

# Ankit Talele

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Interests: Perception, Robot Path planning, Robot Controls

## EDUCATION

**Worcester Polytechnic Institute**  
**M.Sc. Robotics, CGPA: 3.75/4.0**

Aug 2022 - May 2024

**University Of Mumbai, VESIT**

Jul 2017 - Jun 2021

**B.Tech, Electronics Engineering, CGPA: 8.68/10 | Roles: Team Lead DrishTI**

## SKILLS

**Programming Languages** : Python, C++, MATLAB, Buzz

**Software and Environments** : ROS, Git, Gazebo, ARGoS, Blender, Pytorch, Tensorflow

## DIRECTED RESEARCH

**Medical FUSION Lab, WPI | Advisor: Dr. Haichong Zhang**

Jan 2024 - Ongoing

*Designing a custom 3D CNN model for Gesture Recognition using Ultrasound Imaging*

**[Abstract in review for IEEE IUS 2024 Conference]**

- Developed a **3D CNN model from scratch** to work both in spatial and temporal frames because we are trying to compare if video training the model will extract more information for gesture recognition.
- Achieved **98% accuracy** on a 10 Class classification model with our self-created data set.
- Future work includes estimating the force of finger movements which can then be passed on to prosthetic devices.
- Tools Used – Pytorch, Tensorflow, Docker, Ultrasound Probe, 3D printed arm to take readings, GIT

## RELEVANT PROJECTS

**Navigating the Unknown- Optical flow based structure-less gap detection for drone flight** [Link](#)

Oct 2023-Dec 2023

- Developed an autonomous navigation system for the DJI Tello EDU drone to traverse irregular-shaped windows.
- Implemented optical flow detection to identify and maneuver through the largest available gaps in obstacles.
- Enhanced quadcopter guidance with visual servoing, aligning the drone's image center with gap centers for precise traversal.
- Applied post-processing techniques to optical flow data for accurate contour mapping of navigational paths.
- Tools Used – Pytorch, Tello EDU, NVIDIA Orin Nano, Blender, Python

**The Perception Saga- Sim2Real Quadcopter Perception Stack** [Link](#)

Nov 2023-Dec 2023

- Engineered a perception stack for the DJI Tello EDU, enhancing drone navigation precision using sim2real and YOLOv8 for window detection.
- Generated custom synthetic training data for neural networks to identify and segment windows in complex environments.
- Implemented Perspective-n-Point (PnP) algorithm for real-time pose estimation, ensuring safe flight through multiple windows.
- Tools Used – Pytorch, Tello EDU, NVIDIA Orin Nano, Blender, Python

**Unscented Kalman And Madgwick Filter for Sensor Fusion** [Link](#)

Aug 2023-Sep 2023

- Implemented UKF and Madgwick filter to estimate attitude of a quadrotor using IMU rawdata.
- Tuned parameters so that filter output will follow the ground truth estimation.

**Robust Trajectory Tracking for Quadrotor UAVs using Sliding Mode Control** [Link](#)

Nov 2022-Dec 2022

- Generated **quintic polynomial trajectory** using set waypoints and traced a track in gazebo.
- Tools Used: Gazebo, python, ROS, crazyflie 2.0 platform, MATLAB

**Multi Robot Motion Planning for warehouse management using WHCA** [Link](#)

Feb 2023- May 2022

**Built 2D simulation environment of a warehouse.**

- Implemented **Global and Local planner using WHCA\*** for robots loading and unloading items.
- Block like grid was used for navigation assuming robots on rails.
- Tools Used – Python, Matplotlib

**Firefighting Using Robot Swarms** [Link](#)

Mar 2023- Apr 2023

**Simulated forest fires and compared swarm behavior by creating a simulation environment.**

- Tackled forest fires using robot swarms using A\* path planning and dynamic obstacle avoidance.
- Tools Used – Python, Pygame

## ACTIVITIES

**Texas Instruments Organized DrishTI Innovation Challenge** – Secured **3<sup>rd</sup> place** in the DrishTI Innovation challenge as a **team-lead** on team “UAV” with the topic of painting high rise buildings using UAV's.

**Embedded C using ESP32 and Internet of Things** – Participated in **IOT and Embedded C** workshop in college organized by Tech-Tinkerers Lab