META-DROID

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Abstract: **The Robotic and Automobile era in the coming time is supposed to rule all the sectors from manufacturing to household entertainments. It is globally accepted as it offers a robust and compact construction which can further be modified according to our needs. A robot may be defined as a machine which is works on an electro-mechanical interface and can operated through computer & electronic programs. Robots can be referred to as machines that can act as a replacement to human labor and it can be used so as to replicate human actions. Robots can be used in adverse conditions, and nowadays many are used for activities like bomb detection and deactivation. The robotic vehicle is controlled by using a mobile phone or hand gestures. Accelerometer for hand gestures alongside with a Bluetooth module are interfaced through android phone. In a concise form, our project is predominantly a robot vehicle which is being controlled using hand gestures using accelerometer installed on a glove and a Bluetooth module which can be controlled by an app on mobile phones or a tablet. Simultaneously it is equipped with a metal detection and a GPS sensor which sends the coordinates of the bomb or a land mine using a GSM module whereas enemy activities can be monitored using a wireless camera mounted at the top of the robot.**

Keywords: **Robotics, Metal Detector, RDX Sensor, Wireless Camera, Android Phone, GPS Module, Bluetooth IC, Accelerometer, Arduino.**

I. INTRODUCTION

In the present era, smart phone has become one of the priced commodities. Radio Frequency IC is used so as to establish a communication. The Android devices makes the vehicle accessible from an infinite range (provided network coverage is available at the location). Vehicles are designed to be realistic environment and so as to reduce human labor and work as commanded, Modem is used for that purpose. The driving force behind the project is that post the Dokhlam standoff between India and China and with already sour relationships between India and Pakistan, this project might do wonders during war and crunch situations and as it can serve as a game changer by reducing human causalities and limiting enemy infiltrations, it acts as a line of defense before war as we are already aware of the things coming our way. The movement of the robot is controlled via L293D. Via using an android app, instructions are provided to the microcontroller via a Bluetooth module and simultaneously the vehicles can be operated.

II. PROBLEM STATEMENT

There are certain inaccessible locations where human presence can land them problem where a person cannot go to check or help or to take a specific action. At those points if we can use the robots then we can solve any problems or save lives. For this we have to design a system in which we can receive signals and give it to controller by decoding it so that controller can drive the robot and there must be a transmitter (mobile phone) which can send the commands to the robot. So we are designing a system in which we can send commands wirelessly by using mobile phone and that will be received by the robot system and as per the commands robot will be driven.

III. AIM/OBJECTIVE

All in all the aim is to drive a robot remotely by using mobile phone from anywhere. and to alert the soldiers from the mines planted by the enemies.

IV. EXPERIMENTAL DETAILS

In our system we are going to use a mobile phone which will be used to send the commands to the robot wirelessly. When we send command to the robot that signals will be received by RF transceiver and given to the controller by decoding it. Once controller gets the commands, gives the signals to the motors to drive as per the command given.

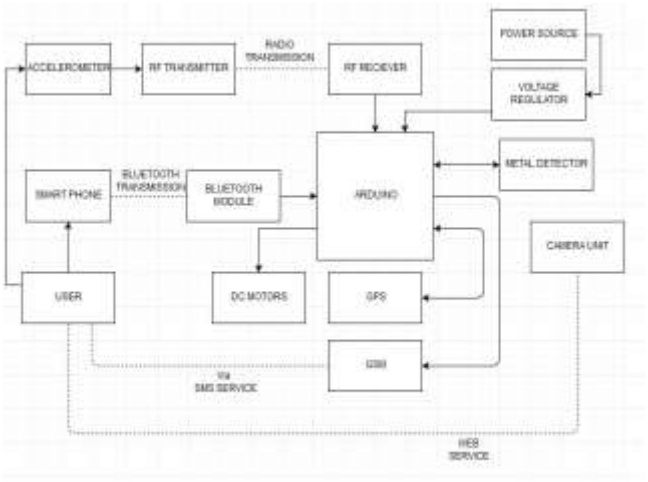

Fig.:1 Block diagram of Meta-droid

V. DESCRIPTION

5.1 Gesture Control Theory

The ADXL 335 sensor is used for the gesture controlled movement of the Meta-droid. It is an accelerometer sensor which is used to sense the tilt movement in the X and Y axis as well as the rise in Z axis. The tilt in positive Y axis commands the robot to move in forward direction while the tilt in negative Y axis commands the robot to move in the reverse direction. As well the tilt in positive X direction commands the robot to turn in the right direction while the tilt in negative X direction commands the robot to turn in the left direction.

These commands are then encoded by an encoder IC HT12E and then are transmitted through the RF transmitter.

On the other hand, the signal is received by the RF receiver on the Meta-droid. The Encoded signal is then decoded by the decoder HT12D.

Fig.:1 Gesture Controller

5.2 Bluetooth Control

A definite user interface having different keys assigned for a definite task is used in this control system of the meta-droid. The interface is designed in an android app which will be functional on a smart phone.

The commands corresponding to different tasks given by pressing different buttons are transmitted by Bluetooth module HC-05). The HC-05 is an easy Bluetooth SPP (Serial Port Protocol) used for interfacing with Arduino. The corresponding module is shown in figure 3.

