

DTMF based Surveillance Robot

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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 at the other end of the call. This tone is called “Dual Tone Multiple-Frequency” (DTMF) tone. The robot perceives this DTMF tone with the help of the phone stacked on the robot. The received tone is processed by the microcontroller with the help of a decoder IC. The microcontroller then transmits the signal to the motor driver ICs to operate the motors. Since this robot is controlled by dialing 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 laptop linked to 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 Arduino controller and the output or arduino 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 Airdroid app for monitoring through camera inbuilt in smart phone mounted on robot.

Keywords: Arduino microcontroller, L293D Motor driver, motors, DTMF decoder, VNC server/viewer, Airdroid.

I. INTRODUCTION

The main objective is to design a system which provides a solution for making aware of the new environment, robot are used instead of human beings to make aware of new places. So, we have proposed a DTMF based surveillance which can be controlled remotely by using internet so the mobile which is mounted on robot will be controlled via internet from another android platform or pc. Camera in the mobile can be used to visually control the robot directions from far places so this can be used to make aware of new places all over the world collecting information.

II. PROPOSED SYSTEM

A. Block Diagram

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 at the other end of the call. The robot perceives this DTMF tone with the help of the phone stacked on the robot. The received tone is processed by the microcontroller with the help of a decoder IC. The microcontroller then transmits the signal to the motor driver ICs. The code for interfacing DTMF decoder to the motor drivers is dumped into the microcontroller. Motors are attached to the robot for the movement of it according to the tones given by the person.

B. Algorithm steps-

The working of the project can be explained in the following steps:

Step 1: Initially power supply is given to the DTMF robot.

Step 2: Call is made from laptop using VNC viewer.

Step 3: Call is picked by the robot operator manually.

Step 4: Directions are given by the operator using laptop from VNC viewer.

Step 5: When key 2 is pressed in VNC viewer, robot moves forward.

Step 6: When key 8 is pressed in VNC viewer, robot moves backward.

Step 7: When key 4 is pressed in VNC viewer, robot moves left.

Step 8: When key 6 is pressed in VNC viewer, robot moves right.

Step 9: When key 5 is pressed in VNC viewer, robot moves stop.

Step 10: Surveillance can be done through camera present in smart phone connected to DTMF robot.

Step 11: Video streaming from the laptop using AIRDROID app.

