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IOT Based Metal detecting robot

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Abstract

The mechanism of this project is to detect the Metal detection robotic vehicle using **IOT TECHNOLOGY.** The project demonstrates real life robotic vehicles used to detect land mines or other metal based objects on its path. The vehicle is fitted with a metal detecting system that can sense metals and update sensor response in web application. The system works in conjunction with an **ESP32-S Microcontroller** to achieve this operation. The buttons are used to send commands to move the vehicle forward, backward, left and right. Two motors at receiving end operate the vehicle as per the commands received. As soon as command is send it send the signal to the web application. At receiving end, a ESP32-S reads the command and starts processing according to the commands. The microcontroller operates the motor to move the vehicle through a motor driver IC. The metal detecting system attached to the system detects any metal underneath it. On detection it automatically sends the signals to web application to notify user about it simultaneously sends message to ESP32-S. Thus, the metal detection system couples with a robotic vehicle allows for operating the robotic vehicle globally.

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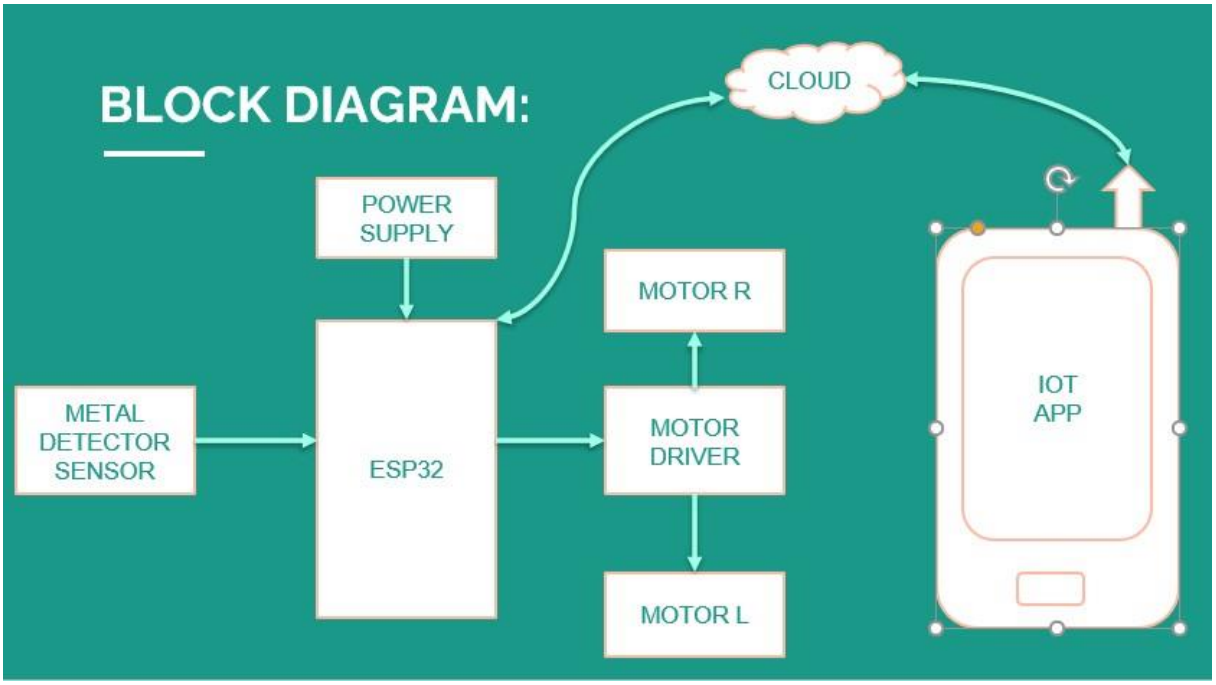
1. INTRODUCTION

Robots can be utilized to complete work in perilous zones and can be used to manage troublesome instability levels in such areas. Gradually robots are becoming dynamically vital for standard subject applications, for instance. A variety of small robotic applications are now arising where robots are utilized to complete an assortment of errands. By and large, robots are still utilized for unsafe work which is dangerous for humans. Metal detecting robot is utilized to search for metal objects covered up in the ground. Electricians also use metal detectors to scan for electrical cables hidden in walls. At airplane terminals, metal finders are utilized to scan travelers for metal protests, for example, cuts and firearms. For searching old combat zones and historical sites, hoping to find treasures, jewelry and old coins, metal detectors are frequently used. In food factories, they are used to check and verify that no metal things have fallen from industrial factories into the food unintentionally.



BLOCK DIAGRAM OF PROPOSED SYSTEM

The Internet of things (IoT) describes physical objects or groups of such objects with sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks. Internet

of things has been considered a misnomer because devices do not need to be connected to the

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public internet, they only need to be connected to a network and be individually addressable.

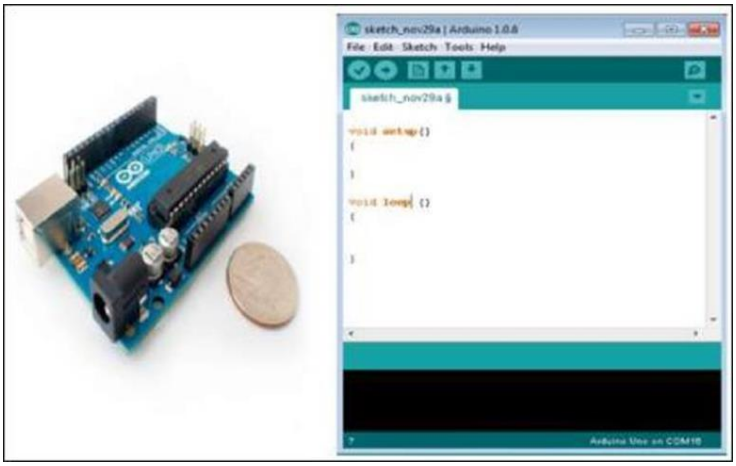

Fig: Arduino

The field has evolved due to the convergence of multiple technologies, including ubiquitous computing, commodity sensors, increasingly powerful embedded systems, and machine learning. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), independently and collectively enable the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems, cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smart phones and smart speakers. IoT is also used in healthcare systems.

