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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
A MINI PROJECT PRESENTATION
ON
SMART FLOOR CLEANING ROBOT BY IOT

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ABSTRACT:

The floor cleaning robot is aims to create an autonomous robot that can clean floors without human intervention. Households of today are becoming smarter and more automated cleaning of floor is very important role in our health and this robot reduces man power requirement. This project is used for domestic purpose to clean the surface automatically.

When it's turned on it clears the dust by moving around the surface as it passes over it sensors are used to avoid obstacles at the same time brushes attached to the motors to cleans the surface. The approximate battery life is expected to be 45 minutes. This can be useful in improving the lifestyle of mankind. The robot returns to its charging station when the battery is low ensuring continuous operation.

EXISTING SYSTEM:

Here's a description of the current methods used to solve the problems of floor cleaning robot using IoT:

- Navigation and mapping
- Cleaning path optimization
- IoT connectivity
- Sensors and Actuators
- Power management
- Security and Privacy

Limitations:

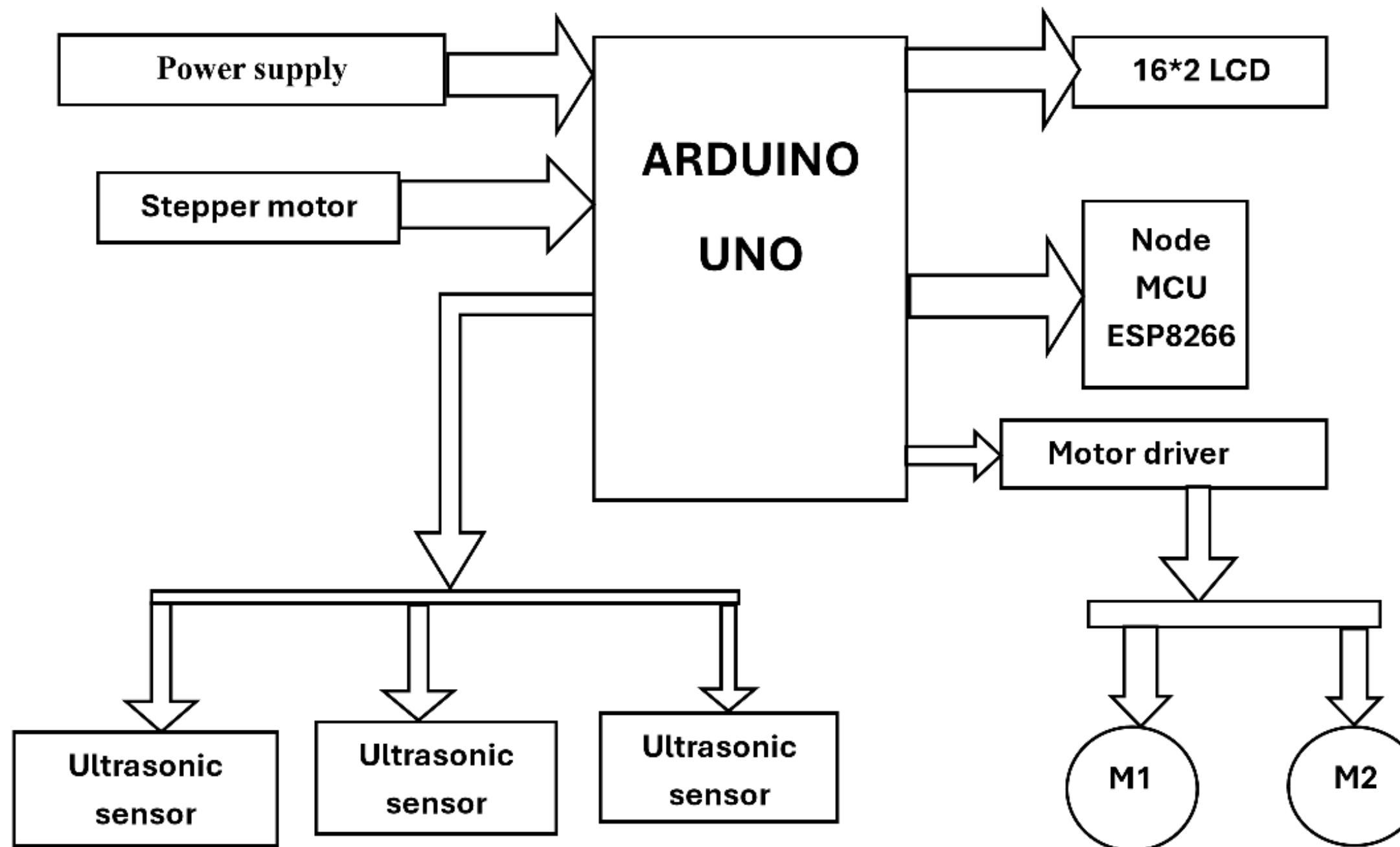
- Noise and disturbance
- Complexity
- Repair costs
- Connectivity issues

PROPOSED SYSTEM:

The proposed system “smart clean” is a WiFi enables, IoT based smart cleaning robot designed to efficiency clean floors while minimizing user intervention.

