algorithms
- **Traffic Visualization** : Developed a visualization tool to visualize traffic captured using a front-facing RADAR on a mobile truck
- **Free Space Estimation** : Developed algorithm to measure the available free space in ego-vehicle's lane by fusing lane map markers with front-facing RADAR, and a camera

Department of Mechanical Engineering, Penn State   2016-2018
Graduate Teaching Assistant   University Park, PA

- **Classes Assisted/Taught** : Vehicle Road Dynamics (senior-year class), ME Design Methodology (junior-year class), Introduction to Thermal Sciences (inter-department class)
- **Highlight** : Mentored 8 project teams to deliver industry-sponsored design projects as part of the junior-year design class

Indian Institute of Science   2014-2016
Junior Research Fellow   Bengaluru, India

- **Smart-Manufacturing Lab** : Designed, and established India's first smart manufacturing laboratory, funded by Boeing R&T
- **Patient Transfer Device** : Designed, and fabricated an assistive device to transfer patients from one bed to another, also testing the device in hospitals. The work was filed for an Indian patent in June 2015.

SKILLS

</>: C/C++, Python, YAML, MATLAB, R, HTML/CSS   >_: CMake, waf, GDB, Protobuff, Git
⌨: ROS, RTI-DDS, LINUX, MacOS   ✏: GoogleTest, JIRA, JAMA

PUBLICATIONS

- Krishna Varadarajan, et al. (2019) (*Presented in invited session*) "Analyzing the Effects of Geometric Lane Constraints on RADAR-based Sensing of Available Vehicle Headway using Mapped Lane Geometry and Camera Registration of Lane Position" *In:* ASME Dynamic Systems and Control Conference (DSCC) [Link]

- V.S.Krishna Prasad, et al. (2013) "Simulation and Modeling of Performance Characteristic of Wire Cut EDM on Inconel825 using Multiple Regression and ANN" *In:* International Conference on Mathematical Computer Engineering - ICMCE. pp. 157-165

PATENTS

- "Subject Transfer Apparatus" - Application No.: 2972/CHE/2015 (*Status: Pending*)
  /brief: Assistive device to transfer patients with limited mobility from one platform to another

LEADERSHIP

2020-xx	**President and Founding Member**, Rvian West-Coast ToastMasters	San Jose, CA
2017-18	**President**, Indian Graduate Students' Association, Penn State	University Park, PA
2017-18	**Seminar Chair**, Mechanical Graduate Student Council, Penn State	University Park, PA
2015-16	**Organizing Team Member**, ICORD'15 and 3rd ICDC international conferences	Bengaluru, India
2013-14	**General Secretary**, Society of Automotive Engineers-VIT Chapter	Vellore, India