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Solar Energy Based Multi-Purpose Robotic Vehicle

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Abstract: *"We can control the Robot using Dual Tone Multi Frequency (DTMF) technology. DTMF technology is most useful technique at present days. It is worked on to methods digital signal processing (DSP). Wireless-control of robots uses RF circuit that has the drawbacks of limited working range and limited control. This DTMF is gives advantage over the RF, it increases the range of working and also gives good results in case of motion and direction of robot using mobile phone through micro controller. This type of wireless communication gives the remote handling operation of Robot using DTMF."*

Keywords: *Arduino UNO, RF Id Reade & Tag, Solar Panel, Charging Controller, Battery, DTMF decoder IC, Motor driver IC.*

I. Introduction

The main objective of our project is to design a system which provides a solution for making aware of the new environment, robotic system are used instead of human beings to make aware of the new places. So, we have proposed a DTMF based surveillance which can be controlled remotely by using the mobile which is mounted on chassis.

The automation using DTMF is controlled by mobile phone that makes a call to another mobile phone attached to the DTMF system. in the course of a call , if any button is pressed, a tone corresponding to the button pressed is heard at the other end of the call ,This tone is called "dual tone multiple-frequency"(DTMF) tone .The system perceives this DTMF tone with the help of phone stacked on the system. The received tone is processed by the DTMF decoder IC. The DTMF decoder IC then transmits the signal to the motor driver IC to operate the motors. since this robot is controlled by dialing call so we can also call it as DTMF controlled robot. Motors are attached to the robot for the movement of it according to the tones given by the person.

Radio frequency identification (RFID) is used in many applications. RFID is a non-contact, automatic identification technology that uses radio signals to identify, track, sort and detect a variety of objects including people, vehicles, goods and assets without the need for direct contact or line-of-sight contact (as found necessary in bar code technology). RFID technology can track movement of objects through a network of radio-enabled scanning devices over a distance of several metres.

A device called RFID tag, or simply a tag, is a key component of the technology. These are actively used in RFID based access control systems implemented in offices all around.

An RFID system typically consists of three key elements:

1. An RFID tag, or transponder, that carries object-identifying data .
2. An RFID tag reader, or transceiver, that reads and writes tag data
3. A back-end database that stores records associated with tag contents.

Accessibility or authorisation for further processing can be granted or refused, depending on results received by the reader and processed by the database.

II. Literature Review

Paper [1]:- Awab Fakih, Jovita Serrao Collage of Engineering and Technology "A Model of Cell Phone Operated Robotic Car" Conventionally, Use of a mobile phone for robotic control can overcome these limitations. It provides the advantages 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. Although the appearance and capabilities of robots vary vastly, all robots share the features of a mechanical, movable structure under some form of control. The control of robot involves three distinct phase namely perception, processing and action.

Generally, the preceptors are sensors mounted on the robot, processing is done by the on-board microcontroller or processor, and the task (action) is performed using motors or with some other actuators.

Paper [2]:- Rakesh Sahu 1, Sidheswar Mallick 2, T. Naveen Kumar 3,D. Sanjana 4 "Cell Phone Controlled Robot Using 8051" Asst. Prof. 1 EEE Dept. GIET, Gunupur, Odisha, India 2,3,4Student (B.Tech.)EEE Dept. GIET, Gunupur, Odisha, India. A robot is usually an electro-mechanical machine that is guided by computer and electronic programming. Many robots have been built for manufacturing purpose and can be found in factories around the world. In this project we are going to build a cell phone controlled robot using 8051microcontroller. Cell phone controlled robot runs over mobile DTMF technology. DTMF stands for Dual Tone Multiple Frequency.

There are some frequencies that we use to create DTMF tones. In simple words by adding or mixing two or more frequencies we generate DTMF tone. Designing of the latest inverted ROBOT which can also be done using an APP for android mobile or directly through keyboard of cell phone. And in which we can use Bluetooth communication to interface controller and android. Controller can be interfaced to the Bluetooth module though UART protocol. According to commands received from android the robot motion can be controlled. The consistent 3 output of a robotic system along with quality and repeatability are unmatched. Pick and Place robots can be reprogrammable and tooling can be interchanged to provide for multiple applications. The objective of the major project is to realise the smart living, more specifically the home lighting control system using Bluetooth Technology. Robot and smart phones is a perfect match, especially mobile robots. As phones and mobile devices are each time more powerful, using them as robot for building robot with advanced feature such as voice recognition. It is concluded that smart living will gradually turn into a reality that consumer can control their home remotely and wirelessly.