- Advanced sensors
- Data analytic
- Voice Assistant Integration
- Real-time Notification
- Mapping and Navigation

BLOCK DIAGRAM:

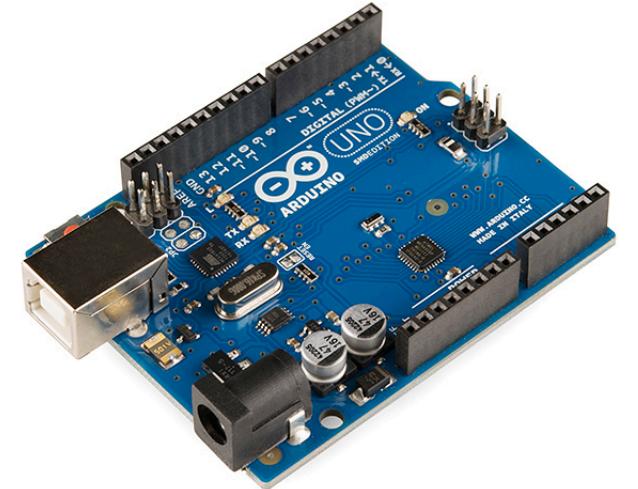


COMPONENTS:

ARDUNI UNO:

An Arduino Uno acts as the central control unit, processing sensor data from the environment, making decisions about movement and cleaning actions, and communicating with a smartphone app or cloud platform via a wireless module like Bluetooth, essentially "thinking" and directing the robot's cleaning operations based on real-time information and user demands.

- 6 Analog input pins
- 12 KB flash memory
- 16 MHz clock speed



DC MOTOR:

The two DC motors allow the robot to move in forward, backward, left, or right directions. Depending on the signal received, the microcontroller adjusts the motor direction and speed for precise control. When the robot moves across the floor, the 5V water pump releases water for cleaning.



LCD DISPLAY:

1. Display Cleaning Mode: Show the current cleaning mode (e.g., "Auto", "Manual", "Spot Cleaning").
2. Display Battery Level: Show the remaining battery life (e.g., "80%", "50%", "20%").
3. Display Cleaning Progress: Show the progress of the cleaning task (e.g., "Cleaning...", "Completed").
4. Display Error Messages: Show error messages (e.g., "Obstacle detected", "Low battery").
5. Display IoT Commands: Show commands received from the IoT platform (e.g., "Start Cleaning", "Stop Cleaning").
6. Display Sensor Data: Show sensor data (e.g., temperature, humidity, dust levels).



specifications:

- Operating Voltage: 5V
- Backlight colour: Green
- Horizontal characters: 16
- No of lines: 2
- Supports MCU speed up to 2Mhz

Ultrasonic:

An ultrasonic sensor acts as a primary obstacle detection mechanism, allowing the robot to navigate around furniture, walls, and other objects by measuring the distance to them using sound waves, enabling it to avoid collisions and clean efficiently while maintaining autonomy.

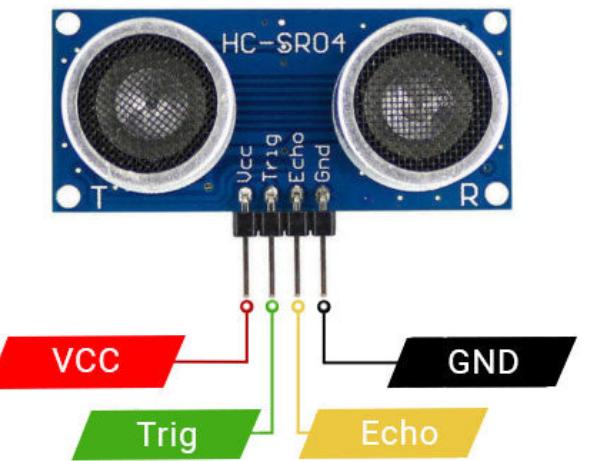
Specifications:

