RAYYAN RAFIKH

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EDUCATION

Northeastern University, *Boston, MA*   Sep 2023 – May 2025
Master of Science in Robotics, Concentration: Electrical and Computer Engineering   *GPA:3.7*
Coursework: Autonomous Field Robotics, Reinforcement Learning, Robotics Sensing and Navigation, Mobile Robotics, Pattern Recognition & Computer Vision, Robot Mechanics and Control
Activities: NU Robotics Club: Space Robotics Technical Member

Manipal Institute of Technology, *Manipal, India*   Jul 2018 – Aug 2022
Bachelor of Technology in Mechatronics   *GPA: 8.7/10*
Coursework: Robotics, Sensors & Instrumentation, Linear Control Theory, Electric Drives, Microcontroller Based System Design, Machine Learning, Hydraulics & Pneumatics Systems, Machine Vision & Image Processing, Data Structures & Algorithms

SKILLS

Programming Languages: Python, C++, C, MATLAB, Embedded C, Assembly
Developer Tools: ROS, Git, Bash, Raspbian OS, Arduino IDE, Keras, TensorFlow, Pytorch, OpenCV
Computer-Aided Design: Solidworks, Fusion 360, Catia, AutoCAD, Simulink
Languages: English (Fluent), Hindi (Native), Urdu (Proficient), Arabic (Proficient), German (Beginner)

PROFESSIONAL EXPERIENCE

Plant Automation Engineer, COMACO GmbH, *Jeddah, Saudi Arabia*   Oct 2022 – Aug 2023
- Devised control routines for automation functions in industrial asphalt-mixing plants using PLCs and Electric Drives.
- Enhanced output by 20% through diagnosis of Pneumatics, Sensorics and Human-Machine Interfaces.
- Increased automation level by 50% through integration of Robotic Hardware, Microcontrollers and Embedded Systems into the plant.

Robotics Research Intern, Sultan Qaboos University, *Muscat, Oman*   Jul 2022 – Sep 2022
- Developed a waterborne autonomous system for detection, measurement and sampling of oil spills on water bodies using ROS.
- Engineered & integrated Self-Stabilizing Drone Landing Platforms and Oil-Sampling Hydraulic machinery into Hydrodynamically efficient hulls using CAD, Simulation & Analysis for 'Autonomous Detection & Sampling of Oil Spills & Red Tides in Shores'.
- Optimized control routines of Drones, Sensors, landing platforms & Sampling device by 80% using MATLAB & Python.

Industrial Automation Intern, Samsung, *Tunis, Tunisia*   Aug 2021 – Sep 2021
- Prototyped electronic circuitry for qualitative inspection of manufactured refrigerator parts before final assembly using 8051 & RPi for 'Refrigerator Control Station Design'.
- Automated inspection line by 90% using an embedded system consisting of Raspberry Pi and temperature probes running on Python.
- Formulated C code for alternative control of the inspection line using a circuitry based on 8051 Microcontroller.

ACADEMIC PROJECTS & PUBLICATIONS

Comparative Implementation of SLAM on Mobile Robotic Platforms using Ultrasonic and LiDAR sensors   Dec 2023
- Built a differential-drive mobile robot with RPi, Arduino & electrical drives communicating over ROS using Python & C++ nodes.
- Employed data from GPS fused with that from IMU and odometry from encoder as the primary navigation stack.
- Achieved 80% matching accuracy between pointclouds of rotating SONAR and LiDAR with closed-loop SLAM in RViz.

Simultaneous Localization And Meshing (SLAMesh) Implementation in Natural Environments   Dec 2023
- Implemented Grid & Sampling based Motion Planning using the SLAMesh model on Natural Environment Datasets.
- Optimized OCM generation of 'wild places' dataset with 75% enhanced efficiency through parameter tuning of the SLAMesh model.

Simulated Evaluation of Navigation System for Multi-Quadrotor Coordination in Search and Rescue,   Nov 2023
International Conference on Robotics, Control, Automation and Artificial Intelligence
- Evaluated the efficiency of different Multi-Robot Algorithms and Convolutional Neural Networks used in Search and Rescue.
- Utilised Gazebo, OpenCV, CUDA and YOLO libraries for implementation of Computer Vision in ROS.

Autonomous Navigation System for Multi-Quadrotor Coordination and Human Detection in Search and Rescue,   Aug 2023
Journal of Robotics and Mechatronics
- Formulated Space-Partitioning algorithm for Optimal Deployment of Swarms using Voronoi Region-Partitioning scheme.
- Implemented MATLAB script and evaluated the real-time usage of the formulated algorithm in Search and Rescue.

Position error estimation and compensation of 3-DOF Delta Robot under the effect of link tolerances,   Mar 2022
International Conference on Recent Advances in Modelling and Simulations Techniques in Engineering and Science
- Authored Python library for estimation and self-compensation of performance errors due to link tolerances in delta robots.
- Leveraged the use of CAD, Forward and Inverse Kinematics to perfect the estimation of errors in real-time.

LEADERSHIP & AWARDS

Recipient of 'Energy Future Leader' Award, *Green Hydrogen Summit Oman 2022*   Dec 2022
- Analyzed and presented the potential for utilization of Green Hydrogen to achieve Carbon Neutrality in the Sultanate of Oman.