RAZAQ KHAN MOHAMMAD ABDUL

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EDUCATION

Master of Science in Robotics **September 2023 - December 2025**
Northeastern University, Boston, MA

Bachelor of Engineering in Electronics and Communication Engineering **August 2018 - June 2022**
Osmania University, India

SKILLS

Programming: C, C++, Python, Embedded C, MATLAB, Verilog
Frameworks/Libraries: ROS, ROS2, RViz, Gazebo, MoveIt, PCL, OpenCV, NumPy, Pandas, Matplotlib, ORBSLAM, Navigation Stack, gmapping, AMCL, YOLO, tf2, TensorFlow, PyTorch
Tools: Linux, Jupyter/Voila, Docker, Git, GitHub, CMake, Jira, SQL
Hardware: Jetson (Nano/Xavier), RealSense D455, LIDAR, RTK GPS, Raspberry Pi, Arduino, ATMega, PLCs, Oscilloscopes, KiCAD

WORK EXPERIENCE

Robotics Engineer Co-op, *Clarapath, New York, USA* **May 2024 – December 2024**

- Automated firmware deployment pipeline for Jetson devices using Python scripting and server integration with flash progress tracking, reducing deployment time from 8 hours to 30 minutes removing technical dependencies
- Created diagnostic tool for multi-motor subsystem monitoring by developing Voila GUI using multithreading and real-time callbacks for unified system control
- Integrated PLC controlled door sensors and latches to pathology equipment control system by modifying C++ algorithms with ROS based fail-safe logic, preventing operator exposure to processing blades and UV light
- Developed automated production validation system using Voila UI with SQL queries and hardware control to test 30+ checkpoints across different subsystems, reducing validation time from 4 hours to 10 minutes

Robotics Engineer, *Dhi Sathi Robotics Pvt. Ltd. (Farm Sathi), India* **July 2022 - June 2023**

- Built modular RS485 communication system connecting three agricultural subsystems (tiller, sprayer, plower), writing embedded firmware for inter-module communication and fabricating production-ready electrical boxes
- Resolved critical ground loop failures in robot's electrical system by designing PCBs with optocoupler isolation using KiCAD and FlatCAM, iterating through multiple prototypes to achieve reliable field-operation
- Designed autonomous navigation for agricultural robot, integrating RTK GPS and developing ROS-based waypoint recording system, enabling outdoor navigation

Robotics Intern, *Introbotics Systems Pvt. Ltd., India* **January 2022 - July 2022**

- Developed autonomous navigation system for logistics prototype robot, integrating RPLidar with ROS navigation stack using gmapping for SLAM and AMCL for localization, achieving accurate indoor navigation and obstacle avoidance
- Implemented vision-guided manipulation system for object picking, using OpenCV/YOLO for detection and MoveIt to control 5-DOF arm for automated pick-and-place operations in cluttered environments

ACADEMIC PROJECTS

Terrain Mapping for Quadruped Robot Navigation, *NEU* **February 2025 - April 2025**

- Developed elevation mapping system for quadruped robots using ROS2 and RealSense D455, containerizing in Docker to test performance on Jetson Nano
- Evaluated performance metrics between laptop and Jetson Nano (x86/ARM) by measuring frame rates, CPU usage, memory, and thermal profiles to determine minimum hardware requirements
- Applied CNN foothold detection using Wellhausen & Hutter's method for autonomous robot navigation on rough terrain

Computer Vision and Machine Learning Applications, *NEU* **January 2024 - April 2024**

- Implemented computer vision techniques for image analysis, developing filters, histogram-based retrieval, and real-time segmentation with OpenCV, creating complete preprocessing pipeline for face detection
- Trained ML models for visual recognition: CNN with transfer learning for digit-to-Greek letter classification and VGG16-based waste classifier achieving 94.5% accuracy for real-time biodegradable detection via webcam

Multi-Sensor SLAM Implementation for Indoor Navigation, *NEU* **October 2023 – December 2023**

- Fused IMU, encoders, and LIDAR data using Extended Kalman Filter for robust localization with 20cm position accuracy
- Implemented particle filter localization with adaptive resampling for kidnapped robot problem recovery

ACHIEVEMENT

Published a paper on 'ROS Based Autonomous Mobile Manipulator Robot' in Atlantis Press part of Springer Nature and won first prize in the “Dr. Abdul Kalam Innovation Challenge”