Power Supply: DC 5V

Working Current: 15mA

Working Frequency: 40Hz

Ranging Distance : 2cm – 400cm



STEPPER MOTOR:

stepper motor is typically used to precisely control the rotation of the mopping pad, allowing for consistent and controlled cleaning movements across the floor, often with the ability to adjust cleaning patterns and pressure based on user input or sensor data via an IoT connection

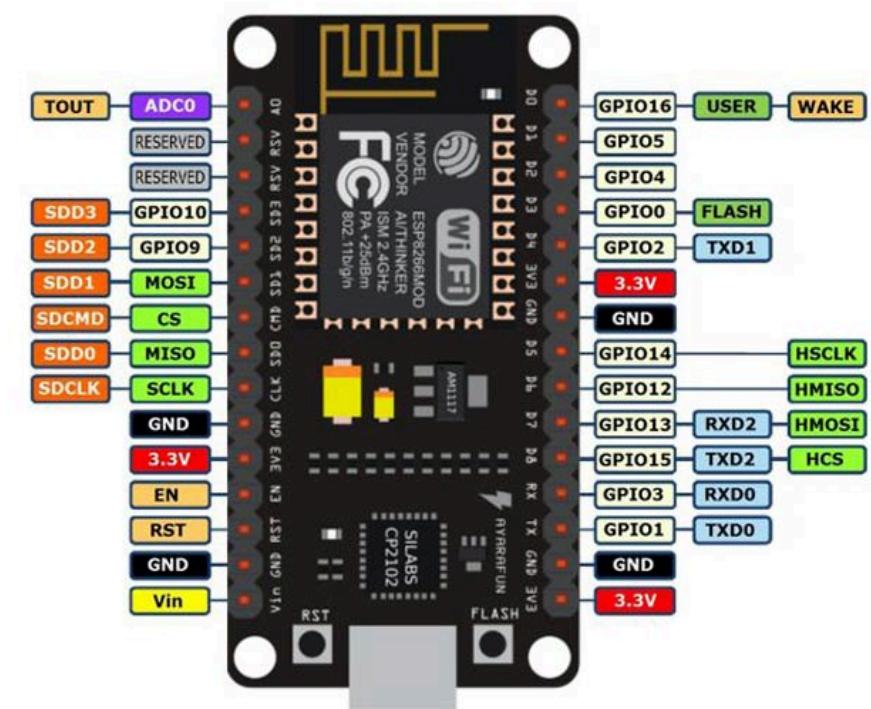


NODE MCU:

In a smart floor cleaning robot, a Node MCU acts as the "brain" - receiving information from sensors like obstacle detectors, processing that data, and sending commands to the robot's motors to navigate and clean the floor, all while allowing for wireless control through a smartphone app via its integrated WiFi capabilities: essentially, it manages the entire cleaning process, making decisions based on real-time sensor data to avoid obstacles and clean effectively.

Specifications:

- Power supply: 5v & 3.3v
- Range: 802.11b/g/n
- Digital I/O Pins: 16
- Analog in pins: 1



