Mayank Bansal

Worcester MA
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EDUCATION:

Worcester Polytechnic Institute (WPI), Worcester, MA
Master of Science in Robotics, GPA 4.0/4.0 May 2024
Relevant Courses: Motion Planning, Robot Control, Reinforcement Learning, Robot Dynamics, Legged Robotics

Manipal Institute of Technology, **(MIT),** Manipal, India
Bachelors of Technology in Mechatronics, GPA 8.71/10.0 June 2022

SKILLS:

Programming Languages/ Operating System: Windows, Ubuntu, OOP, Python3, C++, C, Java, Embedded C
Applications/ Software: MATLAB, SimScape, ROS2, Solidworks, Arduino, PyTorch, OpenCV, Gazebo, Unity, AirSim
Languages: German, Hindi

PROJECTS:

DQN based Autonomous Vehicle control March 2023 – April 2023

- Developed a DQN based controller for an autonomous vehicle in a simulated environment using AirSim simulator.
- Used Python, PyTorch, and OpenCV to preprocess sensor data, train the DQN model, and control the vehicle.
- Achieved an average speed of 5 mph and successfully navigated a neighbourhood environment avoiding collisions.

Complete Coverage Path Planning in Unity March 2023 – April 2023

- Implemented complete coverage path planning and spanning tree coverage path planning algorithms in C#.
- Created a mock-up conference room in Unity and visualized the algorithm on a mobile robot.
- Conducted comparative analysis of the two algorithms demonstrating the advantages and limitations of each.

Robust Control of UAV March 2023 – April 2023

- Designed a robust controller for a quadrotor in Gazebo to track a square trajectory with external disturbances.
- Utilized a sliding mode controller and tuned its parameters to achieve smooth and precise motion of the quadrotor.
- Demonstrated effective control law by achieving a high degree of tracking accuracy and disturbance rejection.

Hexapod Walking Robot October 2022 – December 2022

- Built a hexapod robot capable of walking using tripod gait.
- Collaborated with a team to 3D print and assemble the robot using PLA, Arduino Uno and SG90 servo motors.
- Implemented inverse kinematics for each leg to precisely follow the desired trajectory.

Control and planning for three link SCARA manipulator October 2022 – December 2022

- Controlled a three-link SCARA manipulator to implement set-point position and trajectory tracking.
- Used ROS2 and Gazebo to develop a URDF of the robot and use PID controller to control position and velocity.
- Applied service-client model to move the end-effector to a desired position and velocity.

WORK EXPERIENCE:

Computer Vision Intern, Wastefull Insights, Vadodara, Gujarat, India January 2022 – May 2022

- Trained object detection and classification models to segregate wastes on a conveyor belt.
- Used YOLOv5 object detection algorithm and ResNet based colour classification model and deployed them on Jetson Xavier using TensorRT inference engine and CUDA.
- Developed the dataset and used AWS S3 services to manage and control the flow of data in the pipeline.
- Evaluated and improved the performance of the models to obtain an accuracy of above 90% on both tasks.

LEADERSHIP AND EXTRA-CURRICULAR ACTIVITIES:

- Led a team of four in the signature robotics competition of India, e-Yantra.
- Organizer of a national Capture the Flag cyber-security competition.