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DTMF based Cell Phone Controlled Robot Car using Microcontroller

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ABSTRACT: The "DTMF based robot" is controlled by a mobile phone that makes a call to another mobile phone attached to the robot. In the course of a call, if any button is pressed, a tone corresponding to the button pressed is heard on another phone. This tone is called "Dual Tone Multiple Frequency" (DTMF). The robot perceives this DTMF tone with the help of the phone stacked on the robot. The microcontroller then transmits the signal to the motor driver ICs to operate the motors. Since this robot is controlled by dialling a call so we can also call it as DTMF controlled robot. The transmitted section consists of a laptop linked with a smart phone through an apps call VNC server and client along with DTMF tone generator. Using the mobile phone, we can generate DTMF tones which will be received by other mobile phone mounted on robot after call connection. The mobile phone on robot is connected to the microcontroller and the output or IC89C51 is connected to the motor driver which helps the robot to move wireless. As we are using internet the robot can be operated from any part of the world so, we need to see where the robot is moving, for which we are using Android app for monitoring through camera inbuilt in smart phone mounted on robot.

KEYWORDS: Microcontroller 89C51, Motor Driver IC L293D, Alcohol Sensor, Obstacle Detector, Sound Sensor

I.INTRODUCTION

DTMF is an acronym for Dual Tone Modulation Frequency. Robotic vehicle based on DTMF technology is explained in this project. Here, is a circuit that operates the robot with using a microcontroller. This circuit consists of simple DTMF Tone decoder IC and a motor driver IC. When a key is pressed from our mobile, it generates a tone, which is a combination of two frequencies. This frequency can be decoded by the decoder IC into binary sequence. Using this binary sequence, the robot is controlled.

On cell phone robot we have mounted a 12v battery as the power supply for the circuit and the motors when the user calls the mobile which is mounted on the robot the call is received by auto answer mode. As the call continues when the user presses a button on his handset the tone that is generated is decoded by the DTMF decoder and the command is passed to the microcontroller which is pre-programmed the microcontroller then passes the command to the motor driver ICs for motion.

The background based industrial problems are Brain-computer interfaces (BCIs) enable some device and machines to be controlled by your mind. BCIs could be quite useful in augmenting human abilities in the future, but developing the technology for wider adoption is the challenge. The equipment for sensing brain signals is expensive and cumbersome, and the data processing can be tricky. There's also a long period of training, calibration and learning Generally, the preceptors are sensors mounted on the robot, processing is done by the on-board microcontroller or processor, and the task is performed using motors or with some other actuators. The DTMF technology has overcome the problem of limitation which we can work only in limited range or limited area by using cell phone.

II.METHODOLOGY

DTMF is an acronym for Dual Tone Modulation Frequency. Robotic vehicle based on DTMF technology is explained in this project. Here, is a circuit that operates the robot with using a microcontroller. This circuit consists of simple DTMF Tone decoder IC and a motor driver IC.

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When a key is pressed from our mobile, it generates a tone, which is a combination of two frequencies. One is high frequency and another one is low frequency. This frequency can be decoded by the decoder IC into binary sequence. Using this binary sequence, the robot is controlled.

On cell phone robot we have mounted a 12v battery as the power supply for the circuit and the motors when the user calls the mobile which is mounted on the robot the call is received by auto answer mode. As the call continues when the user presses a button on his handset the tone that is generated is decoded by the DTMF decoder and the command is passed to the microcontroller which is pre-programmed the microcontroller then passes the command to the motor driver ICs for motion. On device and machines to be controlled by your mind. BCIs could be quite useful in augmenting human abilitnsing brain signals is expensive and cumbersome, and the data processing can be tricky. There's also a long period of training, calibration and learning.

