

Manan Patel

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EDUCATION

- **Georgia Institute of Technology**, Atlanta, GA Fall 2021 – Spring 2023
 - **M. S. in Robotics** – Major GPA: 3.9 / 4.0
- **Purdue University**, West Lafayette, IN Fall 2018 – Fall 2020
 - **B. S. in Mechanical Engineering** – Major GPA: 3.9 / 4.0

SKILLS

- **Programming:** C/C++, Python, PyTorch, ROS, MATLAB, Unity, OpenGL, Simulink
- **CAD:** SOLIDWORKS
- **Parallel Processing:** MPI, std::thread, OpenMP, CUDA
- **Artificial Intelligence:**
 - **Graph Search:** Uniform Cost Search (UCS), Bi-directional UCS, A*, Bi-directional A*
 - **Path Planning:** RRT, RRT*
 - **Reinforcement Learning:** Q-learning, Value iteration, Policy iteration, A2C, Constraint Satisfaction
 - **Probability:** HMM, Viterbi algorithm, Bayes networks
- **Computer Vision:**
 - **Classical:** SIFT descriptors, Depth from stereo
 - **Machine Learning:** Image classification using (custom NN, RESNET), Image segmentation (PSPNet)
- **Other skills:** Mechatronics (assembly, sensors, actuators), TCP/IP, I2C, SPI

WORK EXPERIENCE

- **Robotics Engineering Intern (3D Computer Vision)** – Equipment Share, MO Summer 2022
 - Developed computer vision pipeline for safety vest detection and depth estimation using stereo
 - Camera calibration and image rectification to undistort images
 - Color filtering to segment out safety vest colors under different lighting conditions
 - Performed one to one feature matching between keypoints in left and right camera images using SIFT
 - Estimated depth of the matched keypoints by triangulation
 - Incorporated multi-threading to boost performance

RESEARCH PROJECTS

- **Neural Network Based Wall Follower Robot (Deep RL, Gazebo, ROS)** Fall 2022
 - Designing a neural network to learn policy for following a wall using LiDAR data as input
 - Perform real time weight update to reduce sim to real gap and account for changing dynamics

ACADEMIC PROJECTS

- **High Performance Computing (C++, MPI)** Spring 2022
 - Solving N-Queens problem using multi-threading
 - Simulating John Conway's game of life using custom MPI datatypes, communicators and cartesian topologies
- **Multi-modal Sensing and Navigation on Turtlebot3 (ROS, Python)** Fall 2021
 - Implemented Dead Reckoning to navigate robot through a maze based on sensory input (Lidar, Camera)
 - Designed algorithms for dynamic and static obstacle avoidance, detect and follow a particular object
 - Incorporated control architecture to regulate the movement of the robot
- **Controller Design for an Air Engine (PID, STM32, Simulink)** Fall 2020
 - Developed a PI controller to regulate the speed of a miniaturised air engine
 - Involved System ID, Controller Design, Simulation using Simulink, and Implementation

LEADERSHIP EXPERIENCE

- **Lab Teaching Assistant** – Electrical Engineering Fundamentals Lab, Purdue Aug 2019 – Dec 2020
 - Analyse and debug errors in audio amplifier circuits and validate its source