IOT Based Landmine Detection Robot with GPS System

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Abstract—This project presents a new type of robot that uses a metal detector sensor to detect metallic object passing over the metal detector. The robotic vehicle is controlled using android application for metal detection operation controlled with the help of WIFI technology. This project can be widely used because of its simplicity and ability to modify to meet changes of needs. Based on experimental studies, it was found that the mobile controlled robot can move in any direction as per the desired instruction and the beeper in the metal detector circuit beeps whenever it encounters any metallic object. The embedded hardware has been developed on ATmega328P microcontroller and controlled by an android smartphone. This controller receives the commands from the Android phone, takes the data and controls the motors of the robot by L293D.The robot can able to move forward, backward, left and right movements. The smartphone is been interfaced to the device by using WIFI. A WIFI device ESP8266 module was used with Arduino UNO to receive commands from the smartphone. A metal detector circuit was connected to the robot to detect the metal. A beep sound was made when it detected the metal

Index Terms— ATmega38P Microcontroller, Metal detector

I. INTRODUCTION

Different technological terms such as Telecommunications, Internet of Things (IoT), and robotics have been considered a vital part of our daily activities. Although its advances and limitations, innovative tech can be solved fundamental issues and save lives for many people for political or financial purposes. In the electronic era, speed, flexibility, and automation are major defiance that is enabling researchers to meet the challenges of the society against the quick development of the techs. Robotics has been becoming dynamically significant for several standard applications. Applications such as military, Salvage and Urban Hunt. Due to its human reduction activities in a severe environment. Effectiveness metal and landmine detections are two vital research areas that still considered more attractive to researchers due to investing tech. According to Landmine and Cluster Munitions Monitor report in 2014, more than 110 million landmines in the ground scattered in 68 countries. So, landmines and metal detector robots are the advances innovation of the crucial and most dangerous part of the humanitarian detection process. Multi-sensor robot, path planning algorithm, and vehicle-mounted sensors are different strategies that used to search and detect mines. These applications are safer and more efficient due to they provide a safe route for the soldiers through minefields. Robotics, communication, and data analysis have been advanced with high-speed achieved in landmine detection domain.

II. EXPERIMENTAL METHODOLOGY

A. Methodology

This Project presents a new type of robot that uses a metal detector sensor to detect metallic object passing over the metal detector. The robotic vehicle is controlled using android application for metal detection operation controlled with the help of WIFI technology. This project can be widely used because of its simplicity and ability to modify to meet changes of needs. Based on experimental studies, it was found that the mobile controlled robot can move in any direction as per the desired instruction and the beeper in the metal detector circuit beeps whenever it encounters any metallic object. The embedded hardware has been developed on ATmega328P microcontroller and controlled by an Android smartphone. This controller receives the commands

from the Android phone, takes the data and controls the motors of the robot by the motor driver L293D. The robot can able to move forward, backward, left and right movements. The Smartphone is been interfaced to the device by using WIFI. A WIFI device ESP8266 module was used with Arduino UNO to receive commands from the smartphone. A metal detector circuit was connected to the robot to detect the metal. A beep sound was made when it detected the metal.

B. Analysis

Our project proposes a Metal detection robotic vehicle operated using Rf remote control wirelessly. 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 detection system that senses metals and then alarms the user about it through a buzzing sound of land mine possibility. The system works in conjunction with an 8051 series microcontroller to achieve this operation. The push 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 a command is sent it gets transmitted through rf transmitter. At receiving end an rf receiver reads the command and passes it to an 8051 microcontroller for processing. The microcontroller then operates the motors to move the vehicle through a motor driver IC. The metal detection system attached to the system detects any metal underneath it. On detection it automatically sends on a small buzzing alarm to notify user about it. Thus, the metal detection system coupled with a robotic vehicle allows for operating the robotic vehicle on a 200-meter radius remotely through RF technology.

