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Robotic Vehicle with Metal Detection

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Abstract - This paper is intended to develop a robotic vehicle that can sense metals ahead of it on its path similar to detecting land mines. The robotic vehicle is controlled by using a local host server of ESP32. It consists of a metal detector circuit interfaced to the control unit that alert the user behind it about a doubted land mine ahead. A PIC microcontroller is used for the preferred operation. For controlling the movement of robot either to forward, backward & right or left commands are sent to the motor driver through ESP Cam and the data of metal sensing was listed in excel sheet through IOT device.

Keywords— robotic vehicle, metal, local host, IoT.

I. INTRODUCTION

Robots can be used to work in hazardous areas and can be used to manage instability issues in these areas. Robots have become indispensable for academic models such as urban hunting and guarding and military applications. Robots are human-like machines. This was created to some extent. The word robot comes from the Slavic word robota (meaning force). Created in the 1960s, robots are made from a combination of metal and other materials. Robots simply follow what people say and do as they are ordered. Thirty years ago, robots were the subject of science fiction movies. But today, robotics has many uses. This is very important for future humanity. It is being developed to assist in robotics, defense, healthcare, manufacturing, home security, education, appliances, and many other things. Doctors are already using robotics in special surgeries. A robot is important because it can do dangerous tasks that humans cannot. There are now many small robotics applications where robots are used to complete various tasks. In general, robots are still used for unsafe jobs that are dangerous to humans, such as controlling vending machines, spying on robots, rescuing robots, performing surgeries. Metal detecting robots are used to find metal objects hidden in the ground. Army destruction specialists use metal detectors to search for mines in areas under roads and in minefields. Electricians also use metal detectors to detect wires hidden in walls. Metal detectors are used in airline terminals to check passengers for metal attacks such as cuts and guns. Metal tools are often used to explore ancient war zones and historical sites, hoping to find treasures, jewellery, and ancient coins. In the

food industry, they are used to check and make sure that no iron material falls from the plant into the food. The paper focuses on the design and construction of a robot car that can feel the metal in front of it like a mine. The metal detector is connected to the detector to warn the user in advance of suspicious metal. The metal detector is attached to the robot car and its task is to detect the metal under it. What distinguishes our work from traditional work is that it aims to reduce production costs, so this robotic process, which is normal in developed and underdeveloped countries, can be used at low cost.

II. EXISTING METHODOLOGY

This existing methodology is done by using RF technology. The RF technology control the movements of robot from up to 200 m distance. In this method the robotic vehicle was controlled the transmitter circuit which means the transmitter consists of push buttons and it sends signals to the receiver circuit in the vehicle by this the moment of the vehicle is controlled. It is a low cost method and easy to build. The below figure show the method of control through RF Technology

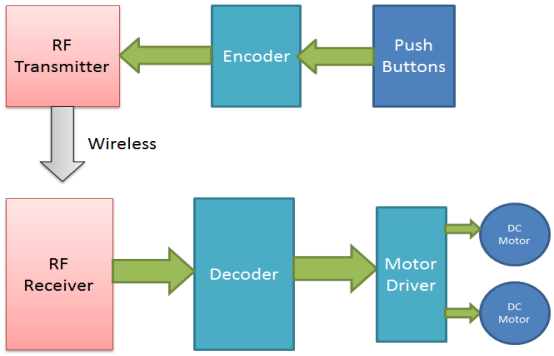


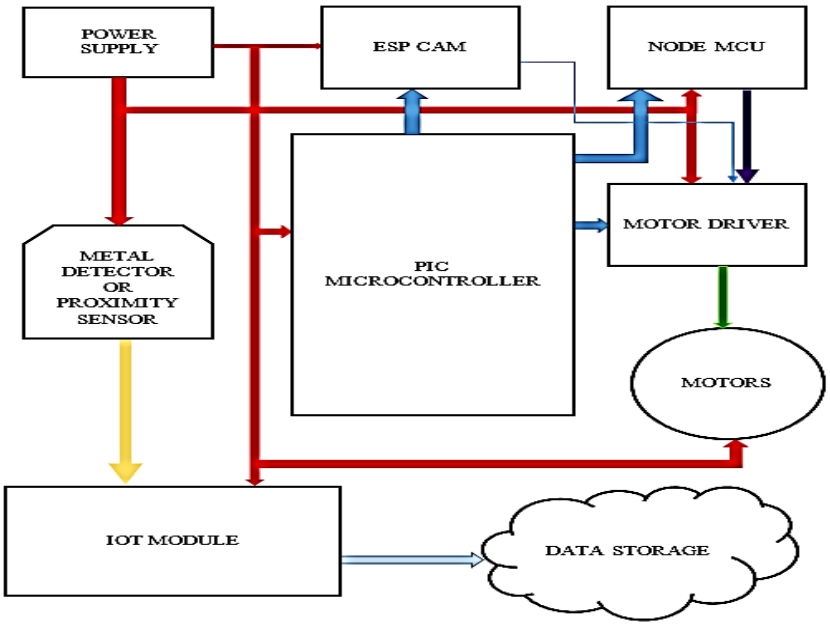
Fig 1.RF Control Method

Even though it is a low cost technique it consists of several drawbacks. A normal metal detector just sense and alert the user or handler through buzzer. The battery used for existing technology is non rechargeable and sometimes it doesn't have enough power to drive the motors of the robotic vehicle. The controlling range of the vehicle is pretty low in RF technology.

III. PROPOSED METHODOLOGY

This existing methodology *is* a low cost method and easy to build but it has several drawbacks such as non-rechargeable batteries, metal sensing sensor just only alert the user through buzzer and sometimes the batteries doesn’t have enough power to drive the motor .The controlling range of the RF technology is

low .These issues are avoided in our proposed methodology . For this we use ESP and Node MCU and they are controlled by PIC 16XX series microcontroller. The following figure shows the proposed methodology



. Fig 2.Proposed Methodology

The following chapter will explain the working of proposed methodology.

IV. WORKING

The method consists of a PIC 16XX, MCU assembly, ESP camera, L29 series motor driver, metal detector and components. In the proposed methodology, the robot vehicle is controlled through the ESP camera's local host server. Send direction commands and other commands to the L29 series motor driver. This achieves motor control. It uses a 300W rechargeable battery to solve the battery problem. This allows you to control the engine and other devices without problems. With the help of ESP cameras, you can control the moment and control the engine from a distance. The metal detector is connected with the IOT module and when it detects metal in the path, it notifies the user with a buzzer because it is connected with the IOT module. Detection data was generated in Excel format. It helps users to analyse the detection of metal in the path of the robot vehicle.

V.ADVANTAGES

The following are the some advantages of our method.

- Long range of control

- Data collection
- Reduce the use of non-rechargeable batteries
- Virtual Monitoring

VI. FUTURE SCOPE

The proposed method is improved by using LPWAN technologies such as LORAWAN, SIGFOX and others. By this we can monitor and control the movement of the robotic vehicle even in remote areas from far distance (up to 750 km).

VII. APPLICATIONS

The proposed method is useful for the following applications.

They are

- Military defence
- Archaeological areas
- Mines

VIII. CONCLUSION

This paper shows the method to control and monitor the robotic vehicle from long distance with an effective way.

IX.REFERENCES

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