

Smit Dumore

📍 College Park, MD, USA ✉️ smitd@umd.edu ☎️ +1 (240) 463 5001 📁 Portfolio in LinkedIn

EDUCATION

University of Maryland, College Park, 08/2022 – Expected (05/2024)
Masters in Robotics (GPA 4.0/4.0)
College Park, MD
Control of Mobile Robots, State Estimation and Visual Odometry, Machine learning.

Vishwakarma Institute of Technology, Pune, India, 2017 – 2021 | India
BTech. Mechanical Engineering (GPA 8.48/10.0)
Machine Design, Mechatronics, Kinematics of Mechanisms, Differential Equations.

PROFESSIONAL EXPERIENCE

Robotics Software Engineer, Botysnc 07/2021 – 06/2022 | India

- Developed a **Hyper Accurate Docking Algorithm** for an AMR (Autonomous Mobile Robot) for autonomous recharging in **C++14**. Experimented with **Iterative Closest Point** scan matching and reflective tape based docking. The docking accuracy obtained was $\pm 2\text{cm}$. ([video](#))
- Worked on Landmark based **Extended Kalman Filter** for localisation of AMR in long corridors. Obtained RMSE of 0.2m and 5 degrees.
- Successfully tuned and tested custom **Navigation Stack** for lifting and tugging applications upto 2 tonnes in various industrial sites.
- Developed a Teleoperator package in **C++** for controlling an AMR with a joystick.

PROJECTS

Autonomous Racing Planning and Control stack, 03/2022
Vishwakarma Institute of Technology, Pune, India

- Implemented real-time **RRT** and **RRT*** path planning algorithms using **C++11** for local planning in a head-to-head autonomous racing car. Implemented optimization technique using **Kd-Tree** to improve the algorithm's performance ([github](#))
- Implemented **Pure Pursuit** to follow waypoints on the racetrack.
- Developed a **Model Predictive Controller** based racing strategy for better path following and obstacle avoidance performance. ([github](#))
- Utilised multi-lane switching and opponent motion prediction for **safely overtaking** the opponent.

Stereo Visual SLAM, University of Maryland, College Park. ([github](#)) 06/2023 – present

- Successfully implemented Stereo Visual SLAM to estimate the 3D locations of keypoints in stereo images.
- Utilized **GFTT** algorithm for feature detection accurate feature identification across frames.
- Employed **triangulation** to accurately determine the 3D positions of keypoints
- Implemented direct method and optical flow techniques for pose estimation and feature tracking
- Performed **Bundle Adjustment** as a backend optimization technique, to refine the camera poses and 3D feature locations

Reinforcement Learning Pacman Agent, 01/2023
University of Maryland, College Park. ([github](#))

- Implemented a **BFS**, **Best first Search**, **Astar**, **Dijkstra** path finding algorithm to search Ghosts in a Pacman environment.
- Modelled the Pacman environment as a **MDP** (Markov decision processes) and used Value Iteration to maximise score of Pacman against stochastic and adversarial ghosts.
- Used Q-learning to learn optimal actions in a state to maximise Pacman score.

Dynamic Window Approach Local Planner, 10/2022
University of Maryland, College Park. ([github](#))

- Developed a kino-dynamic local planner for a turtlebot using the Dynamic Window Approach.
- Planner is capable of dodging **dynamic obstacles**.
- Planner generates paths that are **kinematically feasible** and locally optimal.

SKILLS

Programming Languages

C++11/14/17, Python, MATLAB, Julia

Tools

ROS, OpenCV, PCL, Rviz, Gazebo, pytorch