# Archit Hardikar

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## Skills

**Languages:** ROS1, ROS2, Python, MATLAB, C, C++
**Software:** Ansys, MATLAB Simulink, Solidworks

## Education

**Master of Science (MS) in Applied Mechanics (Robotics)** — Aug 2021 - July 2023
UPenn, Philadelphia, USA

**Bachelor of Technology (BTech) in Mechanical Engineering** — Aug 2016 - Sept 2020
University of Pune, India

## Work experience

**University of Pennsylvania** — Philadelphia, USA
*Graduate Research Assistant* — Feb 2022 (ongoing)
Working in MODLAB Robotics Lab.

**Eaton India Innovation Centre, India** — Pune, India
*Associate Engineer (Aerospace)* — 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. OCR, NLP, data clustering and segmentation. Profile analysis using computer vision. (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 savings)
- 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., India** — Pune, India
*Project Trainee* — Jun 2019 - Dec 2019
[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.

## Academic Research/ Projects

**Instantaneous Motion Planning using RRT** — University of Pennsylvania, March 2022 (ongoing)
To implement Rapidly-exploring Random Tree algorithm for motion planning, obstacle avoidance and overtaking.

**Localization and Pose Estimation - SLAM and Particle filters** — University of Pennsylvania, Feb 2022 – March 2022
Demonstrated Point to Line Iterative Close Point scan match. Hector SLAM for 2D map generation. Particle Filter for state estimation and map localization. Pure pursuit for locomotion.

**Autonomous F1 tenth racing car –reactive path planning** — University of Pennsylvania, Jan 2022 – Feb 2022
Wall follow in close loop circuit using Hokuyu 2D LIDAR scans using ROS2 and C++. Safety node to prevent car crash. PID tuning and design of control for steering through gaps.

**Road image object detection using computer vision and YOLO** — University of Pennsylvania, Oct 2021 – Dec 2021
Road object classification using CNN, autoencoders. Achieved 0.86 test accuracy.

**Autonomous Battle Robot for GTA-2021 competition (UPenn)** University of Pennsylvania
Designed and built an autonomous wall following robot. Localization using HTC Vive in C. Oct 2021 – Dec 2021
Obstacle detection, frequency detection and wall following.

## Trade Secret

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

## Research Publications

- '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) [Link]

## Certifications

- Neural Networks and Deep Learning (Stanford Online) [credentials]
- Machine Learning (Stanford Online) [credentials]

## Awards

- '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)