Manan Patel

215 10th St NW (646) 633 3612

Atlanta, GA 30318 [mpatel608@gatech.edu](mailto:mpatel608@gatech.edu)

https://m-a-c-e.github.io/website/

## EDUCATION

* **Georgia Institute of Technology,** Atlanta, GA Fall 2021 – Spring 2023
  + **M. S. in Robotics** – GPA: 3.54 / 4.0
* **Purdue University,** West Lafayette, IN Fall 2018 – Fall 2020
  + **B. S. in Mechanical Engineering** – GPA: 3.87 / 4.0

## SKILLS

* **Software:** C/C++, Python, PyTorch, ROS, MATLAB, Unity, OpenGL, Simulink, SOLIDWORKS

# Computer Vision: SIFT, Depth from Stereo, Image classification/segmentation (ResNet, PSP net)

# Artificial Intelligence:

**- Machine Learning:** knn, k-means, GMM, Decision Trees, Neural Nets, Bayes Nets, HMM, Viterbi

* + **Graph Search**: UCS, A\*, Constraint Satisfaction, RRT, RRT\*
  + **Deep RL:** A2C, Q-learning, Temporal Difference Learning
* **Parallel Processing:** MPI, threads, OpenMP, CUDA
* **Control Systems**: PID, System ID (time, frequency), Assembly language, TCP/IP, UART, STM32
* **Mechanics**: Lagrangian Mechanics, Forward and Inverse kinematics, Actuator control, Path Planning

## 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

***REASEARCH 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