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IoT Based Floor Cleaning Robot

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Abstract: *Cleaning the dust from the floor is one of the daily tasks that must be completed. This is a common practice not only at home, but also at companies and shopping malls. Due to the fact that dust-cleaning operations take a long time, other activities are sometimes disregarded [6].*

To eradicate this problem, we came up with this project based on cleaning mechanism, our robot can reach out to places where human access is not possible.

Taking the advantage of advancements achieved in mechanical technology innovation have made human life much easier and more pleasant. Today's clinics are becoming more sophisticated and automated. Homegrown robots are making their way into people's homes and daily lives, although the sector is still in its infancy. Regardless, a shift is expected, and the adoption of indigenous robots is moving forward.

There are a few mechanical vacuum cleaners on the market, but only a handful of them can clean wet floors. Using a remote mechanical cleaning framework, this robot makes floor cleaning simple and rapid. This remote framework includes a transmitter app that sees a surge in demand for an android portable app that allows the robot to follow directions supplied by the client via the transmitter app.

The floor cleaner robot is designed to make cleaning interactions easier than they would be if done manually. The main purpose of this project is to design and build a cleaning robot model using NodeMCU.

Keywords: *NodeMCU, Moping, Servo, Robot, Automation.*

I. INTRODUCTION

Cleaning is an important task that must be done meticulously in each location. This is simple at times and difficult at other times. We occasionally assign individuals for the purpose of cleaning and pay cash, and cleaning is occasionally required in areas where the presence of living beings is harmful, so we cannot relegate living beings in each location. Cleaning is occasionally required in regions where the presence of live beings is unsafe, thus we cannot allocate living beings in every place. Some locations have extensive floor areas, necessitating the use of more than one person to clean them, necessitating the use of a technique to mitigate these issues. A robot has emerged as a result of scientific progress, but it is still controlled by humans. More innovations are required to prevent exceeding the faculty limit.

Automation is a novel solution to this situation. So, using the web of things and Arduino programming, we created a self-governing floor cleaning robot [5]. So, using the internet of things and NodeMCU programming, we created an autonomous floor cleaning robot.

Because the ultrasonic sensor serves as the robot's eyes, it is the most critical component for autonomous floor cleaning robots. An ultrasonic sensor can be used to turn a robot by sensing an impediment or a wall. NodeMCU programming is used to set the robot's sensing distance range. In this range, the robot detects an obstruction and reverses direction. Today's households are growing smarter and more automated.

People benefit from home automation because it provides ease and frees up time. Domestic robots are making their way into people's homes and daily lives, although the market is still young and undeveloped. However, growth is expected, and domestic robot adoption is evolving.

There are several robotic vacuum cleaners in the market, but only a few of them can clean wet floors. The goal of this project is to design and implement a Vacuum and Moping Robot that is both autonomous and manual and can be controlled using a phone application called Blynk.

Vacuum and Moping Cleaner Robot is designed to make cleaning easier than using a manual vacuum and moping cleaner. The main goal of this project is to design and build a vacuum robot prototype utilizing a NodeMCU, a motor driver, and an ultrasonic sensor in order to achieve the project's objectives. The Vacuum Robot will meet a number of user-friendly standards.

