

Robotic Vehicle with Metal Detector

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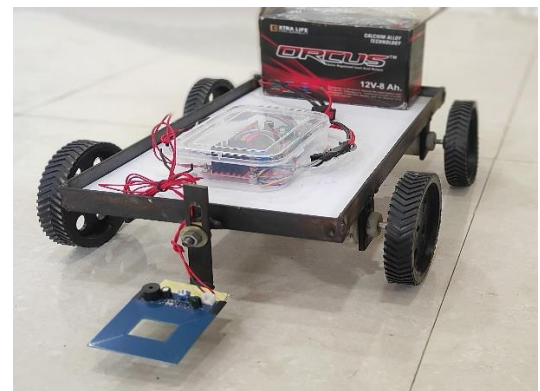
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ABSTRACT

We are not really surprised when mechanical devices pass people by new domains. There are many advantages to these robots compared to human soldiers. One of the most important things about these robots is that they have the ability to make a trip away from the field, without real danger in people's lives. This shows the great influence of military robots. These are robots it is stronger and more resistant to damage than man. So, see provide great opportunities for success in a dangerous environment. Anytime, a robot shot, the soldiers suddenly released a new one. The military robot is an autonomous vehicle that contains a wireless camera that humans can make monitoring through use as a spy. Complete a stand-alone robot that can do different types of jobs are still being developed. To take the best course of action. Our versatile military robot has researched a variety of useful applications various technologies to control these bots. So, by doing some research worldwide work on the construction and development of such a robot, so that to make our jobs easier in exploring the dangerous field and bomb sight robot. This robot will take on the role of military assistant. These military robots are usually hired through an integrated system, including video screens, metal sensors, transmission direction and RF remote control.

Keywords: autonomous vehicle, Metal detection unit, RF remote control

information in a safe area, and safely device a plan for counter attack also trace the locations of enemies' organizations and then plan the attack at the right time. It aims to design RF remote operated metal detection technology to avoid human contact during warzone purpose and also for surveying dangerous areas reducing efforts during metal war places. This network is suitable in enclosed spaces. Mines are usually placed below the ground surface and they are designed to explode because of the weight of the vehicles or troops that are moving over it. Metallic objects can be easily detected by the metal detector sensor using electromagnetic fields. Metal detection takes place using fundamentals of electromagnetism. Furthermore, this robot can be used for archaeological surveys and also move in narrow places where humans are unable to reach.



1. INTRODUCTION

The fundamental reason of this project is to fabricate a robotic vehicle that will help military services by building robots that are not detectable by the enemies. This robot will also serve us to spy on the enemy. It can also detect underground mines and also help in avoiding of the same. Further modifying during the war, it can be used to gather information from the enemy's terrain and monitor that

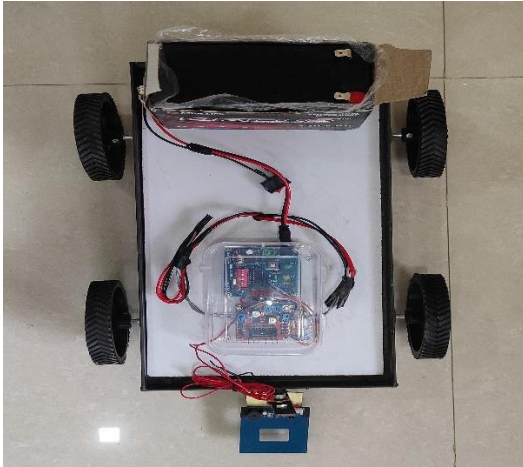


Figure 1: Robotic vehicle with Metal Detector

2. LITERATURE REVIEW AND OBJECTIVE

Dr. Mallikarjun Mudda, Dr. Thangadurai N, Deepu Dharshan, Supriya S, Divya M.R. [JAN 2017] published in World Journal of Engineering Research and Technology they worked on “RF CONTROLLED METAL AND DELETERIOUS GAS DETECTING ROVER”. The proposed gas detection rover can be used in mining and mars area as the transmitter and receiver are handled wireless, hence the distance range increases and able to control the rover from long distance and get the information about gas and metal. The proposed work will be carried out with effective cost and disserve to work accordingly.

V. Nagalakshmi Vaishnavi, Snehal Shinde, Prerna Bhalerao, Dr. Gargi Phadke [2021] published in International Journal of Engineering Research & Technology (IJERT) they worked on “Long Range Spy Robot with Metal and Obstacle Detection”. The main motive of this kind of concept is surveillance of war fields or mining fields where in most of the areas human intervention is not allowed or dangerous. Spy robots are basically used for spying on the enemies and with the help of these we can prepare for counterattack to save military people's lives. This spy robot is also used to observe the mining areas. As this robot is user friendly, it can easily move, capture images and wirelessly transmit them as well as it can avoid obstacles, which alerts people about dangerous situations. This helps organizations to view things at a remote location. With available facilities and infrastructure, we can be successful in designing cost effective systems to meet required applications. Wireless technology that we have used helps to handle robots efficiently without manual operation. As we are using DTMF technology, this robot can cover long range be successful in designing cost effective systems to meet required applications. Wireless technology that we have used helps to handle robots efficiently without manual operation. As we are using DTMF technology, this robot can cover long range.