Paper [3]:- Sushma Ronanki 1, Divya Tandra 2, Prasanth Pogiri 3, Dilleswara Rao 4
1A ssistantProfessor, 2,3,4Student, B.Tech, M.Tech, Electronics and Communication, S SCE, Srikakulam, Andhra Pradesh(India) "DTMF Controlled robot using Arduino" In this paper,we can control the Robot using Dual Tone Multi Frequency (DTMF) technology. DTMF technology is most useful technique at present days. It is worked on to methods digital signal processing (DSP). Wireless-control of robots uses RF circuit that has the drawbacks of limited working range and limited control. This DTMF is gives advantage over the RF; it increases the range of working and also gives good results in case of motion and direction of robot using mobile phone through micro controller. This type of wireless communication gives the remote handlingoperation of Robot using DTMF.

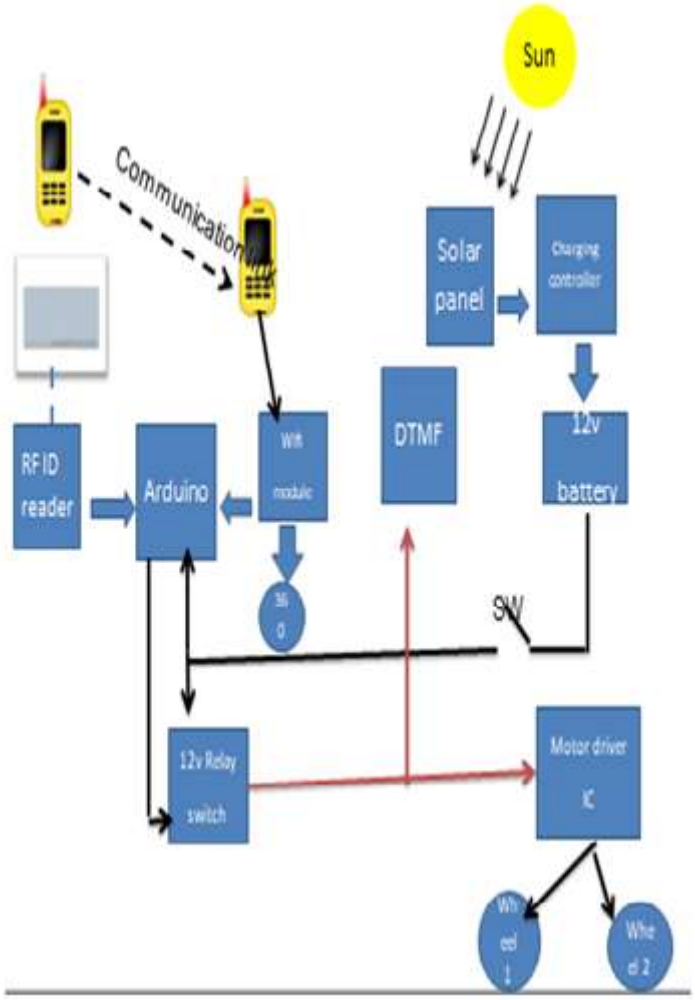
Paper [4] :- Mohammad Javed Ansari, Ali Amir Dept. of Electrical & Electronic Engineering Int'l Islamic University Chittagong (IIUC) Chittagong, Bangladesh. Md. Ahsanul Hoque Lecturer, Dept. of Electrical & Electronic Engineering Int'l Islamic University Chittagong (IIUC) Chittagong, Bangladesh "Microcontroller Based Robotic Arm" Robotics has been a tremendous successful field of research in last few decades. Regarding the development of robotics, many developed robotic arm has been deployed in industrial purposes like automation, sophisticated fabrication etc. This paper is an 4 initiative to patronize the robotic arm for hazardous situation people who can use his hand to move object within certain range to carry out that job. This project is meant to designing and developing of a microcontroller (ATmega) based robotic arm. The project delivers a combined implementation of Electrical, Electronic as well as Mechanical gen. The robotic arm responds to the gesture as well as can be programmed to go along a definite path and task. The system senses the movement of user's arm and robotic arm replicates the given input gesture. The gesture is sensed by a number of potentiometers which are embedded onto a glove or other structural attachment. The movement in potentiometer determines the position for the servo motors driving the parts of the arm.