II. METHODOLOGY

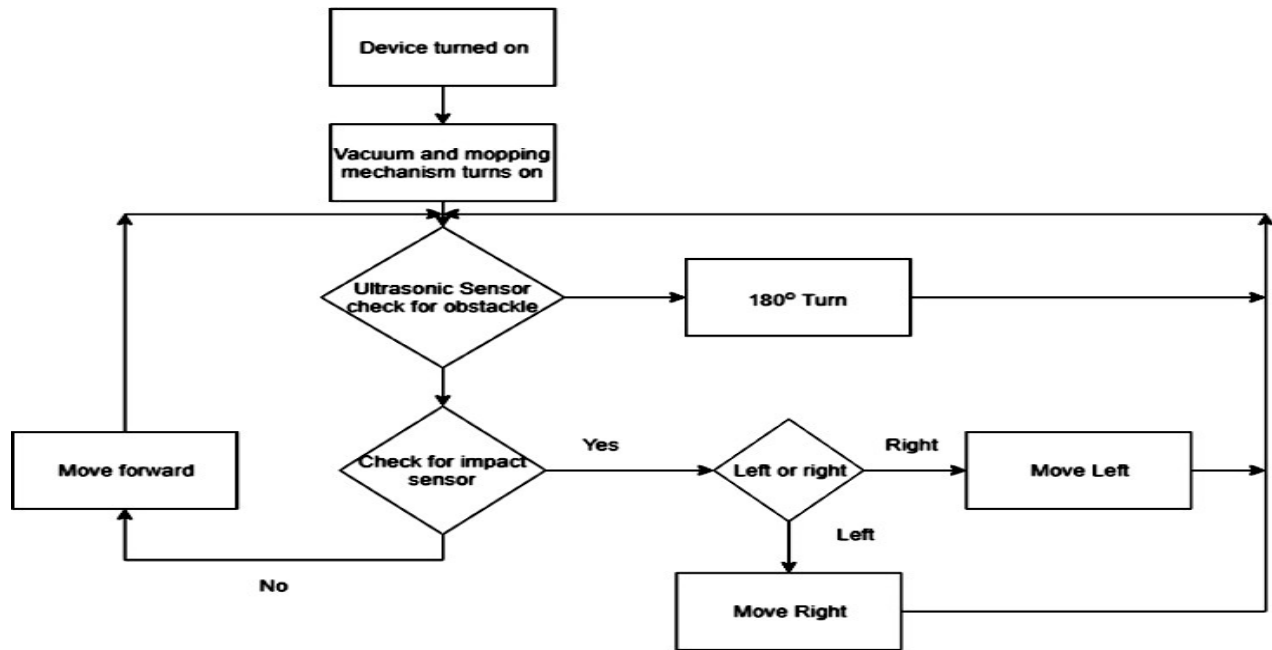


Fig .1 Flowchart of the system

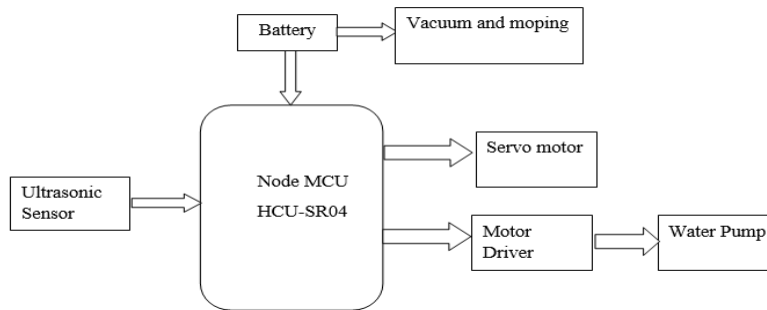


Fig.2 Block Diagram of the system

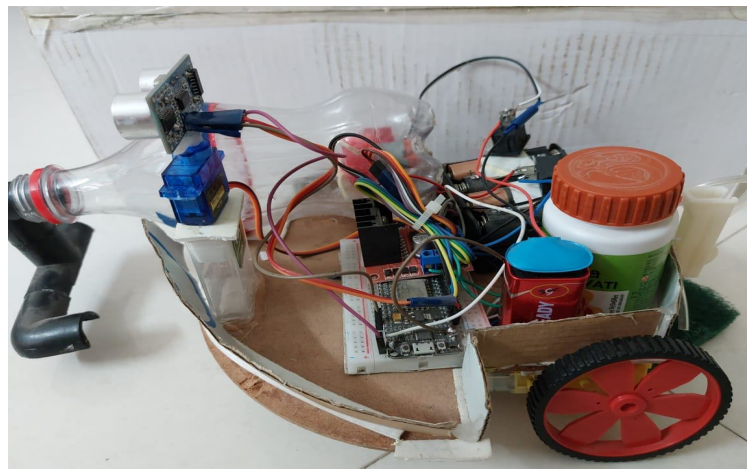


Fig. 3 Connection of components

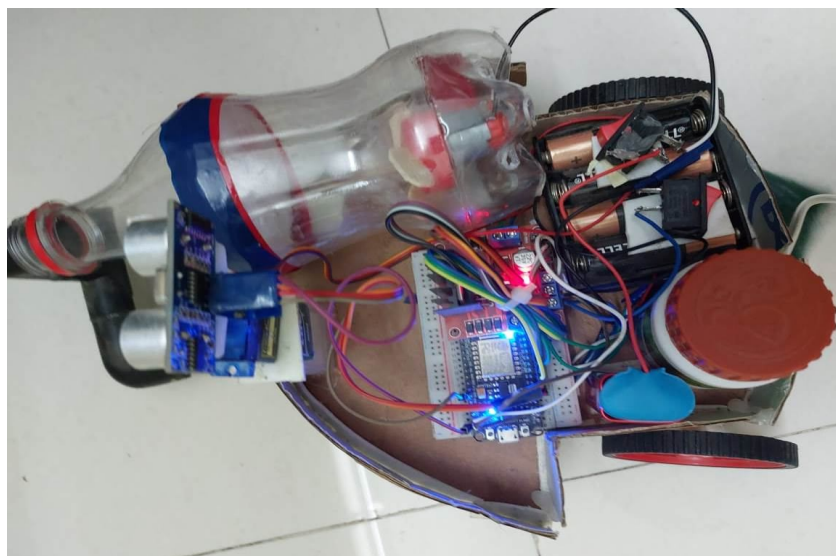


Fig.4 Working model

The Figure 3 shows the connection of the components. The Figure 4 shows the working model.

Floor cleaning robot has two switch that are connected with two batteries. First step is to turn on both switches and connect Wi-Fi with NodeMCU and make the whole circuit online with Blynk app. When we give a signal from the Blynk app to start motion, the forward motion will start by the program set by the NodeMCU. The project has another switch which is connected with a vacuum cleaner. When switch D3 turns ON from the Blynk app, the wheels start to move in the forward direction. If any obstacle or wall comes in front of the robot, the ultrasonic sensor receives the signal and sends information to NodeMCU, and the wheels start to turn. This turn is to move towards the left if the round is even and to the right if the round is odd, so the robot turns to the right. We need to analyze the dimensions of the room and then set the number of turns in NodeMCU software programming. For motion straight or turning to the left or right, we have to connect the motor driver to NodeMCU software and set the low or high pins.

III. RESULT AND FUTURE SCOPE

As a result of this autonomous IOT-based floor cleaning robot, the function of each part is working well, and the whole system is successfully accomplished. This performs well the working of movement in a whole room direction and makes cleaning of the room. The ranging accuracy of the ultrasonic sensor in this prototype is about 20cm to 2m and works effectively within the prescribed limit of 50 cm range.

IV. FUTURE SCOPE

This robot can be modified in the future for a better effective work and multipurpose. Efficiency of cleaning can be improved. By using an IR sensor and adding other features, we can make a device that perfectly works for cleaning. If we add a timer, it can work for a special time with starting automatically. This floor cleaning robot is limited to clean floors; stairs cannot be cleaned by this, so it can be modified for cleaning of stairs. This robot can be modified for cleaning of more than one room by one robot. This robot cannot clean a circular room; we can program it for cleaning every shaped room. So, these are the future scope of a floor cleaning robot.

V. CONCLUSIONS

We have successfully completed the autonomous IOT-based floor cleaning robot model prototype, and this project presents the implementation of an Automatic Cleaning System controlled by the Internet of Things, but the speed of the vehicle can be reduced automatically due to the sensing of the obstacles. It reduces the accident levels and tends to save the lives of so many people. By doing this project practically, we gained the knowledge about working of an automatic braking system, and with this future study and research, we hope to develop the system into an even more advanced speed control system for automobile safety, while realizing that this certainly requires tons of work and learning, like the programming and operation of microcontrollers and the automobile structure. Hence, we believe that the incorporation of all components in an Automatic Braking System will maximize safety and also give such a system a bigger market space and a competitive edge in the market.



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