



Design and Fabrication of Wireless Defence Robot Using Rockerbogie Mechanism

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ABSTRACT

The purpose of this paper is to design a robot which is capable of detecting buried landmines and marking their locations also locate target and destroyed it, while enabling the operator to control the robot wireless mechanism from a distance. The ideas and concepts from the theoretical stages are shaped into the physical hardware components by fabrication of a prototype and then software programs are integrated into the system so as to test and experiment the concepts that had been developed. The designed robot is capable of detecting a buried mine, marking the exact location of the buried mine, and controlling itself from stepping over it and detonating the mine. The detection of the buried mine is done by using metal detectors since most land mines contain metal components.

Keywords: Wireless Mechanism, Software Program

1. Introduction

The landmine crisis is globally alarming since there are presently 500 million unexploded, buried mines in about 50 countries. Governments are looking into this situation seriously since landmines are claiming the limbs and lives of civilians every day. Also the army operation which include the more danger or there operation is in more danger area's to operate [1]. The two purpose of this project is to design a robot which is capable of detecting buried land mines and marking their locations, while enabling the operator to control the robot wirelessly from a distance. A land mine detection robot is needed to be designed to employ in peace support operations and in the clearance of contaminated areas. Also the robot shall be able to detect 50-90% of landmines (Anti-personnel mines) and mark the locations of the mines within a tolerance of 5cm. For the safety of the operator, the designed robot must be able to operate remotely, moreover, must be equipped with wireless data transmitting capabilities. We mounting gun on wireless robot which help to operator to operate remotely and safely from the distance without any injury or any kind of domastical damages in army operation [2,3]. Landmines are easy-to-make, cheap and effective weapons that can be deployed easily over large areas to prevent enemy movements. Mines are often laid in groups, called mine fields, and are designed to prevent the enemy from passing through a certain area, or sometimes to force an enemy through a particular area. While more than 350 varieties of mines exist, they can be broken into two categories, namely, anti-personnel mines and anti-tank mines. Anti-personnel mines are designed to kill or injure enemy combatants

Literature Survey

[1] 'Design and Implementation of a RF Controlled Robotic Environmental Survey Assistant System' by Md. Shamsul Alam, Insan Arafat Jamil, Khizir Mahmud and Najmul Islam published in 2014, focused on use of RF robots for environmental survey which involved data collection and logging and sensors to sense the hazardous compounds in the vicinity.

[2] 'Low Cost Radio frequency Controlled Robot for Environmental Cleaning' by M.Muthiah, Rk. Sathiendran, K.Nirmal published in the year 2015, used RF controlled robot for the cleaning in hazardous areas like Chemical Labs, Radiation Factories, etc. and even in home applications.

[3] 'Robust Stabilization of Wheeled Mobile Robots Moving on Uncertain Uneven Surface' focuses on stability of wheeled mobile robots (WMRs) which is more than legged robots. The control design is carried out for the dynamic model of unicycle, the most common and simplest among WMRs.

The need of such WMRs has been necessity of the age; they can be used in field operations such as for rescue and search applications. By this we can be sure that less human harm is done in rescue operations.

[4] 'Robust Stabilization of Wheeled Mobile Robots Moving on Uncertain Uneven Surface' by Xiaocai Zhu, Guohua Dong and Dewen Hu and Zixing Cai published in 2006, used dynamics of the system to stabilize the robot (WMRs).

Objectives of work

- *To design the block diagram and circuit related to system.*
 - *To design and fabricate mechanical structure*
 - *To select motor specs*
 - *To simulate the circuit using diptrace software.*
 - *To create push buttons in GUI (graphical user interface) using MATLAB.*
 - *To write a program in MATLAB.*
 - *To design the PCB layout using suitable Software.*
 - *To implement the circuit.*
 - *To test the developed system*
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2. Methodology

Design on paper–Block diagram, Study of required components and specification, Circuit diagram and component value selection.

Software Analysis –Analyze the circuit on Diptrace, an simulated on Proteus and test the results for different component values, Microcontroller (AVR) programming using MATLAB.

