Nanda Kishore Vasudevan

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EDUCATION

University of Pennsylvania, *Philadelphia, PA*
Master of Science (MSE) in Robotics — *Aug. 2018 - May 2020 (expected)*
GPA: 4.00 / 4.00

National Institute of Technology, Trichy, *Trichy, India*
Bachelor of Technology (B.Tech.) in Electrical and Electronics Engineering — *Aug. 2014 - May 2018*
GPA: 9.72/10.00
Gold medalist

EXPERIENCE

State Estimation and Safety-Critical Control of a Bipedal Robot, *DAIR Lab, UPenn*
Research Assistant under Dr. Michael Posa — *Jan. 2019 - Present*

- Implemented Contact-aided Invariant EKF for localization of the pelvis of a bipedal robot in simulation and on hardware
- Generated trajectories for walking and standing using reduced-order model and tracked the trajectories using Partial Feedback Linearization
- Developing safety-critical controllers by incorporating barrier functions found using Sum-Of-Squares (SOS) optimization

Light Writing with Crazyswarm, *ACT Lab, USC*
Visiting Research Scholar under Dr. Nora Ayanian — *May 2017 - Jul. 2017*

- Developed a graph-based algorithm to generate collision-free minimum snap trajectories for a swarm of quadrotors
- Performed light writing using a swarm of 10 quadrotors for any given font and text

Strategy for Evader in Pursuit Evasion using Reinforcement Learning, *IIITDM, Jabalpur*
Visiting Research Scholar under Dr. Aparajita Ojha — *May 2016 - Jul. 2016*

- Implemented Q-learning coupled with a neural network for the evader in grid-based pursuit-evasion games
- Achieved a success rate of 92.4% for the evader in simulations

PROJECTS

Navigation and Control for an Autonomous Vehicle — *Jun. 2019 - Aug. 2019*

- Implemented Finite State Machine based behavioral planner for a car in CARLA simulator
- Implemented a local planner to avoid static obstacles using trajectory rollout and tracked the trajectory using MPC
- Developed a separate library of motion planners and controllers like A*, RRT*, Stanley controller, LQR and MPC

Localization and Mapping — *Feb. 2019 - Apr. 2019*

- Estimated the 3D orientation of a handheld camera equipped with an IMU using Unscented Kalman Filter
- Implemented Extended Kalman Filter SLAM on the Victoria Park dataset

Trajectory Generation for a Car — *Nov. 2018 - Dec. 2018*

- Generated trajectories for a car avoiding obstacles using nonlinear optimization technique called Direct Collocation

Soccer Robots — *Jan. 2017 - May 2018*

- Designed and fabricated four soccer-playing robots capable of traversing the field without collision with other robots
- Planned paths for each robot using A* and generated trajectories using Bezier curves and splines

Mobile Robotics Development Platform — *Aug. 2015 - May 2016*

- Developed a mobile robot using low-cost sensors including Kinect, IMU and wheel encoders endowed with the ability to perform mapping indoors using ROS

SKILLS

Programming Languages: C++, Python, Matlab, C
Software and Tools: Drake, ROS, Gazebo, CARLA, SNOPT, YALMIP, CVXOPT, Bazel, Git, Simulink, OpenCV, Eigen, PyTorch

COURSES

Graduate Courses: Control and Optimization with Applications in Robotics, Learning in Robotics, Model Predictive Control, Computer Vision and Computational Photography, Deep Learning

Undergraduate Courses: Classical Control Systems, Modern Control Systems, Pattern Recognition, Data Structures and Algorithms, Image Processing

ACHIEVEMENTS

- One of the 19 students selected from India for Viterbi-India Summer Research Program 2017
- Supervised 36 students working on 6 projects as the Vice President of the Robotics Society of NIT Trichy