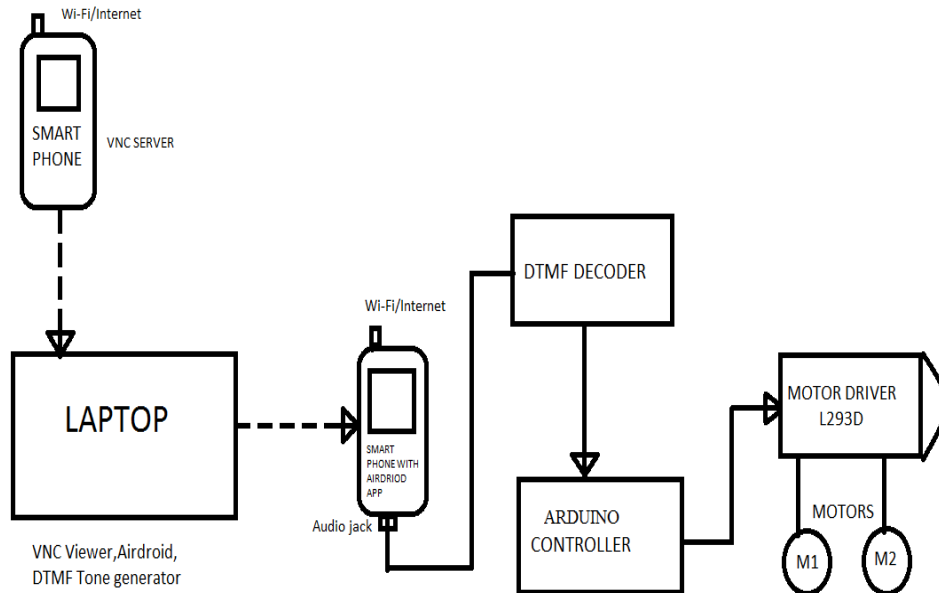


Figure 1 DTMF based surveillance robot block diagram

C. Flow Chart

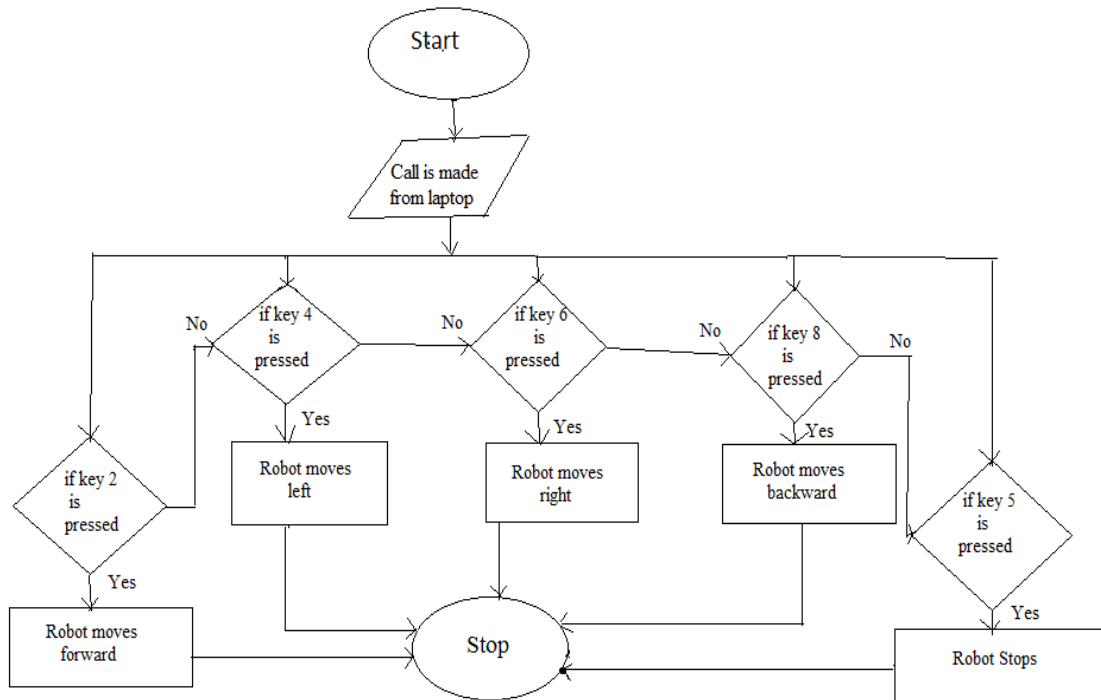


Figure 2 DTMF based surveillance robot flow chart

D. Hardware Implementation

Power supply

9v or 12v battery is used for giving power supply for DTMF decoder, controller and motor driver. 7805 regulator IC is used to give constant dc 5v output which is given as operating voltage for the DTMF decoder, controller and motor driver.

DTMF decoder

DTMF decoder is used here to train the commands for the robot. DTMF decoder consists of 4 output pins D0-D3. Whenever a command is given, the binary value of the address is given to the output pins D0-D3. The key tone commands as shown below:

Command	Address	DTMF module output (D0-D3)
Forward	02	0010
Backward	08	1000
Left	04	0100
Right	06	0110
Stop	05	0101

Table 3.3.6(a) Commands

Microcontroller

The output pins of DTMF module (D0-D3) is given to Arduino microcontroller input pins (3,4,5,6) as per the program. The output pins(7,8,9,10) of microcontroller are connected to input pins(2,7,10,15) of motor driver.

