Mohammed Abdul Rahman

Robotics and Programming Enthusiast | ROS Dev

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Summary

I'm a passionate robotics enthusiast focused on mastering **Robotics Operating System (ROS)**. I aim to develop innovative software for efficient robotic **communication**, **control**, and **coordination**. Committed to **continuous learning**, I strive to push the boundaries of **robotics technology**.

Education

Osmania University — **December 2024**

B.Eng. Computer Science and Engineering — Artificial Intelligence and Data Science

Technical Experience

Team Robocon MJCET — **12/2020 - Present**

Robotics Engineer

Funded by Muffakham Jah College of Engineering and Technology (MJCET); overseen by the Department of ECE

- Led the team to its **first national DD Robocon** qualification in **5 years**, managing a **core team of 25+ members** through **robot design**, **autonomous programming**, and **competitive strategy**.
- Developed full-stack robotic systems using **Python**, **ROS**, and **MoveIt** across **6+ autonomous builds**, implementing **SLAM**, **odometry-based navigation**, and **real-time computer vision** pipelines.
- Engineered high-speed autonomous robots with precise odometric control and **peak acceleration of 4 m/s²**; integrated **ROS-based PS4 teleoperation** for hybrid control.
- Collaborated with mechanical teams to co-develop and optimize **swerve, mecanum, and holonomic omni** drive systems; provided control logic that shaped drivetrain performance.
- Designed and fabricated **4 custom 2-layer PCBs** enabling seamless integration of **10+ sensors and actuators** (LIDAR, IR, servos, steppers, DC motors).
- Built modular ROS nodes for **sensor fusion** (IMU + encoders), **object detection**, and simulated a **7-DOF robotic arm** using MoveIt for planning and testing.
- Devised competitive gameplay and **anti-strategies** by analyzing tape, scouting opponents, and adapting tactics in real-time; preserved key strategies for playoffs to maintain unpredictability.
- Directed media and branding efforts: co-designed the official team logo (from 2023), edited **10+ recruitment and marketing videos**, and created campaign visuals.

Consciente Technologies — **08/2022 - 09/2022**

Robotics Engineer - Intern

- Developed software systems for **robot localization**, **object detection**, **tracking**, and **control**.
- Utilized **ROS2**, **C++**, **MoveIt**, and **Python** to enhance robotic **functionality** and **performance**.

Skills

ROS/ROS2	Python	C/C++	SLAM	Computer Vision
MoveIt	Linux	3D Printing	CAD Design	PCB Design

Projects

Custom DWA Local Planner — 02/2025 - 03/2025

- Developed a customized **Dynamic Window Approach (DWA) Local Planner** for autonomous navigation in **ROS**.
- Enhanced **obstacle avoidance** and **trajectory optimization** by implementing custom **cost functions**.
- Integrated the planner with **ROS 2 Navigation Stack** and tested it in **Gazebo simulation** for real-time performance.
- Optimized local path planning to improve robot **motion smoothness** and **collision avoidance**.
- Fine-tuned **velocity sampling** and **obstacle evaluation** parameters for better responsiveness in **dynamic environments**.

GAMORA - Gesture Articulated Meta Operative Robotic Arm — 12/2022 - 06/2024

- Designed a **5-DOF robotic arm** using **SolidWorks** and converted it into a **URDF** for **ROS integration**.
- Implemented **motion planning** and **inverse kinematics** using **MoveIt** to achieve precise control.
- Integrated **Oculus Quest 2** for immersive visualization of the robot's **digital twin**, enhancing real-time interaction.
- Used **Oculus Touch controllers** to directly manipulate the robot's **end effector**, enabling remote operation in hazardous environments.

KALB - Kinematical Autonomous Legged Bot — 08/2022 - 10/2023

- Designed a **12-axis quadruped robot dog** using **SolidWorks** and created its **URDF** for **ROS integration**.
- Configured controllers using the **CHAMP setup assistant**, modeling the system after the **MIT Cheetah robot**.
- Implemented autonomous navigation with the **ROS navigation stack**, incorporating **SLAM** and **mapping** for environmental awareness.
- Achieved fully autonomous operation with advanced **locomotion** and **navigation capabilities** using **Gazebo simulation**.

Swerve Drive — 08/2021 - 08/2022

- Designed a **swerve drive system**, enabling **omnidirectional movement** by allowing each wheel to steer independently for enhanced **agility** and **maneuverability**.
- Converted the design into a **URDF** for **ROS integration**, implemented a **swerve steering controller**, and developed a **waypoint navigation script** using **odometry** and sensor fusion with **encoders** and an **IMU**.
- Utilized **BLDC motors** to achieve high-speed operation, optimizing performance within the competition's **3-minute time constraint**.
- Played a key role in **design**, **testing**, and **ROS integration**, with a primary focus on **odometry** and **waypoint navigation**.