Rahul Roy

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https://github.com/roy2909
Portfolio: https://roy2909.github.io/

EDUCATION

Northwestern University **Evanston, IL**
M.S. in Robotics *Expected December 2024*

Manipal Institute of Technology **Manipal, India**
B.Tech. in Mechatronics Engineering - Minor in Robotics and Automation *June 2018- July 2022*

PROJECTS

Autonomous Colored Bowling Pin Targeting with the 7-DOF Franka Arm and Nerf Blaster *Fall 2023*

- Programmed a Franka Emika robot arm using ROS2 and Python to autonomously detect and knock down colored bowling pins in an unknown environment
- Trained a YOLO (You Only Look Once) model for detection and classification of the colored bowling pins, displaying them as markers in Rviz2.
- Developed a Python API for the ROS2 Moveit package and used it to control the robot's movements

Motion Controlled Differential Drive Car with Infrared Sensor (IR) Operated Gripper *Fall 2023*

- Programmed an nRF52833 microcontroller in C to control a differential drive car and autonomously operate a gripper on object detection using an IR sensor.
- Transmitted precise Euler angles via Radio communication to direct the car's movement based on tilt and inclination.
- Integrated an IR Grid-EYE sensor for object detection, triggering servo-controlled gripper actions for precise object manipulation within the car's range.

Automated Grasping: Pincher X100 4-DOF Robot Arm Grasps a Purple Pen *Fall 2023*

- Programmed a Pincher X100 4-DOF robot arm to grasp a purple colored pen.
- Leveraged Intel Realsense D435i camera and OpenCV for precise object localization, utilizing HSV color space and depth mapping for spatial orientation.
- Enabled Trossen PincherX 100 robot arm manipulation, seamlessly coordinating movements for accurate and secure object grasping based on camera-detected coordinates.

PROFESSIONAL EXPERIENCE

Center for Artificial Intelligence and Robotics, DRDO *Jan 2022 - June 2022*

Project Intern

- Set up IMU and Velodyne LIDAR for the Husky A200 robot.
- Achieved autonomous navigation through a set of waypoints by generating a map of the environment using SLAM Toolbox (based on KartoSLAM), Cartographer, and Nav2 (Foxy).
- Performed a comparative study of the TEB and DWA planners for the proposed robot**.**

Central Research Laboratory, BEL *July 2021 - August 2021*

Intern

- Implemented algorithms related to Robotic Navigation including Trilateration, Triangulation, and GPS.
- Observed practical demonstrations of Oxygen Concentrators and an Autonomous UV Sanitization Robot.

SKILLS

- **Software**: Python, C++, C, Git, Linux, Unit Testing, Bash, Matlab
- **Robotics**: ROS2/ROS, Nav2, Computer Vision, Machine Learning, MoveIt, Gazebo, SLAM, CoppeliaSim, Embedded Systems, nRF52833
- **Manufacturing**: Circuit design, 3D Printing, Solidworks