Aditya Bharambe

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Education

Carnegie Mellon University — Pittsburgh, PA
Master's in Mechanical Engineering - Research | *CQPA - 4.0* — *Aug. 2023 { Present*
- **Relevant Coursework:** Advanced Controls, Path Planning, Soft Robotics, SLAM
- Graduate Researcher at Soft Machines Lab, CMU working on In-space manufacturing

Vishwakarma Institute of Technology — Pune, India
Bachelor of Technology in Mechanical Engineering | *CGPA - 9.31* — *Aug. 2019 { May 2023*

Experience

Project Intern — Jan. 2023 { June 2023
Forbes Marshall Pvt. Ltd. — *Pune, India*
- Conducted a detailed study and Time Analysis of Standard and Non-standard Boiler Manufacturing Process to identify factors afecting productivity
- Implemented advanced robotic techniques to decrease the duration of multi-stage drilling and welding operations, leading to 75% increase in productivity

Mechanical Intern — May 2020 { Sep. 2020
The Robotics Forum, Vishwakarma Institute of Technology — *Pune, India*
- Gained knowledge about various mechanisms, drive systems, actuators, sensors and micro-controllers
- Played a pivotal role in the design and CAD modeling of Arrow Shooting and Reloading, Pick and Place and Lifting Robots, for the DD ROBOCON 2021 competition

Research Projects

Space University Research Initiative | *Trajectery and Control Planning, Soft AM* — Oct. 2023 { Present
- Enhanced an open-source FRESH 3D bio-printer to support UV-curable soft ink applications
- Developed and implemented precise motion control for a multi-DOF UR robotic arm using ROS and Python.
- Fabricated intricate 2D and 3D UV-curable structures utilizing the modifed bio-printer and UR arm.
- Currently designing a trajectory and motion planner for advanced conformal printing.

Comparative Analysis of Kalman Filters for 2D SLAM | *SLAM, Kalman Filter* — Jan 2024 { May 2024
- Analyzed MKF, EnKF, and I-ExKF for 2D SLAM on the UTIAS dataset, highlighting MKF's robustness in handling non-linear, non-Gaussian noise.
- Developed Moment Based Kalman flter using higher-order moments, reducing trajectory estimation errors and improving robustness against disturbances

Autonomous Driving Controller for Tesla Model 3 | *Optimal Control, SLAM* — Sep. 2023 { Dec. 2023
- Developed a lateral full-state controller and a PID lateral and longitudinal controller
- Designed a discrete time infnite horizon LQR lateral optimal controller and implemented A* path planning algorithm with 98% accuracy
- Implemented Extended Kalman Filter SLAM to control the vehicle without default sensor input

Hand Rehabilitation using Soft Robotics | *Soft Pneumatic Actuators* — Sep. 2022 { Dec. 2022
- Conducted literature review on hyper-elastic silicone materials and application
- Designed, fabricated, assembled and tested four PneuNet Bending Actuators using Ecofex-30
- Designed a wearable device with fnger-mounted actuators for remote physical therapy task repetition

Publications

- Yiwen Song, **Aditya Bharambe**. *PASTA: Pneumatically Actuated Software-Tunable Antenna*. Submitted to the 25th ACM International Conference on Mobile Computing and Networking (MobiCom '25), 2025.

Technical Skills

Programming Languages: C, C++, Python
Tools: SolidWorks, AutoCAD, Catia, Abaqus, Matlab, ROS, Webots, Additive Manufacturing