Paper [5]:- Sourangsu Banerji, Department of Electronics & Communication Engineering, RCC-Institute of Information Technology, India "Design and Implementation of an Unmanned Vehicle Using A GSM Network without Microcontrollers"In the recent past, wireless controlled vehicles had been extensively used in a lot of areas like unmanned rescue missions, military usage for unmanned combat and many others. But the major disadvantage of these wireless unmanned robots is that they typically make use of RF circuits for maneuver and control. Essentially RF circuits suffer from a lot of drawbacks such as limited frequency range i.e. working range, and limited control. To overcome such problems associated with RF control, few papers have been written, describing methods which make use of the GSM network and the DTMF function of a cell phone to control the robotic vehicle. This paper although uses the same principle technology of the GSM network and the DTMF based mobile phone but it essentially shows the construction of a circuit using only 4 bits of wireless data communication to control the motion of the vehicle without the use of any microcontroller. This improvement results in considerable 5 reduction of circuit complexity and of manpower for software

development as the circuit built using this system does not requireany form of programming. Moreover, practical results obtained showed

an appreciable degree of accuracy of the system and friendliness
without the use of any microcontroller.

III. Block Diagram



Proposed System

The automation using DTMF is controlled by mobile phone that makes a call to another mobile phone attached to the DTMF system. in the course of a call , if any button is pressed, a tone corresponding to the button pressed is heard at the other end of the call ,This tone is called "dual tone multiple-frequency"(DTMF) tone .The system perceives this DTMF tone with the help of phone stacked on the system. The received tone is processed by the DTMF decoder IC. The DTMF decoder IC then transmits the signal to the motor driver IC to operate the motors. Since this robot is controlled by dialling call so we can also call it as DTMF controlled robot. Motors are attached to the robot for the movement of it according to the tones given by the person.

Radio frequency identification (RFID) is used in many applications. RFID is a non-contact, automatic identification technology that uses radio signals to identify, track, sort and detect a variety of objects including people, vehicles, goods and assets without the need for direct contact or line-of-sight contact. A device called RFID tag, or simply a tag, is a key component of the technology. These are actively used in RFID based access control systems implemented in offices all around.

We are using solar panel for making the robot for totally independent . Robot can generate our own energy with the help of solar panel. And we also provide a HD camera for capturing the visual movement of environmental objects. HD camera can capture and record the movement of object in day as well as in night also.

We are using Arduino UNO that is ATMEGA328 , 28 pin microcontroller . With the help of Arduino we can easily program , control and run the robot. We are adding RF ID technology to prevent a better security in robot.

WORKING

The automation using DTMF is controlled by mobile phone that makes a call to another mobile phone attached to the DTMF system. in the course of a call , if any button is pressed, a tone corresponding to the button pressed is heard at the other end of the call ,This tone is called "dual tone multiple-frequency"(DTMF) tone .The system perceives this DTMF tone with the help of phone stacked on the system. The received tone is processed by the DTMF decoder IC. The DTMF decoder IC then transmits the signal to the motor driver IC to operate the motors. Since this robot is controlled by dialling call so we can also call it as DTMF controlled robot. Motors are attached to the robot for the movement of it according to the tones given by the person.

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Future Scope

- It will reduce the percentage of accidents by using automatic breaking system in future.
- We can easy find the location of system by using GSM network.
- By using RFID system security of system can be improve.
- We can add multi media camera to see where and what car is doing.

IV. Conclusion

Advance capability of robotics technology in Military Technology can be verified. From this investigation we should conclude that it is possible to produce an alternative method to RF communication and reduces the amount of RF noise in the environment.

It should decrease the mystery of robots for the average user. Black box that is Motor vehicle event date recorder can be satisfactorily installed to record physical parameters of vehicle during crash, pre- crash & post- crash.

In the designing of our project the controlling of our system is controlled wireless communication. The future implication of the project are very great.

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