Ankit Talele

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EDUCATION:

Worcester Polytechnic Institute — *Aug 2022 - May 2024*
M.Sc. Robotics, **CGPA: 3.77/4.0**

University Of Mumbai, VESIT — *July 2017 - Jun 2021*
B.Tech, Electronics Engineering, ***CGPA:* 8.68/10** | *Roles: Team Lead DrishTI*

EXPERIENCE:

Deep Learning Research Student | Medical FUSION Lab, WPI | Advisor: Dr. Haichong Zhang Poster — *Jan 2024 – May 2024*
Designing a custom 3D CNN model for Gesture Recognition using Ultrasound Imaging
*[**Selected for presentation** at the **IEEE International Ultrasonics Symposium (IUS) 2024 Conference**]*

- Developed a 3D CNN model from scratch to work both in spatial and temporal frames to compare information processed through video frames in the training data instead of image snippets.
- Achieved 98% accuracy on an 11 Class classification model with our self-created data set.
- Currently tackling the issue of identifying finger force estimation
  Tools Used – Pytorch, Tensorflow, Docker, Ultrasound Probe, 3D printed jig with vicon markers and sensors, Git

System Controls Automation Intern | Electronic Control System | Nagpur, India — *Sep 2019 - Feb 2020*

- **Designed and implemented SCADA systems** for a milling factory to optimize and monitor operations effectively.
- **Developed and fine-tuned PID controllers** for milling robots, ensuring precise and stable control of the robotic milling processes.
- **Programmed PLC ladder logic** on Philips PLCs tailored to meet the specific needs of individual clients, enhancing operational efficiency and customization.
- **Configured and programmed DC servo motors** using PLCs for a garment factory, improving automation and control in the production process.

RELEVANT PROJECTS:

Navigating the Unknown- Optical flow based structure-less gap detection for drone flight GitHub — *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 navigation.
- **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 Video GitHub — *Oct 2023-Dec 2023*

- **Engineered a perception stack** for the **DJI Tello EDU**, enhancing drone navigation precision using **sim2real** techniques and **YOLOv8** for window detection.
- **Conducted camera calibration** to determine camera intrinsics for the **Perspective-n-Point (PnP) algorithm**.
- **Generated custom synthetic training data** for neural networks to identify and segment windows in complex environments.
- **Implemented the 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 GitHub — *Aug 2023-Sep 2023*

- **Implemented the Unscented Kalman Filter (UKF) and Madgwick filter** to estimate the attitude of a quadrotor using IMU raw data.
- **Tuned parameters** to ensure the filter output closely follows the ground truth estimation.

Robust Trajectory Tracking for Quadrotor UAVs using Sliding Mode Control GitHub — *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* GitHub — *Feb 2023- May 2022*

- **Built a 2D simulation environment** of a warehouse.
- **Implemented global and local planners using WHCA*** for robots loading and unloading items.
- **Used a block-like grid for navigation**, assuming robots on rails.
  Tools Used: Python, Matplotlib

Firefighting Using Robot Swarms GitHub — *Mar 2023- Apr 2023*

- Simulated forest fires and compared swarm behavior by creating a simulation environment.
- Tackled forest fires using robot swarms with A* path planning and dynamic obstacle avoidance.
  Tools Used: Python, Pygame

ACTIVITIES:

Texas Instruments Organized DrishTI Innovation Challenge – Secured **3rd 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