

Landmine Detector Robotic Vehicle

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ABSTRACT - Now a day in places like Afghanistan and Iraq we know that land mines are causing serious threat to the lives of civilians. A land mine is an explosive device that designed to destroy or disable enemy and hided under or on the surface of ground, especially in mine-affected countries like Afghanistan and Iraq. Most land mines are laid on just below the surface of ground and are activated by pressure or trip-wire. Usually most of the land mines will contain many metallic parts, which can be made use of in their detection. The mines which are embedded amid the war time may stay undetected. As the name suggests detection is done using Metal Detector and hence can be done further away from the mine carefully. Mine detection robot will go from this path where solders passing the roads in mine areas. This is the method in which special purpose of robot are use to find landmines without setting foot into the ground offering safe and efficient way of landmine detection. There are some methods for detection of land mines, such radar bullets, Biological method and mechanical method. These methods are dangerous and risk is involved to life of soldier. A safe method for detecting land mines is "Landmine detection robot", where we are dealing with IoT as well as GPS technique

Key Words: Metal Detector, WI-FI Module, Global Position system (GPS), Global System For Mobile Communication (GSM), IoT, solar panel, LCD, motor driver

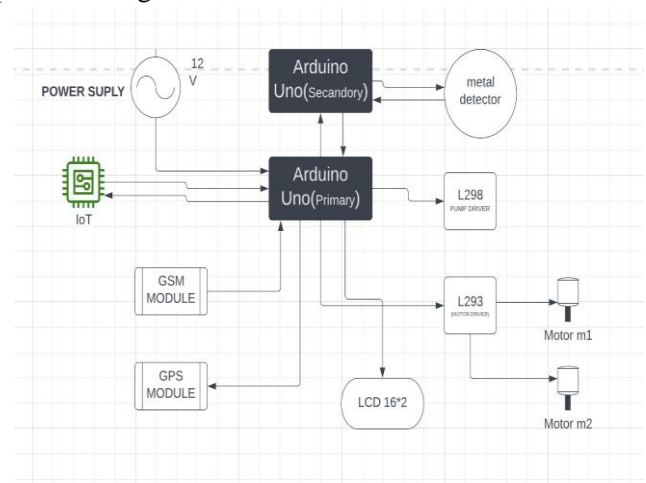
1. INTRODUCTION

In warfare most of casualties are done by buried landmines. The unexploded landmines take several lives even after end of a conflict. Brutal properties of landmines is once it is active, it can be functional for a very long time. Hence there is always a risk of fatal damage and injury causing death. Landmines became effective weapon in warfare as it is cheap and easy to build. Basically, it consists of explosives along with some triggering mechanism. Triggering may be caused by weight. There are several types of landmines depending upon weight it needed to get triggered. When ready, they are buried at shallow depth in soil and hence not easily get spotted with bare eyes [2]. Someone not aware of presence of mine can step over it causing itself fatal damage because of the explosion. Landmines can be buried in certain pattern to restrict enemy movements.

Zigzag pattern slows down advancing enemy; or mines can be deployed causing enemy to diverge their path and leads them in to middle of an ambush. Because of these many characteristics they are found to be very effective weapon as they can be deployed easily and they remain undetected, fully functional for very long time. This project presents a review of all the existing and latest techniques devised for the detection of landmines. Electronics has paid an important role in the development and efficient use of some of these techniques. Few techniques that are discussed here includes the use of metal detectors, mechanical methods. Working, advantages and limitations of each technique are discussed [3]. The performance of the detection system can be enhanced by using multiple techniques.

2. DESCRIPTION

The automated control system consists of GPS module, GSM Modem, Microcontroller, Metal detector sensor Motor Driver L298, DC Motor. The unit is expressed in figure below:



Arduino UNO-

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010. The board is equipped with sets of digital and analog input/output (I/O) pins that may be

interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery. It is similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

GPS Receiver with Active Antenna-

Global Positioning System (GPS) satellites Broadcast signals from space that GPS receivers use to provide three-dimensional location (latitude, longitude, and altitude) plus precise time. GPS receivers provides reliable positioning, Navigation and timing services to worldwide users on a continuous basis in all Weather, day and night, anywhere on or near the Earth. Sunroom's ultra-sensitive GPS receiver can acquire GPS signals from 65 channels of satellites and output position data with high accuracy in extremely challenging environments and under poor signal conditions due to its active antenna and high sensitivity. The GPS receiver's 160dBm tracking sensitivity allows continuous position coverage in nearly all application environments. The output is serial data of 9600 baud rate which is standard NMEA 0183 v3.0 protocol offering Industry standard data messages and a command for easy interface to mapping software and Embedded devices.

GSM- GSM stands for Global System for Mobile Communication. GSM is an open and digital cellular technology used for mobile communication. It uses 4 different frequency bands of 850 MHz, 900 MHz, 1800 MHz and 1900 MHz. It uses the combination of FDMA and TDMA.

Motor driver- there are two motor drivers first one is L298N and second one is L293d

L293D is a basic motor driver integrated chip (IC) that enables us to drive a DC motor in either direction and also control the speed of the motor. The L293D is a 16 pin IC, with 8 pins on each side, allowing us to control the motor. It means that we can use a single L293D to run up to two DC motors. L293D consist of two [H-bridge](#) circuit. H-bridge is the simplest circuit for changing polarity across the load connected to it.

