Unmesh Uttam Patil

Portfolio | GitHub | LinkedIn | Google Scholar

Education _

Oregon State University (OSU), OR, USA M.S. in Robotics (CGPA: 3.96/4)

Visvesvaraya National Institute of Technology (VNIT), Nagpur, India Bachelor of Technology in Chemical Engineering (CGPA: 8.17/10)

Skills _

- Languages: Python, C++, MATLAB, Shell Scripting
- ROS2, Motion Planning, Optimal Control, Dynamics & Simulations Robotics:
- Tools: PyTorch , Linux , Git, Docker

Experience _____

Trossen Robotics

Robotics Software Developer Intern

Autonomous Rover software development

- Working on Sensor fusion involving ONVIF camera, Thermal cameras and other sensors.
- Built ROS2 c++ wrapper for dynamixel motors and sensors. •

Oregon State University

Graduate Research Assistant

Autonomous racing (Project F1tenth) [Project]

- Built a safe and efficient autonomy stack in C++ on the NVIDIA Jetson TX2.
- Demonstrated trajectory optimization and dynamic obstacle avoidance at a speed of 13 miles/hr.

INRIA (French National Research Institute)

Research Intern

Collision risk estimation for Autonomous Vehicles (AVs). [Project] [Paper]

- Constructed novel, stochastic motion models to parametrize future occupancy of vehicles and pedestrians.
- Proposed a method to estimate collision risk and tested it by creating collision scenarios in the Carla simulator.
- Presented method generated a 76% larger decision window compared to existing CMCDOT method.

Hi-Tech Robotic Systemz Limited

Research Intern

Local planning and behavior planning for AVs. [Project]

- Developed safety-features to avoid collision with road curbs and updated lane-change behavior states.
- Automated a HD-map generation pipeline to convert OSM maps into required formats which saved around 3 hours everytime a new map was created.
- Studied motion planning architecture of autonomous vehicles and Auto-ware codebase.

IvLabs, VNIT

Student Researcher

[Project] [Thesis] Motion planning and control for Autonomous driving platform.

- Aimed to develop an autonomous ground vehicle for outdoor navigation.
- Designed a custom local planner to navigate on a crowded sidewalk using contour of navigable area from semantic segmentation map. Used A-star for global planning on OSM map.
- Integrated perception, controls, and planning modules by establishing a ROS architecture.

Sept 2022 - May 2024

Sept 2016 - May 2020

Chicago, USA Jan 2024 - ongoing

Oregon, USA

Sept 2022 - ongoing

Gurugram, India

Nagpur, India July 2017 - Apr 2020

Grenoble, France Oct 2020 - Apr 2021

May 2019 - July 2019

Autonomous Multistory Surveillance Robot. [Project] [Paper1] [Paper2]

- Built a robust, novel mechanical design to conquer various terrains and staircases.
- Collected dataset for stair detection and deployed Tiny-YOLOv3 model on Jetson TX1 for stair detection.
- Managed a team of 6 students and secured funding from IEEE student chapter.

Publications _

- Unmesh P., Alessandro R., Anshul P. and Christian L., "Real-time Collision Risk Estimation based on Stochastic Reachability Spaces", IEEE International Conference on Advanced Robotics (ICAR), 2021 [Paper] [Code]
- Aniket G., Akshay K., Unmesh P., *et al.*, "Design and Development of Autonomous Delivery Robot", 2021, Arxiv:2103.09229 [cs.RO] [Thesis] [Code]
- Navid P., Khush A., Unmesh P., et al., "Deep Learning Based Stair Segmentation and Behavioral Cloning for Autonomous Stair Climbing". International Journal of Semantic Computing, (2019)(04), 497-512.[Paper] [Code]
- Unmesh P., Aniket G. *et al.*, "Deep Learning based Stair Detection and Statistical Image Filtering for Autonomous Stair Climbing", IEEE International Conference on Robotic Computing (IRC), 2019 [Paper] [Code]

Coursework and Certificates _____

ROB534 (OSU)	Sequential Decision Making	Outstanding
AI535 (OSU)	Deep Learning	Outstanding
ME531 (OSU)	Control Systems	Outstanding
ROB514 (OSU)	Robotics I & II	Outstanding
CSL101 (VNIT)	Computer Programming	Outstanding
CML433 (VNIT)	Project Planning and Management	Outstanding
AI534 (OSU)	Machine Learning	Very good
CML224 (VNIT)	Numerical Methods	Very good
MAL301 (VNIT)	Optimization Techniques	Very good
Coursera (uTorronto)	Motion Planning for Self-Driving Cars	certificate
Coursera (Georgia Tech.)	Control of mobile robots	certificate

Volunteer Experience

- Reviewer and program committee member for IRC, 2020.
- Led a team of 5 students to create helper robot for hospitals during COVID-19. (Press feature)
- Reviewer for IROS, 2023.
- Served as a core-coordinator of IvLabs for 2019-20. Mentored multiple students on projects related to robotics.
- Organized and taught in various workshops for freshman students during bachelor's degree. (Info.)
- · Presented a poster in OSU Robotics outreach program to help new students understand the field.