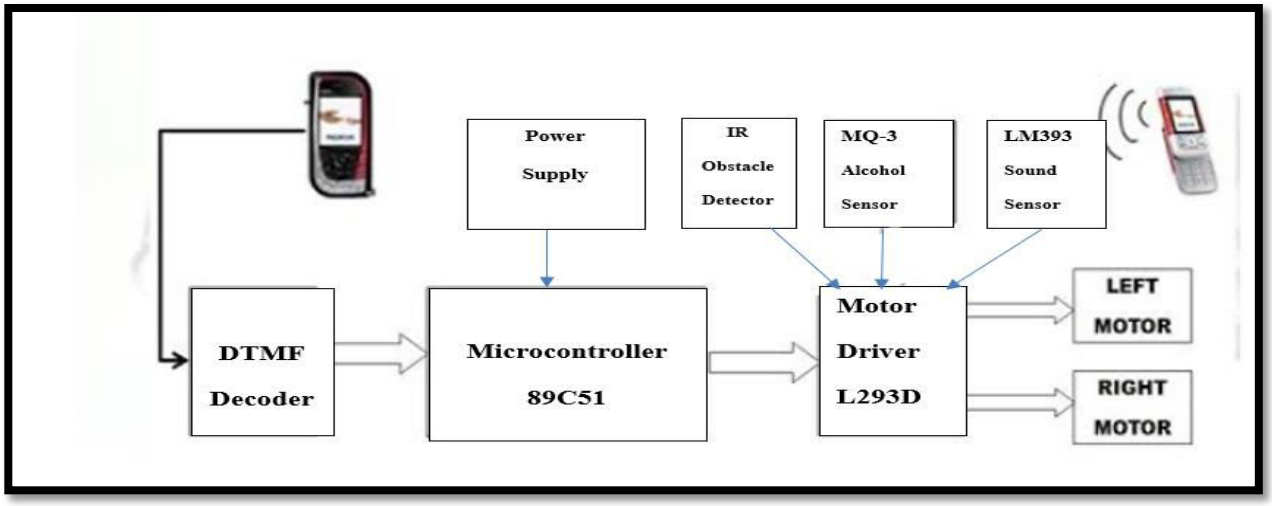

Figure 1 .Block Diagram of Model

System Hardware Designing:

System hardware designing is divided in to 2 sections:

a) CPU Board
b) Input Board
c) Output Board

- **Microcontroller 89C51:**

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer.

- **MT8870 DTMF Decoder:**

The MT8870D is a complete DTMF receiver integrating both the band split filter and digital decoder functions. The filter section uses switched capacitor techniques for high and low group filters; the decoder uses digital counting techniques to detect and decode all 16 DTMF tone-pairs into a 4-bit code.

- **Alcohol Sensor MQ3**

This module is made using Alcohol Gas Sensor MQ3. It is a low-cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO2, whose conductivity is lower in clean air.

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Figure 2. Alcohol Sensor

- **Obstacle Detector Sensor**

This is yet another one of those modules with cool possibilities. You could for example, sound an alarm when something got too close or you could change the direction of a robot or vehicle. The device consists of an Infrared light

Transmitter, an Infrared Detector, and support circuitry. It only requires three connections The drawing and table below identify the function of module pin outs, controls and indicator. When it detects an obstacle within range it will send an output low.

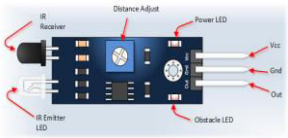

Figure 3.Obstacle Detector

- **Sound Sensor**

Sound detection sensor module detects the intensity of sound where sound is detected via a microphone and fed into an LM393 op-amp. It comprises an onboard potentiometer to adjust the set point for sound level.