III. MODELLING ANALYSIS

This project can be widely used because of its simplicity and ability to modify to meet changes of needs. Based on experimental studies, it was found that the mobile controlled robot can move in any direction as per the desired instruction and the beeper in the metal detector circuit beeps whenever it encounters any metallic object. The embedded hardware has been developed on ATmega328P microcontroller and controlled by an Android smartphone. This controller receives the commands from the Android phone, takes the data and controls

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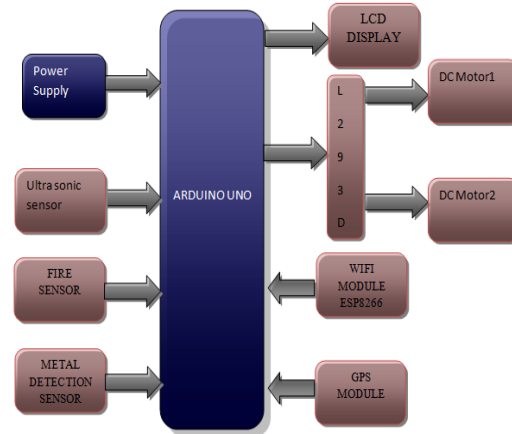

Figure 1: Block Diagram

IV. RESULTS AND DISCUSSION

Here is the practical implementation of "IOT Based Landmine detection robot with Gps system". This prototype can be effectively utilized to detect the Landmines by using of metal detector. Whenever, there is any metal is detected then the buzzer turns on.
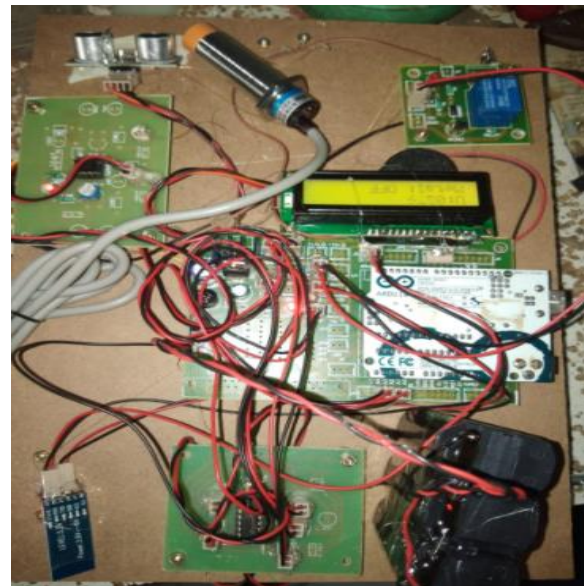

Figure 2: Connections of the Kit
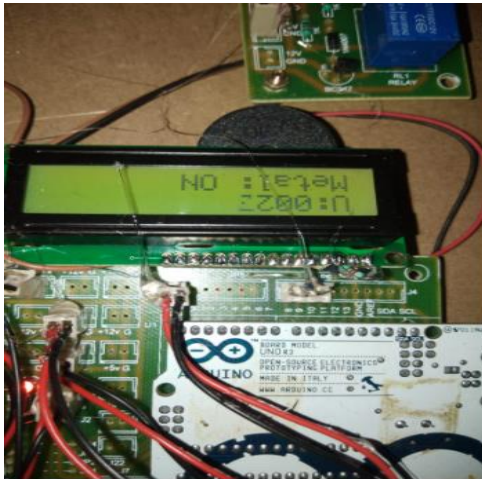
Figure 3: When metal is not detected

Figure 4: When metal is detected

VII. CONCLUSION

The main goal of this project is to design a robotic vehicle which can sense metals near to it on its track, and this robot is controlled by an android application. This project comprises of a metal detector circuit which is interfaced to the control unit that produces a buzzer sound to the user when a metal object is close to it. A microcontroller is used for the desire operation. The project is successfully detecting the metal and chemical, it can be mainly used in defense applications. It consists of metal detecting unit, chemical sensor, IR for line following. Whenever the metal or chemical explosive is detected, it gives an alarm and also sends the relevant information to the higher official using Internet of Things (IOT). An android application is developed to control the robot vehicle from the side of higher officer. High encryption keys are used for the security purpose.

After detecting the location information is also send through this application. So, the officers can be find it out as early as possible mean while the robot checks for another area.

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