Working principle

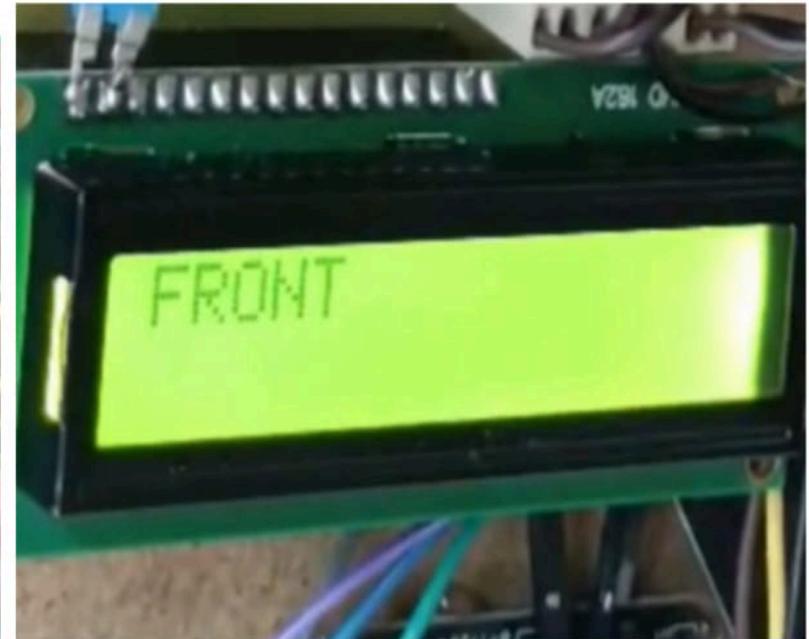
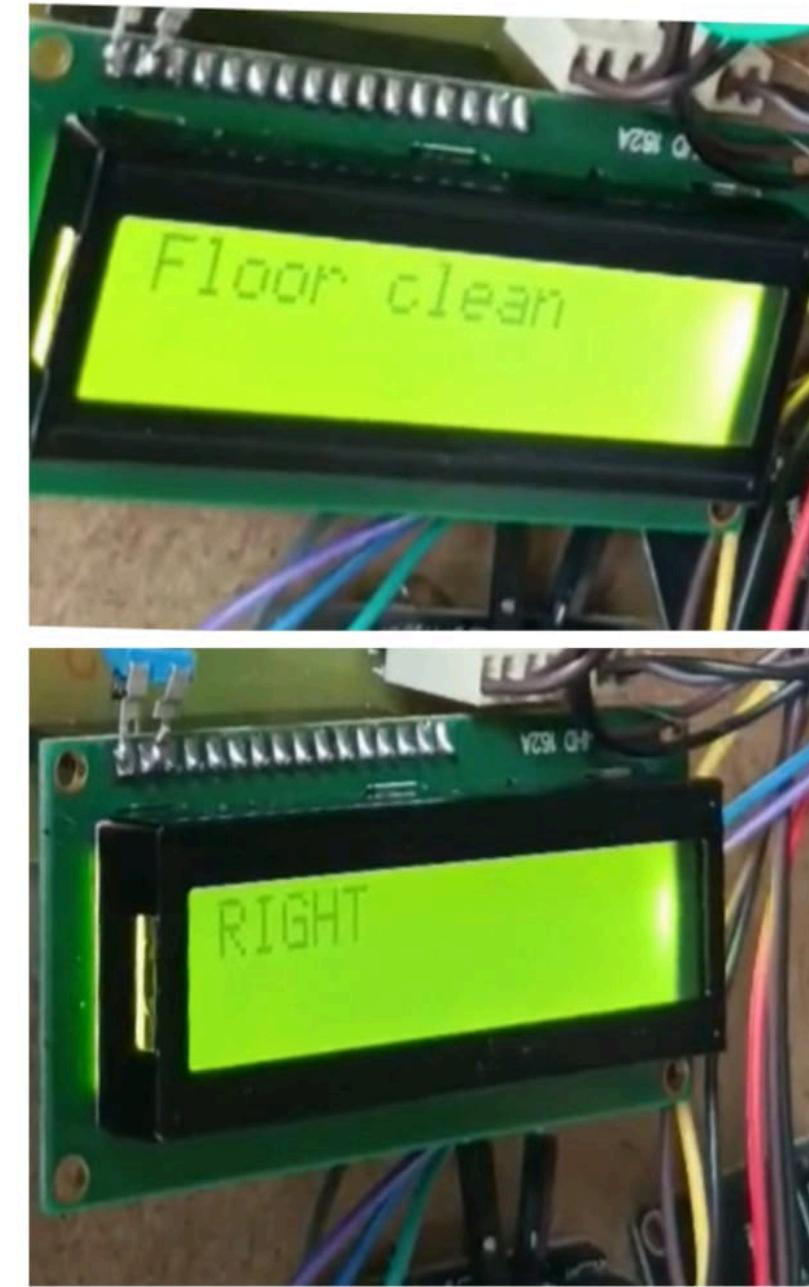
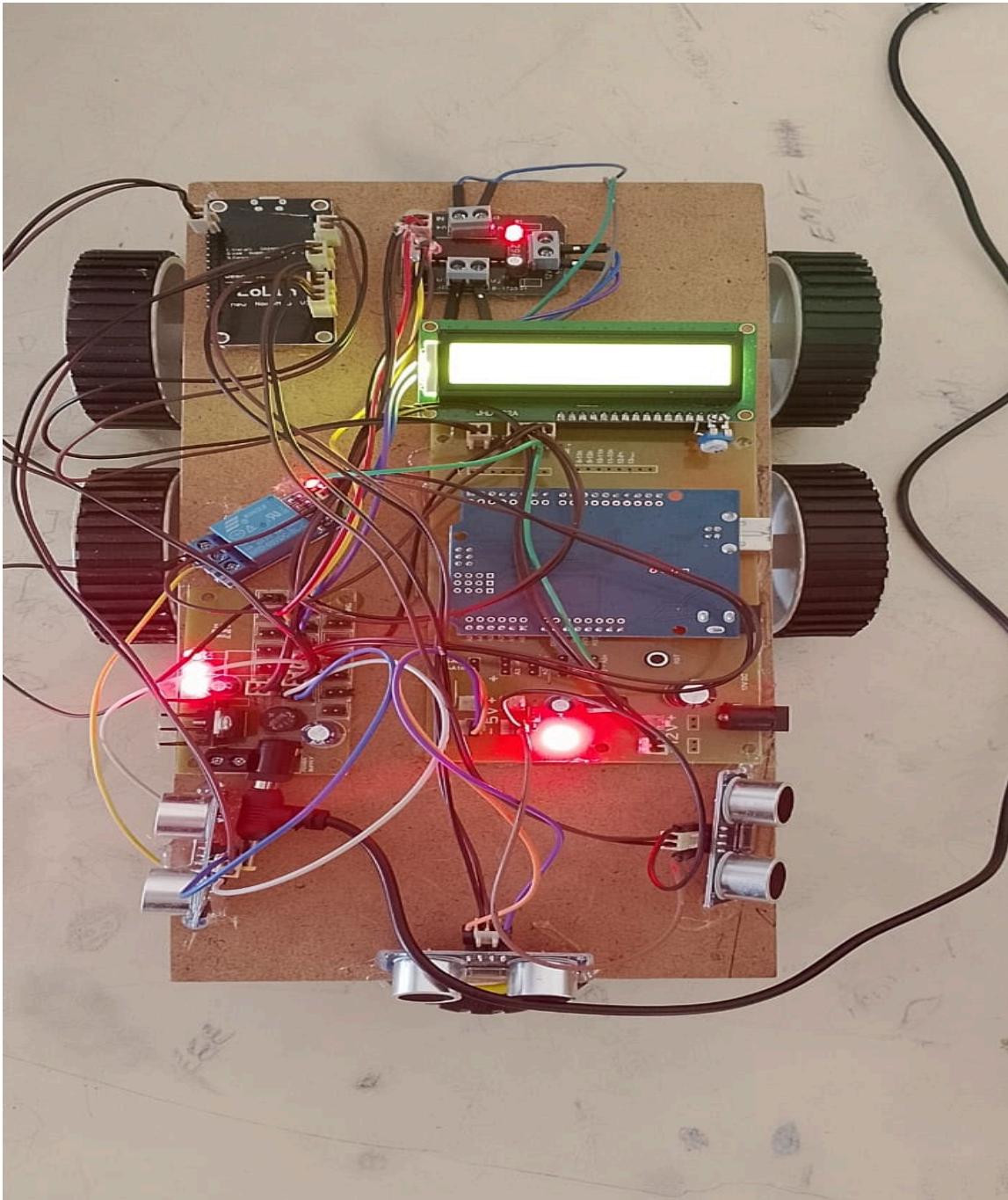
- Sensors and Navigation
- Cleaning Mechanism
- IOT Connectivity
- Artificial Intelligence and Mapping
- Battery and Charging
- Data Collection and Monitoring
- Automatic Scheduling

APPLICATIONS:

- Home cleaning
- Pet owners
- Allergy sufferers
- Factory floors
- Transportation
- Office cleaning
- Public cleaning
- Hotel and Hospitality cleaning

ADVANTAGES:

- Time saving feature
- Automated operation
- Reduced human effort
- Remote monitoring and control
- Increased cleaning efficiency
- Improved Accuracy
- Increased productivity
- Improved cleaning quality



Conclusion:

In conclusion, the Smart Floor Cleaning Robot based on IoT revolutionizes cleaning tasks by increasing efficiency, improving accuracy, and enhancing convenience. With its advanced sensors and navigation systems, it optimizes cleaning paths and schedules, reducing labor costs and energy consumption. The robot's remote monitoring and control capabilities, scheduling, and notifications make it a valuable asset for smart homes, offices, and cities. As a cost-effective and environmentally friendly solution, the Smart Floor Cleaning Robot is poised to transform the cleaning industry, freeing up time for more productive tasks and paving the way for more automated future.

Future scope:

- Artificial intelligence integration
- Multi-functionality
- Connectivity
- Mobility
- Efficiency

References:

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Any Queries??



Thank You...