



DEVELOPMENT OF A MILITARY ROBOT TO DETECT LANDMINES BY USING METAL DETECTORS IN DEFENCE APPLICATIONS

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Abstract

Military robots based on IOT used for surveillance, defense, and military applications are a cutting-edge method for monitoring remote and border areas. In today's world, automation robots are utilized in numerous industries, defense, surveillance, medical fields, and so on. This robot is electromechanical as well as artificial intelligent machine controlled by computer programming. It is designed to replace human beings in various hazardous areas. The robotics and automation industry which is ruled the sectors from manufacturing to house-hold entertainments. It is used a lot because it is easy to modify to meet changing requirements and is widely used. The goal of the project is to create a remote-operating robotic vehicle with multiple features, including a metal detector for landmine detection, a wireless camera for monitoring, and an Android application. A robot is a machine capable of carrying out a complex series of actions automatically, especially one programmable by a computer. A human operator can control a robot, sometimes from a great distance. The control signal from the transmitter is sent to the receiver, which is connected to an object, device, or vehicle that is to be controlled remotely. In these kinds of applications, wireless communication is more important. Similarly, this project mentions about a wirelessly controlled commando robot controlled using IOT.

I.INTRODUCTION

Robotics is the most exciting and fastest-growing field in the world today. ROBOT can sense its surroundings and take the appropriate action using a variety of input and output. Scientists have developed military robots through technological advancement and research. This makes soldier's life more secure on war field. Military robots are used to perform various risky task like monitor war field, diffuse live unexploded bombs, detect landmines and shoot enemies. Nowadays, many nations employ these robots to perform dangerous tasks. These military robots have integrated systems like sensors, grippers, weapons, cameras, and actuators, and they come in a variety of shapes and features depending on their purpose. The buried landmines play a crucial role in conflicts. Even after the war has ended, civilians continue to face significant danger from unexploded landmines. Landmines pose a threat not only to soldiers but also to civilians. In addition, landmines pose significant threats to agricultural lands, water reservoirs, and the construction of roads in the affected areas. Landmines are classified into a variety of categories based on the weight required to detonate them. Landmines are typically buried 10-40 mm below the surface of the ground and require a minimum pressure of nine kilograms. Brown et al. (2002) By burying the landmines in specific patterns, landmines are

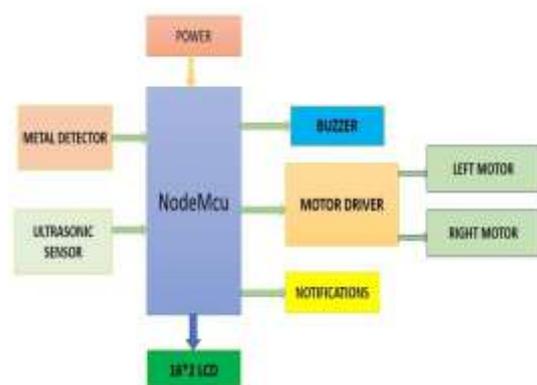
used to prevent the enemy from moving. The Zig-zag pattern is one of the patterns that slows down the enemy's movement. Additionally, landmines are used to divert the enemy from their path and trap them in an ambush. The demining of the affected areas, which necessitates the use of a large number of human soldiers, required a great deal of manpower, time, and effort, as shown in Figure 1. In addition, specially trained animals participate in the demining process, helping to verify and clear the affected area. This project aims to design a robot to detect the landmines by using the GPS technology, metal detector and Arduino uno.

II.CLASSIFICATION OF LANDMINES There are typically two types of landmines: anti-vehicle and anti-personnel. Anti-tank and anti-vehicle mines require a lot of pressure to activate, and a person's footstep is not enough to detonate them. The anti-tank mines require a pressure between 348.33 and 745.16 pounds, or 158 and 338 kilograms, to explode. The majority of military vehicles, including tanks, are sufficiently heavy to generate the necessary pressure to detonate the mines. Anti-personnel landmines are primarily used to divert or expel foot soldiers from the conflict zone..

III.PROPOSED SYSTEM

WIFI module is used to control this robot. It shares the location. It has a camera to keep an eye on the area and an ultrasonic sensor to determine the target's distance. This robot is mostly used for surveillance of remote areas, enemy bases, etc., and mine detection. It has an ultrasonic sensor to measure the distance that was detected in front. It has a camera for surveillance, and it has a microphone and speaker for communication. We are using the BLYNK APP to control it.

BLOCK DIAGRAM:



IV.MODULE DESCRIPTION:

A. NodeMCU

The NodeMCU (*Node MicroController Unit*) is an open-source software and hardware development environment built around an inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains the crucial elements of a computer: CPU, RAM, networking (WiFi), and even a modern operating system and SDK. That makes it an excellent choice for Internet of Things (IoT) projects of all kinds.

However, as a chip, the ESP8266 is also hard to access and use. You must solder wires, with the appropriate analog voltage, to its pins for the simplest tasks such as powering it on or sending a keystroke to the “computer” on the chip. You also have to program it in low-level machine instructions that can be interpreted by the chip hardware. This level of integration is not a problem using the ESP8266 as an embedded controller chip in mass-produced electronics. It is a huge burden for hobbyists, hackers, or students who want to experiment with it in their own IoT projects.



Fig 1:Node MCU

B.METAL DETECTOR

Inductive sensor are industrial electronic devices used to detect the presence of metal objects, without any interference of other different materials (like plastic, wood, water or oil). Datasensing qualifies as one of the main world manufacturers of sensors, after the merger of Datalogic and M.D. Micro Detectors, two companies that have made the history of sensors in Italy since the early 1970s.

A threshold detector inside the sensor detects when the amplitude is below a defined value and so the output switches. When the target moves away, the drain currents in the target decrease and so the elec-

tromagnetic field amplitude increases. Over a defined threshold, the sensor output switches again in the initial working condition.



C.WIRELESS CAMERA

We have introduced most advanced technology for V380 Indoor Security IP Camera, integrated with various features of HD 1080P 60fps, POE(Power Over Ethernet), P2P and Auto HD IR-CUT and so on, which bring you a very clear and vivid image and also offers a immersive illusion. Beside, with 360 degree globe panoramic IP Camera, viewing what is in range of the camera, you can also have a video surveillance in every corner of your house as well. Built-in microphone and speaker, there is no problem for talking with someone wherever the IP Camera is set up directly from your mobile device. V380 Camera also will be provided with cloud service, all of you will not worry about the loss of video and you can record all playback what you want. Moreover, V380 IP camera is for surveillance and monitoring, truly achieves families protection, it can be regard as a baby monitor when you are on business, also can use for pets in the daily life, which you can enjoy the happiness even when you are abroad. Never lose such a household artifacts.



V.RESULTS:



VI.CONCLUSION:

In the current examination of the existing prototype of automatic landmine detection robot has been presented and it can be made economically. The investment on landmine detection robot is made economical in the countries because this prototype is cost effective and less complex structure. The landmine detection robot is used to detect the landmines present under uneven ground surface. Once the robot detect the landmine which the produces buzzer sound to the user. And also send the coordinates of landmine which helps in diffusion without hazard .

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