Prototype Testing –Transmitting the data from MATLAB and receive on AVR controller and test results to go for final design. PCB layout and Itching – Layout by using Diptrace software, Itching by suitable method.

Soldering and debugging

DESIGN OF MECHANICAL FRAME MOTOR SELECTION

STRUCTURE

Final check on design

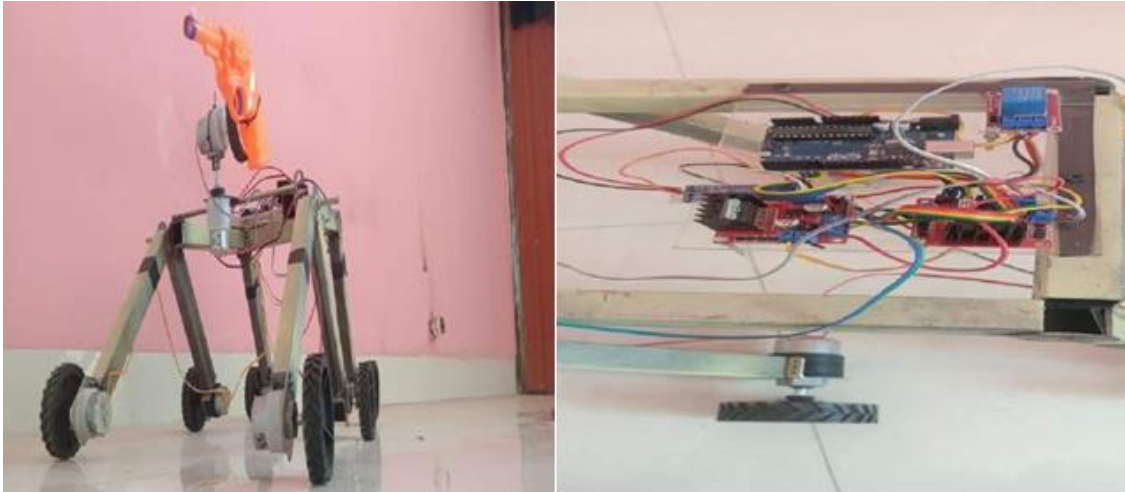
Application of walking machines

The applications of walking machines can be divided into those for which legs are an alternative to other forms of locomotion and for those, which are essential. The former category includes many tasks currently considered suitable for wheeled, tracked or ground-effect vehicles (or even aircraft) but for which legs may offer an added advantages. The second group involves modeled legged animals.

Practical applications of legged robot are divided into the following main categories.

1. Transport on rough ground.
2. Transport in buildings (esp. stairs).
3. Transport in unusual environments such as pipes or orbiting structures,
4. Animal modeling.

Communication systems play a major role in maintaining communication between humans or organizations or institutions or radio broadcasting programs via wired or wireless communication systems. To overcome disadvantages of wired communications, advancement in technology has resulted in the development of most advanced wireless communication systems including wireless radio frequency technology, infrared technology, GSM technology, and so on.



3.

Advantages

Moving and defusing LANDMINE.

Increasing productivity, safety, efficiency, and quality of products. Achieving more accuracy than human beings.

Easy to monitor and control things.

4. References

Md. Shamsul Alam, Insan Arafat Jamil, Khizir Mahmud and Najmul Islam, "Design and Implementation of a RF Controlled Robotic Environmental Survey Assistant System".

M.Muthiah, K.Nirmal, Rk.Sathiendran, "Low Cost Radio frequency Controlled Robot for Environmental Cleaning", 2015 International Conference on Circuit, Power and Computing Technologies[ICCPCT], 2015, 978-1-4799-7075-9/15.

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Xiaocai Zhu, Guohua Dong and Dewen Hu Zixing Cai, "Robust Stabilization of Wheeled Mobile Robots Moving on Uncertain Uneven Surface", Sixth International Conference on Intelligent Systems Design and Applications(ISDA'06),2006, 0-769-2528-8/06.