Mihir Parmar

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EDUCATIONAL BACKGROUND

University of Pennsylvania, Philadelphia, PA May 2021
Master of Science in Robotics; GPA: 4.0/4.0
Coursework: Machine Learning, Computer Vision, Learning in Robotics, Deep Learning, F1/10 Autonomous cars

National Institute of Technology Karnataka, Surathkal, India May 2019
Bachelor of Technology, Mechanical Engineering; GPA: 9.0/10

EXPERIENCE

University of Pennsylvania Jan'20-present
Graduate Teaching Assistant

- Course development and Teaching Assistant for the edX Micromasters program in Robotics which includes 3 courses encompassing topics from various domains of Robotics.
- Teaching assistant for the CIS 581: Computer Vision and Computational Photography, a graduate level course focusing on image processing concepts and deep learning for vision.

Robotics Lab, National Institute of Technology Karnataka May-July'17
Summer Research Intern

- Implemented a Centroidal Voronoi Configuration based search algorithm to achieve optimal deployment of multi-quadcopter system for maximizing the reduction in uncertainty density over the search space.
- Simulated point agents on MATLAB and extended the simulation to AR Drones simulated in Gazebo.
- Uncertainty density reduced below the threshold value of 0.1 in 8 search steps during simulation experiments.

Daimler India Commercial Vehicles Sep'16-April'17
Project Team Member (Industrial Research Project)

- Designed a novel optimised Material Handling System (MHS) for AGV. Designed and implemented a servo-controlled toothed coupling between the trolley and AGV in an under-tugging position, reducing the torque and power required at drive motor in a 1:15 ratio while occupying minimum floor-space.
- This project of developing a low-cost AGV was sponsored by Daimler India Commercial Vehicles.

PROJECTS

F1/10 Autonomous Racing Jan'20-present
Working on a 1/10th scaled high-speed autonomous Formula EV research platform for evaluating perception, planning and control algorithms. Development of algorithms targeting map-less approach is in progress. The car should be able to make decisions on the fly from the current sensor data without prior information of the environment. Thus far, implemented and tested time-to-collision based collision avoidance, follow-the-gap reactive method, point-to-line metric based iterative closest point algorithm for scan-matching , RRT* planner, trajectory tracking using Pure Pursuit and MPC on the Jetson TX2 for the car using the ROS framework.

Quaternion-based Unscented Kalman Filter for Orientation Tracking Feb'20
Implemented an Unscented Kalman Filter (UKF) for real-time estimation of orientation of a rigid body using measurements from 6 DOF IMU onboard the rigid body. UKF used the quaternion representation of the orientation to avoid singularity problems.

Simultaneous Localization & Mapping (SLAM) for THOR-OP humanoid robot Mar'20
Implemented an Occupancy grid-based SLAM algorithm to generate the map of an indoor environment. Particle filters were used for localization of the robot, using measurements as scan from LIDAR, odometry data and the estimated map in the previous step.

Deep Learning for Vision Nov-Dec'19
Implemented transfer learning on ResNet for image classification, and generative architectures: Variational AutoEncoder, Least-Square GAN and DCGAN for image generation.

Object Tracking in Videos Nov'19
Optical flow model to track multi-object moment in videos. Implemented Lucas-Kanade feature tracker and pyramidal KLT tracker to estimate object moments in successive video frames

SKILLS

Programming Languages	Python, C++, MATLAB
Software/Tools	ROS, MATLAB, LabVIEW, SolidWorks, Git, Jupyter.
Libraries	PyTorch, TensorFlow, Keras, Scikit-Learn, Numpy, Pandas, nltk