RITIKA GHOSH

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EDUCATION

Northwestern University, *MS in Robotics* Dec. 2023
Relevant Courses: Machine Learning, SLAM, ROS2, Robotic Manipulation and Machine Dynamics
Thapar Institute of Engineering and Technology, *BE Mechatronics* 2017- 2021

RELEVANT SKILLS

Programming: Python, C++, C (including embedded), MATLAB, Version Control (Git), Unit Testing, Linux
Robotics: ROS2/ROS, Gazebo, Rviz, MoveIt, Computer Vision (OpenCV), Machine Learning, CoppeliaSim
Mechanical/Electrical Design: Creo, SolidWorks, Abaqus, Siemens NX, AutoCAD, Eagle

WORK EXPERIENCE

Siemens Industry Software Pt. Ltd Gurgaon, India
Simulation and Design Intern Jan. - July 2020
- Collaborated with a team developing digital twin simulations of a rubber belt manufacturing plant in NX CAD/MCD.
- Established signal flow to the simulated digital twin with PLCsim advanced software and OPC UA communication.
- Developed programmable logic controller (PLC) ladder programs and built HMI applications in TIA portal software.

Thapar Institute of Engineering and Technology Patiala, India
Research Assistant 2019 - 2021
- Designed, simulated and analyzed a bone drilling module in Abaqus for an ongoing comparative study between the practical outcomes with the theoretical results from the software.
- Tested the drillbit in simulation while observing the thermal and vibrational impact on the bone with changing frequency.

TECHNICAL PROJECTS

Franka Robot Playing Air hockey (HockeyBot): Python, ROS2, MoveIt, OpenCV Sept. - Dec. 2022
- Collaborated with a team of 4 to program a 7 DOF industrial arm to autonomously play air hockey, integrating perception and motion planning for the continual blocking of a moving puck.
- Tracked a sliding puck by applying OpenCV and predicted its trajectory path with the help of Intel RealSense D435.
- Developed a python API wrapper for the ROS2 interface to MoveIt which was implemented in the planning and execution of desired motion trajectory of the manipulator to collide with the moving puck.

4 DOF PincherX grabbing a Pen: Python, Realsense, OpenCV Sept. 2022
- Utilized the OpenCV library and an Intel RealSense D435i depth camera to identify the contour of the pen based on its color, find the center pixel, and translate the point to 3D coordinates.

Design of an Automated Dry Waste Segregation System: Creo, C++, Raspberry Pi Sept. 2020 - May 2021
- Led a team of 4 to design, simulate and analyze (considering manufacturing constraints) a mechanical system segregating dry waste into categories of paper, plastic, glass and ferrous & non-ferrous metals for recycling with Creo 4.0.
- Identified different materials using proximity & triad spectroscopy sensors and an image recognition algorithm in C++.
- Integrated a synchronized flap-conveyor mechanism that separates the mixed waste according to the data from sensors.

Design of Remote-Controlled Sanitization Bot: Creo, SolidWorks, C++, IoT Mar. - June 2020
- Designed a contactless high-pressure disinfectant spraying robot to sanitize all contact surfaces of large indoor areas.
- Implemented IoT on a NodeMCU microcontroller in C++ for remote control of the robot via a web server accessed by any device on the same Wi-Fi network.

Design and development of a line following Robocar: C++, Arduino Uno, Zigbee Aug. - Dec. 2018
- Built out the electronics subsystem and programmed a line following Robocar to sense obstructions and reroute its course in case of multiple cars on the same path using IR and Ultrasonic sensors with wireless Zigbee communication.

LEADERSHIP

- Joint-secretary and Sergeant at arms of Rotaract Club.
- Sergeant at arms of Toastmasters Club in Thapar Institute of engineering and technology.