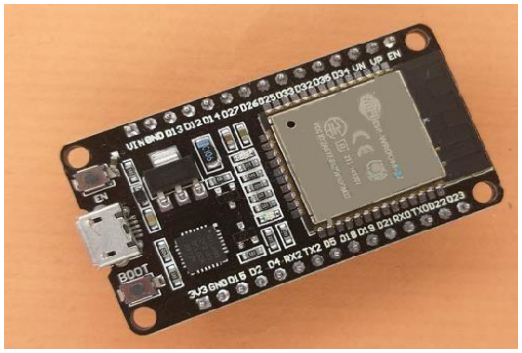

Fig: ESP32S

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ESP32S is a low-cost System on Chip (SoC) Microcontroller from Espressif Systems, the developers of the famous ESP8266 SoC. It is a successor to ESP8266 SoC and comes in both single-core and dual-core variations of the Tensilica's 32-bit Xtensa LX6 Microprocessor with integrated Wi-Fi and Bluetooth.

There are a number of concerns about the risks in the growth of IoT technologies and products, especially in the areas of privacy and security, and consequently, industry and governmental moves to address these concerns have begun, including the development of international and local standards, guidelines, and regulatory frameworks.

This project focuses on designing and developing a robotic vehicle that can sense metals in front of it on its way like detecting land mines. The metal detector circuit is mounted on a robotic vehicle and its operation is to detect metals underneath automatically with the help of IOT. Metal detecting sensor will move 180 degrees to detect and the complete robot can move in four directions using 4 buttons(Forward, Backward, Left, Right). If metal gets detected we get a notification that metal got detected and also in which angle this metal is facing with respect to the Robot direction.

Blynk App:

Fig: Blynk IoT App

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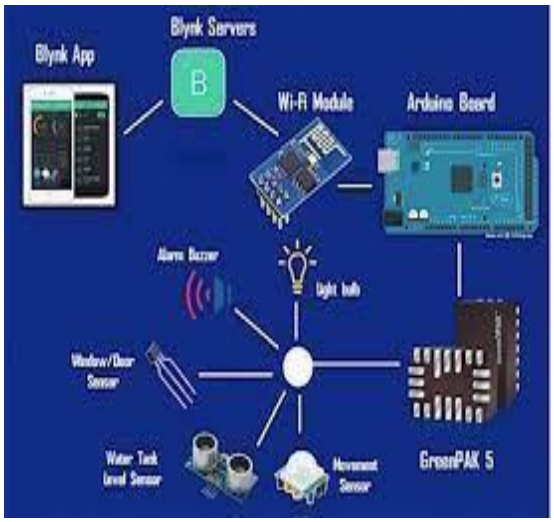
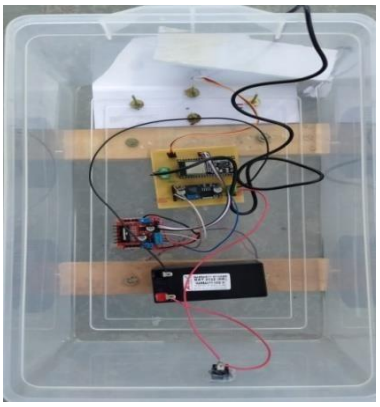


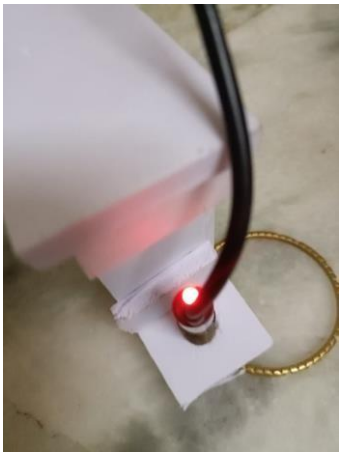
Fig: Blynk App to all devices

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things.

2. RESULT







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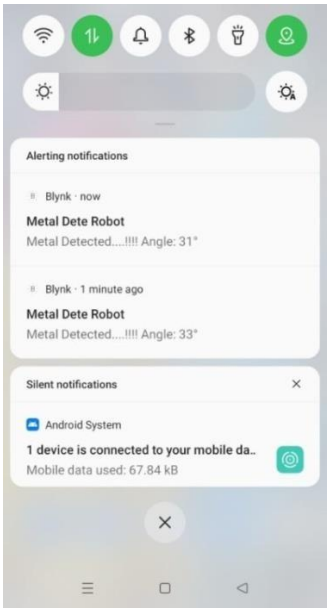

3. CONCLUSION

The robot was designed and implemented with an ESP32S microcontroller for its operation. It is moved in different directions with the help of buttons which is done with the help of web application (Blynk App). It is verified to be highly beneficial for security and industrial purposes. The robot can detect objects within a very good radius which is a highlybeneficial characteristic; it can also work at a constant speed. The radio frequency transmission is not blocked by common materials. This means, it can penetrate most solids and pass through walls, control of the device can be maintained at a range of up to 100m, therobot is not sensitive to the light and it is not much sensitive to the environmental changes and weather conditions.

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