Nouman Hassan¹, Zeeshan Haider, Shahzad Anwar, Shamaraz Firdous and Chen Yi Hong [February 19, 2020] worked on “Sensor for Landmine Detection using Unmanned Vehicle

Metal Detector and Mobile Computing Technology” published in Open access journal of Environmental and soil science. With the high-level achievements in mobile computing and robotics, we are able to successfully design and develop a metal detector vehicle. The proposed system is capable of detecting buried metals and landmines and marking the exact location and controlling itself from stepping over it. The vehicle can be remotely controlled with the help of mobile phone and wireless technology. Whenever the vehicle detects a Landmine or metal, an encrypted acknowledgement signal is transmitted to the mobile application to inform the operator about interest field and detected metal. The vehicle is capable to move in various directions, such as forward, backward, left, right and stop. The outcome of the project validates that a huge amount of effectiveness and usefulness is to be sure accomplished utilizing the developed framework. The developed system is checked to be very helpful for both civilians and soldiers. The inductive proximity sensor works at an appropriate steady speed with having no issue are used.

Dr. Sandeep Bhat, Dr. M. Meenakshi [2019], done the work on. Real-Time Autonomous Military Robot Path Planning, according to his work, these days the robots are assuming an imperative job in the human life. In risky zones like military medical, atomic reactor, and so on robots are utilized rather than human. To play out all these activities the robot should be self-governing and furthermore fit for its way arranging by keeping away from snags. This paper clarifies about the ongoing execution of the self-governing robot way arranging and approved by utilizing an implanted framework stage.

Objectives-

- 1) To design automatic RF wireless remote operated metal detection technology.
- 2) To develop automatic robotic vehicle for avoiding human contact during warzone purpose.
- 3) To make an automatic robotic vehicle for dangerous area surveying

3. MATERIALS AND METHODS

3.1 Component Description:

Sensor: -Generic Metal Detector Scanner Kit DC 3V-5V Suite Metal Sensor Board Module

Power supply voltage: 3-5V;

Dimensions 66 * 61MM;

Detection distance: <5CM;

The PCB board uses FR-4 military grade A material plate. The tolerance of the plate and the stability of some parameters. A material is very powerful, which is beneficial to the expensive price of some other materials. The parameters of the

components are printed directly on the PCB, which can be directly soldered without referring to the circuit diagram, which is quite convenient.



Figure 1: Metal detector Scanner

Battery: - The battery must have a good power-to-weight ratio & should be able to discharge a large amount of current fairly quickly. There is 12V rechargeable battery is used in the robotic vehicle. The batteries are used to the power supply for motor



Figure 4: Lead Acid Battery

Transmitter & Receiver: - This system is responsible for relaying the commands given by the operator through the transmitter to the receiver via a frequency band. It's the central & most fundamental component of the whole RF controlled vehicle. There are four channels in this system.

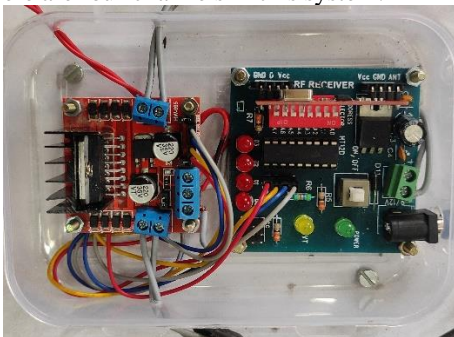


Figure 6: Transmitter & Receiver

DC motors: - Four DC motors are used for four wheels, a 12 V Battery is connected to motors. The motor has 60 rpm speed.



Figure 7: DC motor

3.2 Metal Detector Principle

The proposed system consists of transmitter and receiver circuit. The transmitter circuit transmits the commands required to operate the robot. The receiver circuit receives these commands through RF and moves the robot according to the received commands. A metal detector is interfaced to the controller in the receiver side. Thus whenever any metal is detected the robot stops there and buzzer starts ringing.

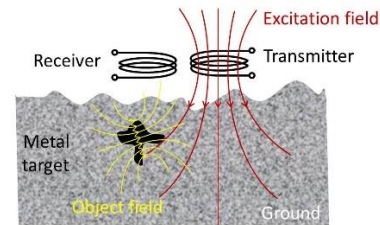


Figure 8: Metal Detection Principle

4. RESULTS AND DISCUSSION

4.1 ADVANTAGES

- 1) This type of robot is easily made with the cost is also at a perishable level.
- 2) It can be controlled easily by any skilled person. The operation of the robot is at advanced level and can move with speed.
- 3) Human life is unthreatened and can help to protect lives of human beings by not letting them into contact of and hazards material.
- 4) Easy to manufacture & low-cost system for dangerous area surveying robot for military purpose

4.2 DISADVANTAGES

- 1) False alarm - Metal detector may give a false alarm in case an individual carries a metal object such as phone, watch or a toy causing unnecessary panic.
- 2) Interference - Metal detectors may interfere with personal devices such as magnetic recording gadgets like CD or a cassette.
- 3) A metal detector is not safe with people who had to get a pacemaker or replacements such as a knee replacement.

5. CONCLUSIONS

This project presents a metal detecting robot using Radio Frequency controlled vehicle with Transmitter and Receiver Module. The robot is moved in a particular direction with the help Radio frequency technology, controlled by our transmitter and receiver. Experimental work has been carried out successfully. The result shows that higher efficiency is achieved using the embedded system. This proposed method is verified to be highly beneficial for many purposes. The metal detector worked at a constant speed without any problem.

This project can be further developed by enhancing the performance and by adding more features. Further developments in this project can be an addition of features like the addition of a gas sensor, video camera, ultrasonic and thermal sensor connecting robotic arms for pick and place purposes etc

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