Archit Hardikar

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LinkedIn | GitHub | Portfolio

Education

University of Pennsylvania — Philadelphia, USA
Masters of Science- Mechanical Engineering and Applied Mechanics (Robotics); ***GPA: 3.5/4.0*** — *Aug 2021 - May 2023*

University of Pune — Pune, India
Bachelor of Technology - Mechanical Engineering; ***GPA: 4.0/4.0*** — *May 2016 - Aug 2020*

Skills

Programming: ROS, ROS2, Python, C++, MATLAB, C, Bash Script, Linux, Docker
Technologies: Git, Arduino, Simulink, Ansys, Solidworks
Languages: English (Professional), German (Limited), Marathi (Native), Hindi (Native), Sanskrit (Limited)

Projects

Perception based overtaking for Autonomous vehicles

- Opponent car detection using R-CNN. 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.

SLAM (Simultaneous Localization and Mapping) and Particle Filter

- Implemented Simultaneous mapping - Point to Line Iterative Close Point scan match on occupancy grid map using C++. Particle Filter for state estimation and map localization.

Autonomous Racing Reactive Navigation

- Implemented Obstacle avoidance using Hokuyu 2D LIDAR scan data. Reactive navigation in close loop path using ROS2 and C++. Wall follow and Follow-The-Gap algorithm.

Road image object detection using computer vision (YOLO) | *GitHub*

- Computer Vision using cv2, opencv- Road car detection using convolutional neural networks and autoencoders. Non-maximum suppression and sliding window for bounding boxes. Achieved 0.86 test accuracy. Implemented lane detection and Camera calibration, distance calculation.

Path Planning for 7 DOF Robotic Arm using A*, RRT

- Implemented A* and RRT algorithms for the 7-dof Franka Emika PANDA robotic manipulator arm in ROS using Python.
- Solved the pick and place task. Rotations and translation using Homogeneous transformations.

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.

Experience

University of Pennsylvania Philadelphia, USA
Graduate Research Assistant *Feb 2022 - April 2022*

Eaton India Innovation Center LLC, Aerospace Department Pune, India
Associate Requirements Engineer, SDE *Dec 2020 - Aug 2021*

- Contribution to two Intellectual Property (IP) disclosures, a Research Paper and a Trade Secret.
- Implemented digitization tool for scanned Engineering Drawings to database digitization. NLP, data clustering and segmentation. Profile analysis using computer vision opencv. (80% TAT reduction, 80,000$ annual savings).
- Developed Graphical User Interface for a smart hose directory search tool.
- Developed a requirements assessment tool for data validation using semantic textual similarity, NLP. (50% TAT reduction, estimated 180,000$ annual saving.
- Other responsibilities: Requirements capture, analysis, validation and assessment for global Aerospace companies. Successfully handled Requirements Report (100% On Time Delivery and 100% First Pass Yield).

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

- Skills developed: 6-axis robot, Kaizen (Continuous improvement), Macros, VBA.
- Programmed 6-axis KUKA robots in paint shop, body assembly shop.
- Implemented line setup and line balancing for 5 new cars/ models. Kaizen for 20% cycle time reduction- overhead glass gluing station. (50,000$ yearly savings).
- Created an Automation Tool for a Calibration Alert System using Excel VBA macros and access database.

Trade Secret

Automatic Engineering Drawing Digitization Data Extraction Tool (Classified Trade Secret - ITAR)

Research Papers

Automation and Digitization of Systems Engineering tools (INCOSE)

Addition of Rosy Pipit Anthus roseatus to the avifauna of Peninsular India
(IndianBirds journal- Vol. 15. No. 5) | *Credential*

Certificates

Neural Networks and Deep Learning, DeepLearning.Ai | *Credential*

Machine Learning, Stanford Online | *Credential*

Achievements

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

First rank in BTech.- batch of 2020. (VIT Pune, 2021)

Mercedes Star award for high performing managers (Mercedes Benz, 2019)