

FLOOR CLEANING ROBOT



CONTRIBUTORS

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01. INTRODUCTION

The Floor Cleaning Robot using ROS is an innovative project that explores the integration of robotics and automation technology into everyday cleaning tasks. This project aims to design and develop an autonomous robot capable of efficiently navigating and cleaning indoor environments, thereby revolutionizing traditional floor cleaning methods. By leveraging the power of the Robot Operating System (ROS), the robot's capabilities are enhanced, allowing seamless communication between its various components for improved efficiency and performance.

02. OBJECTIVE

The system will be programmed in Python with rospy libraries, enabling seamless communication between Raspberry Pi and ROS nodes for effective control and data exchange. Key goals include:

1. Building a robust robot platform integrating Raspberry Pi for control.
2. Implementing object detection for collision avoidance during navigation.
3. Creating a structured ROS software architecture with Python and rospy.
4. Developing path planning and cleaning algorithms for efficient floor cleaning.
5. Integrating a vacuum mechanism for effective cleaning.
6. Designing a user-friendly interface for easy cleaning of floor.

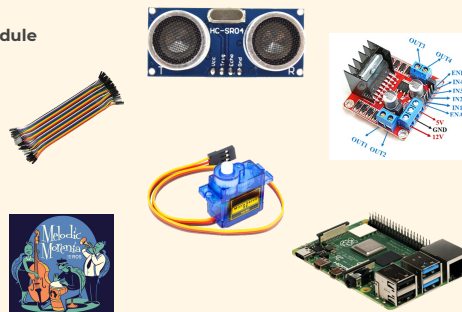
08. REFERENCES

ROS Noetic - <https://wiki.ros.org/noetic>
 Raspberry Pi - <https://www.raspberrypi.com/>
 Ultrasonic Sensor - <https://tutorials-raspberrypi.com/raspberry-pi-ultrasonic-sensor-hc-sr04/>

03. COMPONENTS USED

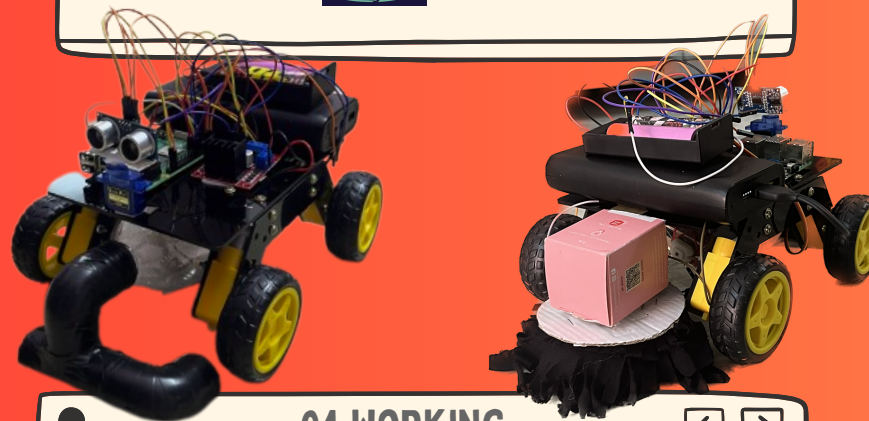
HARDWARE

- L298N Motor Driver Module
- Ultrasonic sensor
- Raspberry Pi 4
- tyre
- Battery
- Vacuum
- Jumper Wires
- Servo Motor



SOFTWARE

- ROS Noetic
- Raspbian Buster

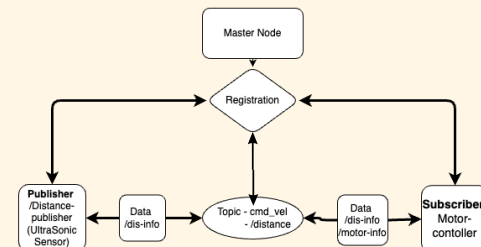


04. WORKING

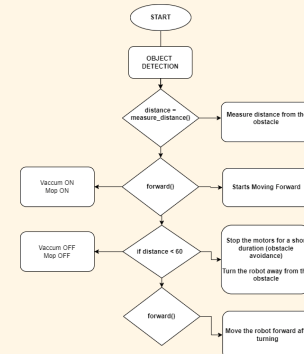
1. The Ultrasonic Sensor detects obstacles and relays data to the Raspberry Pi 4.
2. The Raspberry Pi 4 processes the sensor data and determines the optimal cleaning path, sending commands to the L298N Motor Driver Module.
3. The Motor Driver Module controls the robot's movement, allowing it to navigate around obstacles while cleaning efficiently.
4. The mop and vacuum are activated by the Servo Motor, providing a dual-cleaning mechanism for spotless floors.
5. The robot operates autonomously, maximizing cleaning coverage and minimizing human intervention.

05. FLOW DIAGRAM

ROS FLOW DIAGRAM



CODE FLOW DIAGRAM



07. CONCLUSION

It seamlessly integrates components like Ultrasonic Sensor, L298N Motor Driver Module, Raspberry Pi 4, versatile tyres, long-lasting battery, mop, vacuum, Servo Motor, and jumper wires for efficient cleaning. With precise object detection, agile movement, and real-time decision-making, the robot navigates safely and autonomously. Its dual-cleaning mechanism, robust battery, and seamless connectivity ensure spotless and immaculate floors.