Figure 4.Sound Sensor

III.EXPERIMENTAL RESULT

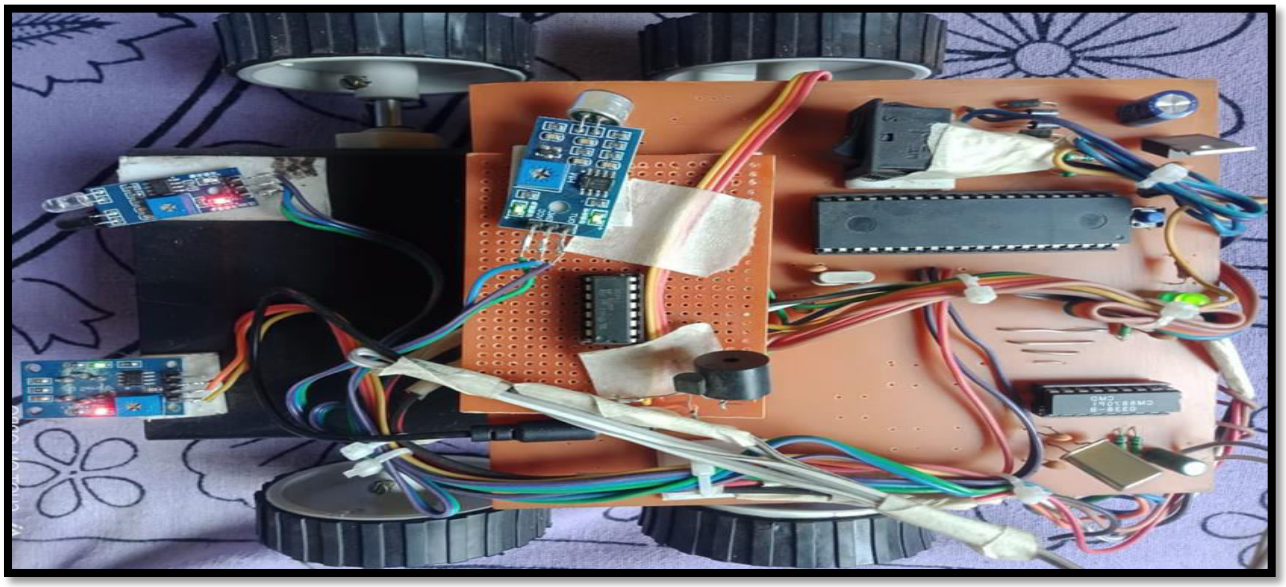

Figure 5. Project Model

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The result section is as follows:

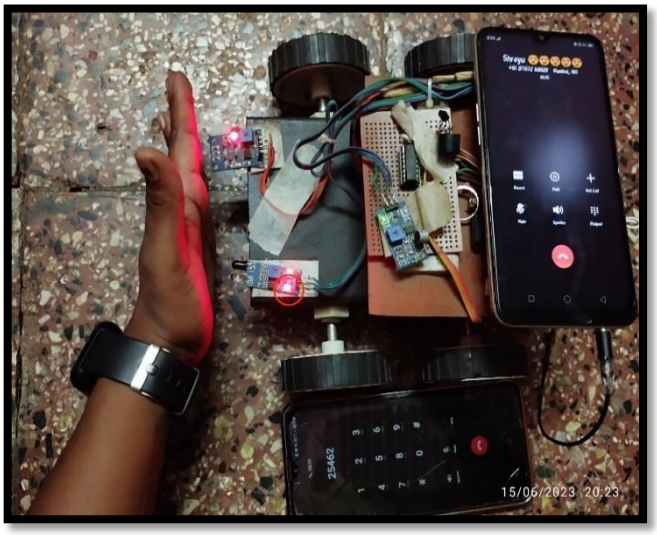

Figure 6. Obstacle Detector Result

Figure 7. Alcohol Detector Result

IV.CONCLUSION

Many existing systems have discussed about the robots and have proposed many for reducing these efforts. But, still there is difficulty in moving robots using different signals. In order to avoid the difficulty, instead of controlling the robots manually using RF, GSM, Bluetooth technologies our project succeeded in moving the robot using DTMF module. When the commands given by the disabled person sitting in one place, according to that commands the motors will move which in turn moves the robot.

As days passing on, the use and the acceptability of robotics are getting more and more popular because of its friendly features. Robotics technology is also adopting numerous new methods and development. Commercial production of DTMF controlled cell phone-controlled robot with more advancement may be able to control the robot and using military applications to finding the enemy.

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