Motor Driver and Motors

Motor driver is used to drive the two DC motors for the robot. The output of controller is given to the inputs of motor driver and depending upon the inputs given to the motor driver. The motor output pins (m11,m12,m21,m22) rotates the motors by which the robot moves.

DTMF module inputs (D0-D3)		Motor Outputs
Forward	02 0010	1010
Backward	08 1000	0101
Left	04 0100	1001
Right	06 0110	0110
Stop	05 0101	0000

Table 3.3.6(b) Motor outputs

III. EXPERIMENT AND RESULTS

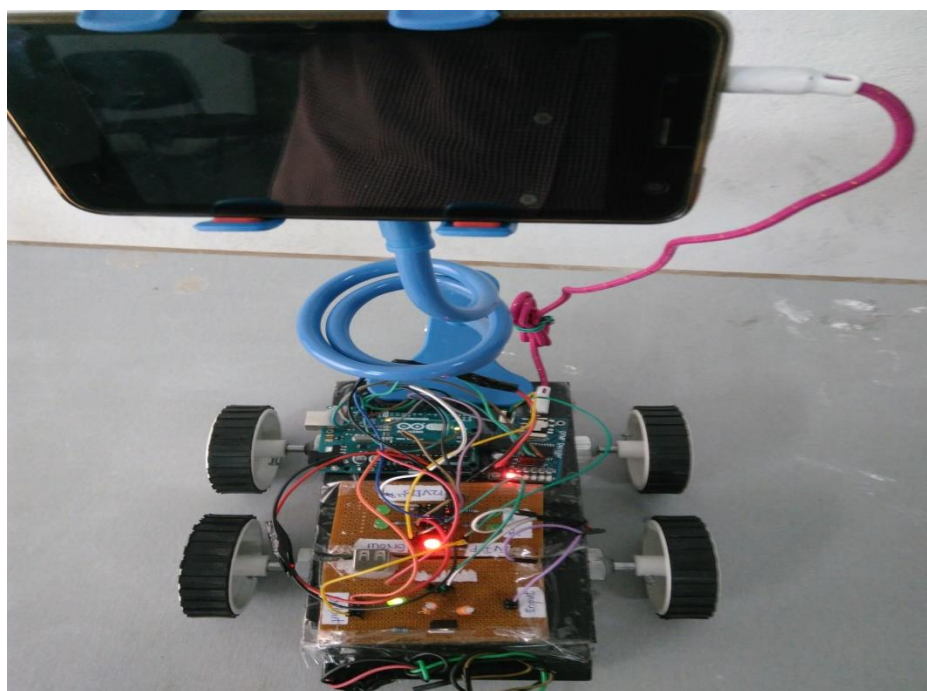
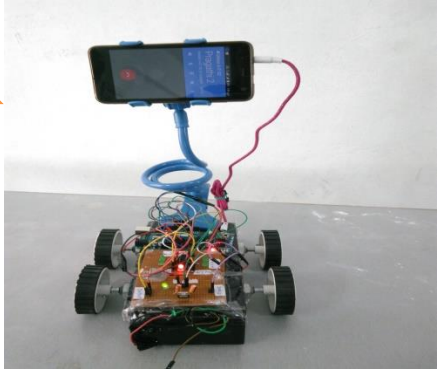
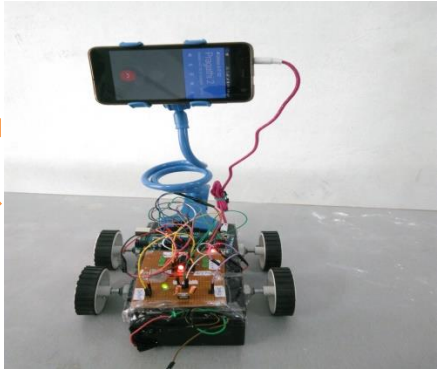