The L298N Motor Driver Module is a high power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. L298N Module can control up to 4 DC

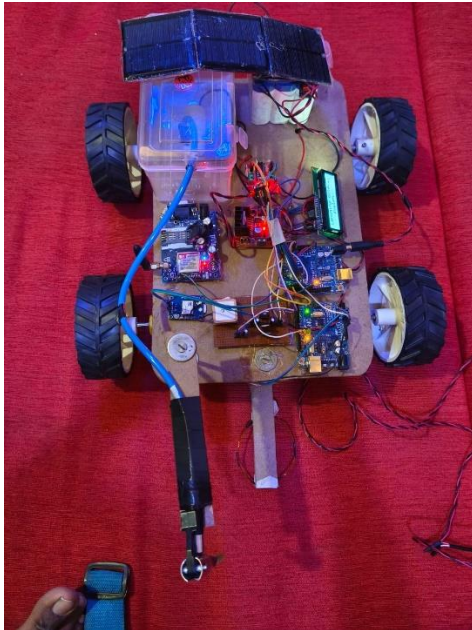
motors, or 2 DC motors with directional and speed control.

Power supply unit- On-board 5V rechargeable battery is used to drive dc motors & PIC16F877 & AT89C51. We require 3.3V and for various sensors and we require 5V to drive RF module, etc. So to do this we will have to build power supply unit using voltage.

WORKING

Metal detector consists of copper coils. On the off chance that any metal is identified, it sends the flag information to controller and with the assistance of GPS it shows the scope and longitude of the correct position. GSM through Attention Command sends the SMS. We utilize engine driver L298D on the grounds that we give just +5v control supply and +12v is required to turn the engine so just L298D has the property to pivot the engine regardless of whether the information control supply is +5v. System comprises of two fundamental modules, which are the control station, which keeps running on a PC or Laptop and the remotely controlled robot. The control station comprises of three coordinated modules comprising of Metal recognizing segment, GPS information gathering segment and Remote control segment. These three segments go about as one framework however the fundamental framework parts go about as all the while working autonomous frameworks. Remote control framework utilizes a radio recurrence transmitter. Control framework, which keeps running on a PC or a Laptop, utilizes the parallel port and control transfers to remotely control the robot. Bluetooth GPS sends the area of the robot through Bluetooth information association. Controlling programming of the GPS of three incorporated modules comprising of Metal distinguishing segment, GPS information gathering part and Remote control segment. These three segments go about as one framework yet the fundamental framework parts go about as all the while working free frameworks. © 2019 JETIR February 2019, Volume 6, Issue 2 www.jetir.org (ISSN-2349-5162) JETIRAB06117 Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org 632 Remote control framework utilizes a radio recurrence transmitter. Control framework, which keeps running on a PC or a Laptop, utilizes the parallel port and control transfers to remotely control the robot. Bluetooth GPS sends the area of the robot by means of Bluetooth information association. Controlling programming of the GPS goes about as a transitional layer, in the correspondence between the created programming and the robot. GPS segment of the created programming peruses NMEA information by means of correspondence port of the PC or the laptop. The programming unravels NMEA information and the area of the robo delineate is utilized as the GIS programming, which serves the GIS layers to the created programming. In the event that the robot recognizes a landmine by utilizing its metal indicator, it sends a radio flag by

utilizing a FM transmitter. At that point the flag is caught by a FM collector which is connected to the control framework and afterward framework perceive the situation of the robot as the landmine sullied area and adds a point highlight to the landmine point layer in the GIS database.



suspicious regions. GSM sound tracker, GPS tracker, smart cellphones plus advanced applications and RC truck equipment were brought together to do three main tasks for metal landmines, a) Tracing, -b) Detecting, -c) pinpoint location coordinates.

FUTURE WORK

In future, this proposed system can be used to find the actual condition of the place where the robot is sent to detect the landmine. This can be achieved by using a CCTV (Closed Circuit Television) interfaced with the microcontroller. Thus the actual images can be accessed directly using the CCTV. Since the use of GPS, the weather conditions of the area can be accessed. Knowing the weather conditions like heavy snowfall, landslide, heavy rains, etc. can be known. Thus the army headquarters can actually decide to send more number of personnel in order to minimize the loss.

ADVANTAGES

- Totally Remote Controlled.
- With the help of GPS we get the latitude and longitude of the detected position.
- Locations of detected landmines can also be accessed by mobile phones via GPRS and SMS.
- Wireless-controlled robots use RF circuits, which have the drawbacks of limited working range, limited frequency range and the limited control. Use of a mobile phone for robotic control can overcome these limitations.
- It provides the advantage of robust control, working range as large as the Coverage area of the Service provider, no interference with other controllers and up to twelve controls.

CONCLUSIONS

The paper presents an advanced solution and a new direct approach for remote sensing based on the concept of metal detectors to detect the metallic landmines in El Alamein region. The advanced solution solves three main problems a) The absence of maps that show landmine locations that planted in the Egyptian western desert from WWII, b) The lack of funds, c) The limited use of technology. The solution based on integrated technologies by using the wireless communications, cellular technologies and the packet oriented mobile data service to obtain a full control from a safe distance for landmine monitoring team in fenced minefields or