Fig.:3 HC-05 Bluetooth Module

5.3 Mine Detection Theory

In this mode, the robot works as a mine detector, prevents itself from steppingon it. This is done by using a metal detector sensor. The sensor consists of an LC circuit. The LC circuit generates a magnetic field when it detects a resonating frequency from any metal, this magnetic field induces a current in coil which leads to change in signal flow in the circuit. This change in signal flow is notified by the sensor with a beep sound. The working of this module is illustrated in figure 4.

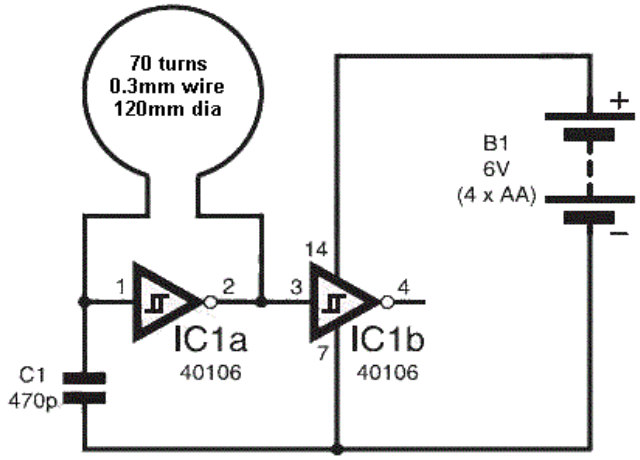

Fig.:4 A simple metal detector circuit

5.4 Mine location by GPS

The robot is able to locate the mine planted by the enemy with the help of GPS(Global Positioning System) module. The module is used to find the coordinates of any given location on the world map. When any mine is detected by the mine detector, the GPS will search the corresponding location and the coordinates i.e. the latitudes and the longitudes of the mine planted. The GPS directly receives information about the coordinates from the satellite. Then the coordinates are sent to the main microcontroller for the further action. The corresponding module is shown In figure5.

Fig.:5 GPS Module

5.5 Transmission through GSM

The coordinates from the GPS (Global Positioning System) are sent via the GSM (Global System for Mobile Communications) as an SMS to the user's smart phone. The GSM is used because of the trustworthy service of the mobile communication system. The GSM module take the information from the microcontroller and transfers it as an SMS with the help of the mobile service. The corresponding module is shown in the fig. 6.

Fig.: 6 GSM Module

5.6 Camera Unit

A camera unit is attached to the Meta-droid for the efficient movement. As the user may have to operate it from a distance which will lead to confusion for the correct path. In this case the path will be shown on the screen near the user.

The camera unit would be connected with an internet connection so that the images can be transferred just as in the video conferencing.

The camera unit can be another phone with an internet connection as well as a well-equipped web camera with an internet dongle connected to it.

Examples of camera unit is shown in the fig. 7.

Fig.: 7 Camera Unit.

VI. ADVANTAGES

- Soldiers will not be needed to check for any post for the enemies which will lead to less human work.
- Information regarding the enemies camp in the areas can be transmitted through the internet service through webcam attached to the Meta-droid.
- Soldiers can be notified for the mine location which will lead to less casualties during war time.
- Infiltration of the enemy camps will be easier because of the smaller size of the Meta-droid.

VII. CONCLUSION

The above concepts are applied and constitute the Meta-droid as a whole the assembled prototype of the Meta-droid is shown in the figure 8.

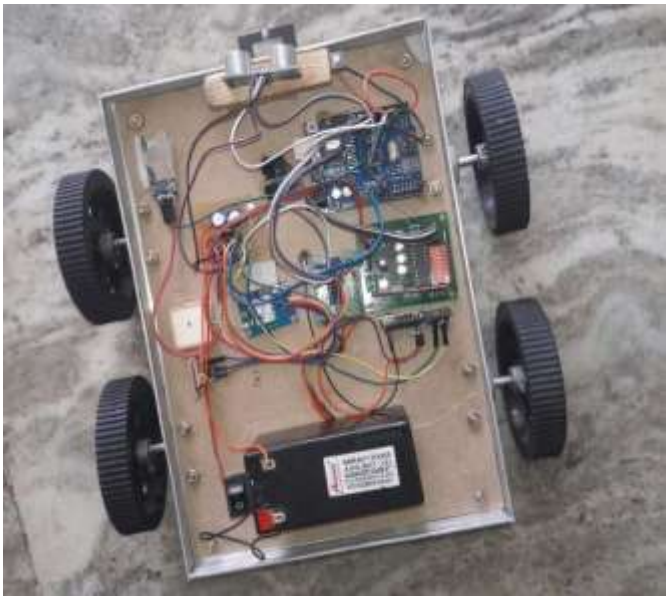

Fig : 8 Hardware unit

In future robotics has a lot to explore into, Mechanics, Motor Controls, Sensors & Actuators, Vision, Computing and Intelligence. There are a lot of companies and various organizations that are working for the betterment of this field. But there are hardly few companies that are working for such robotic product that could be useful for the defense services.

In the near future the advancement in robotics will lead to production of such concept for the betterment of the defense technology. The drone technology is already used by the defense forces but no robots are used for the ground level operations such as this product. With the advancement of the robotics this concept can revolutionize the defense forces. New technology with the upgrades of better communication system will make it even more efficient.

And this will also lead to the growth of defense forces and would help our nation to make its defenses compete with the world in respect to the nation's security and research.

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