

# KAILASH NAGARAJAN

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## EDUCATION

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**Amrita Vishwa Vidyapeetham**

*Btech in Mechanical Engineering - CGPA: 8.13/10.0*

June 2015 - June 2019

*Amritapuri, Kerala*

## WORK EXPERIENCE

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**OLA Electric**

*Research Engineer-II(Control Systems)*

July 2022 - Present

*Bengaluru, Karnataka*

- Worked on implementing a simple stanley controller on a golf-cart to track trajectories generated by GPS and obstacle avoidance algorithms using LIDAR's and camera's.
- Currently working on researching various algorithms of Model-Based Reinforcement Learning and Optimal Control to develop a novel algorithm to learn the drive behaviour and use this to drive.
- Leading the DBW (Drive-by-Wire) discussion with vendors to discuss and match the requirements for a DBW system on the in-house AV vehicle being built for testing.

**Siemens Digital Industries Software**

*Associate ES Engineer*

September 2019 - July 2022

*Chennai, Tamil Nadu*

- Implemented an MPC-based adaptive cruise control algorithm for a Japanese AutoOEM and a multi-modal filtering algorithm for object detection.
- Lead the design, implementation and integration of Simcenter Prescan-based OpenAI gym environment. This environment was used to train and test various reinforcement learning algorithms
- Adapted one of the rule-sets from Intel's responsible sensible safety (RSS) pipeline into the existing reinforcement learning algorithms for lane-keeping and collision avoidance.
- Implemented and tested an active-learning pipeline using YOLO in real time for an industrial automation project. Also, automated the image labelling process using computer vision techniques and simple neural nets.
- Contributed to the object fusion algorithm in the sensor fusion pipeline for an AutoOEM. Used a nonlinear, multi-modal filtering algorithm for track management and prediction.
- Worked on the design, implementation and analysis of an autonomous drift controller using model-based reinforcement learning techniques.
- Currently working on a GAN-based offline-RL algorithm for highway driving.

## RESEARCH PROJECTS

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**International Institute of Information Technology**

*Research Intern - Robotics Research Center*

January 2015 - June 2016

*Hyderabad, Telangana*

- Explored and analyzed the fundamentals of trajectory generation for non-holonomic robots with reactive obstacles using collision cone strategies.
- Contributed to the implementation of a collision avoidance and priority assignment problem for multi-agent systems using time-scaling in the presence of probabilistic velocity obstacles.

## SELECTED PROJECTS

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### Adaptive Cruise Control

- Design and stability analysis of a quadcopter in an open loop setting.
- Implemented autonomous take-off and landing features to the existing LQR tuned PID controller

### Quadcopter Control

- Extensively developed a MATLAB environment for adaptive cruise control of a self driving car using model predictive control.
- Contributed to the implementation of a vision system for pedestrian, vehicle detection and tracking using ACF, YOLO and SSD models on the NVIDIA Tegra.

## PUBLICATIONS

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1. Kailash Nagarajan, J Ananthu, Vijay Krishna Menon, KP Soman, EA Gopalakrishnan, and Ajith Ramesh. An approach to detect and classify defects in cantilever beams using dynamic mode decomposition and machine learning. In *Intelligent Manufacturing and Energy Sustainability*, pages 731–738. Springer, 2020

## INITIATIVES TAKEN

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- Co-founded the Robotics club in 2016. Currently the club receives over 200 applications every academic year from students of various departments.
- Conducted many workshops on fundamentals of control theory and its applications in robotics.
- Helped sophomore and freshman students enroll for competitions and mentored them through the construction of various robotic systems.
- Designed and conducted a very interactive and hands-on drone workshop session for kids between the ages 9 and 18.