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*

GPA 3.85

Manipal Institute of Technology   **Manipal, India**

B.Tech. in Mechatronics Engineering - Minor in Robotics and Automation   *June 2018- July 2022*

GPA 3.75

RELEVANT COURSEWORK

Theory of Machine Dynamics, Robotic Manipulation, ROS/ROS2, Embedded Systems in Robotics, Mechatronics, Microprocessor System Design, SLAM for Robotics.

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 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 using **SLAM Toolbox**, **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/GitHub, Linux, Unit Testing, Bash, MATLAB
- **Robotics**: ROS2/ROS, Nav2, Computer Vision, Machine Learning, MoveIt2, Gazebo, SLAM, CoppeliaSim, Embedded Systems, nRF52833, YOLOv8, Unitree Go1, Nvidia Jetson, Franka Emika Panda
- **Manufacturing**: Circuit design, 3D Printing, SolidWorks, Onshape