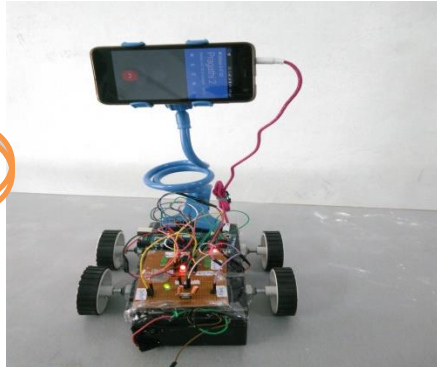
Figure 3: DTMF based surveillance robot



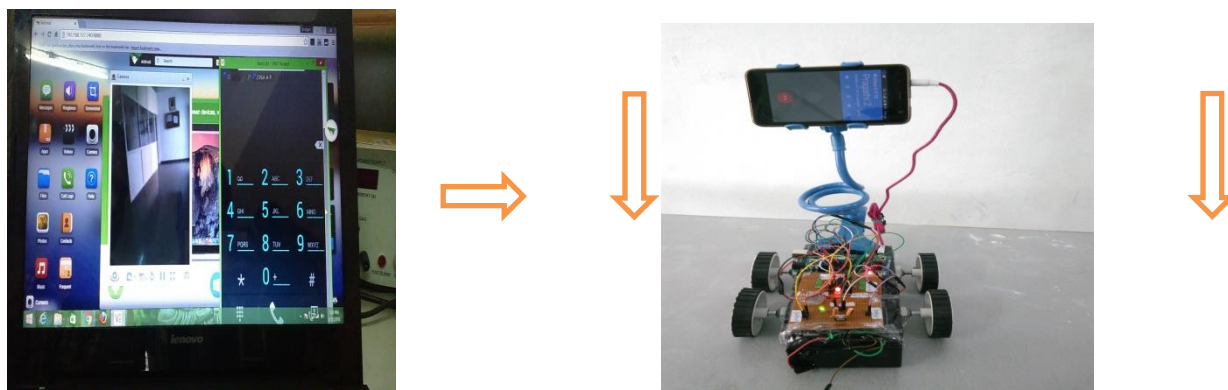
(a)



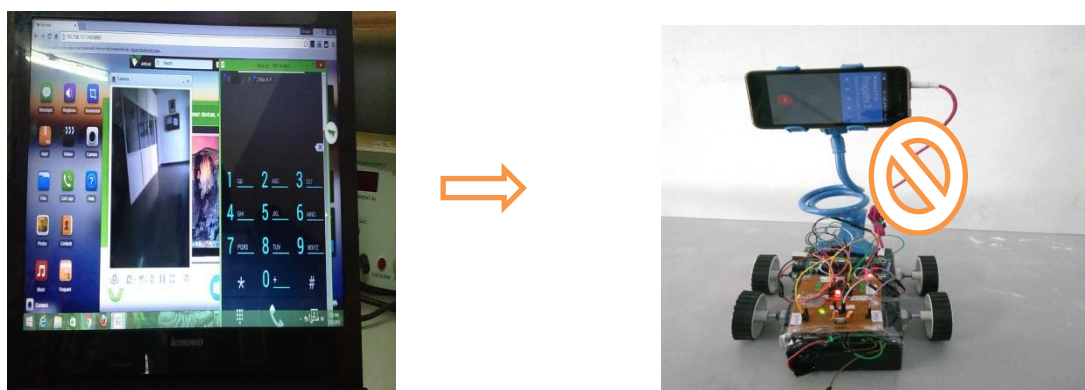
(b)



(c)



(d)



(e)

- (a) When key 2 is pressed robot moves FORWARD direction.
- (b) When key 4 is pressed robot moves LEFT direction.
- (c) When key 6 is pressed robot moves RIGHT direction.
- (d) When key 8 is pressed robot moves BACKWARD direction.
- (e) When key 5 is pressed robot STOPS.

IV. CONCLUSION

The paper has been successfully designed and tested. It has been mainly designed to make aware of new place using robots through internet. 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.

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