Archit Hardikar

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Education

University of Pennsylvania — *Master of Science - Robotics,* ***GPA: 3.62/4***
University of Pune — *Bachelor of Technology - Mechanical,* ***GPA: 4.00/4***

Skills

Programming: ROS, ROS2, Python, C++, HTML, MATLAB, C, Bash Script, Linux, Docker

Technologies: Git, Simulink, Pytorch, Tensorflow, Opencv, Arduino, Ansys, Solidworks, PLC

Experience

Robotics Intern, Maglev Aero Inc. (MassRobotics) *June 2022 - Aug 2022*

- Airfoil pitching aerodynamic force analysis and Fast Fourier Transform. Set up coordinate frame transform toolbox for transforms from aeroplane to ground frame. Euler angles, and quaternions.
- Implemented Kalman Filter for eVTOL magnetic levitation.

Participant and Volunteer, IEEE RAS ICRA 2022 *May 2022*

- Competed in the 10th International F1Tenth Autonomous Grand Prix. Second fastest autonomous car lap time.

Associate Engineer, Eaton Aerospace *Dec 2020 - Aug 2021*

- Contribution to two **Intellectual Property** disclosures, **INCOSE** Research Paper, **Trade Secret**.
- Implemented Deep Neural Network for Engineering Drawing text extraction. NLP, k-NN and segmentation. Image processing, feature detection with using Opencv. (50% TAT reduction, 260,000$ annual savings).

Project Trainee, Mercedes Benz India Ltd. *June 2019 - Dec 2019*

- Programmed 6-axis KUKA robots, implemented production line setup for 5 new cars. Improvised PLC for 20% cycle time reduction (50,000$ yearly savings), created Calibration Alert Tool.

Projects

Path Planning using Inverse Perspective Mapping (IPM) for Autonomous Race Vehicles | *Github* | *Report*

- Opponent car detection using R-CNN, tensorflow and TensorRT. Lane detection, path planning using RRT* based splines. Inverse perspective mapping view generation, and depth perception using 4 Intel Realsense d435i cameras.

Instantaneous Motion Planning using RRT, RRT* | *GitHub*

- Implemented Rapidly Exploring Random Tree (RRT) and RRT* for local path planning. RRT* based Spline path follow for dynamic obstable avoidance. Localization using Adaptive Monte Carlo (AMCL) Particle Filter.
- Hector Odometry for 2D map generation and Pure Pursuit along spline for racing. Programming in C++, ROS2, bash shell.

Iterative Close Point Scan Match for SLAM (Simultaneous Localization and Mapping)

- Implemented Simultaneous mapping - Point to Line Iterative Close Point scan match on occupancy grid in C++.

Deep Learning for Computer Vision | *YOLO* | *SOLO*

- Trained YOLO, SOLO, Mask R-CNN from scratch for fast real time multi object detection using Pytorch.

Robotic Arm Manipulation using MPC and Vision based Dynamic Obstacle interaction | *GitHub*

- Vision based robotic arm manipulation for static and dynamic objects. Finite horizon Model Predictive Control (MPC) using Pydrake with goal point as the waypoints given by the RRT algorithm.

Autonomous Battle Robot for GTA-2021 competition (UPenn)

- Designed and built an autonomous wall following robot. Localization using HTC Vive in C. Obstacle detection, frequency detection and wall following.

Extracurricular Activities

Lab development Assistant (MEAM 520) - Implemented vision planning for FRANKA Panda robotic arm.

Teaching Assistant (MEAM 510, MEAM 210) - Held weekly office hours, recitation.

Discovered a new bird species for first time in South India - IndianBirds Vol. 15. No. 5 | *Credential*

Achievements

Best Outgoing Student, Institute Topper in Bachelor of Technology (2020)

E-Star award for developing automation tools (Eaton, 2021)

Mercedes Benz Highest Honor Award (2019) - (Award for continuous improvement process PLC implementation)