



DTMF Mobile Controlled Robotic Car

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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 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 received tone is pressed by the microcontroller with the help of a decoder IC. The DTMF board transmits the signal to the Raspberry-Pi (3+) board to operate the motors and camera directions. Since this robot is controlled by dialing a call so we can also call it as "DTMF Controlled Robotic Car". Hence we can introduced newly upgradable technology of Raspberry Pi (B+). The mobile phone on robot is connected to the Raspberry Pi (B+) controller and the output is connected to the relay's. which helps the robot to make 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 the windows App "MobaXterm & Advanced IP Scanner" for monitoring through camera mounted or built on robot. Hence also we have introduced 4 wheel drive, automatic calling attending technology for the particular number and camera IP address security technology so, In this robot more secure and safely one.

Keywords: Raspberry Pi (B+), Motors, Camera, IP address security technology, Advanced IP scanner, Automatic call attending software.

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 new places. So, we have proposed a DTMF controlled robotic car.

Which can be controlled remotely by using internet so the mobile which is mounted on robot will be controlled via internet from another Android mobile or platform. Here we can used the night vision

II. OVER VIEW OF THE TECHNOLOGY

DTMF stands for "Dual Tone Multiple Frequency". It is the signal to the phone company that generates when you press an ordinary telephone's touch keys.

In the united states and perhaps elsewhere, it's known as "Touch Tone Phone".DTMF has generally replaced loop disconnect calling. DTMF generation is made of audio signal of two tones between the frequency of 697HZ and 1633HZ.

The DTMF technique output distinct representation of 16 common Alphanumeric characters (0-9, A-D,* ,#) on the telephone. With DTMF, each key you press on your phone generates two tones of specific frequencies.

So, that a voice can't imitate the tones, one tone is generated from a high-frequency group of tones and other from a low frequency group. Here we can the signals you send when you press your touchtone phone keys.

REQUENCY TABLE

Table .1. Frequency Table

Digit	Low frequency	High frequency
1	697	1209
2	697	1336
3	697	1477
4	770	1209
5	770	1336
6	770	1477
7	852	1209
8	852	1336
9	852	1477
0	941	1336
*	941	1209
#	941	1477

When any DTMF code has been received at mobile it can be audible through speaker, so to decode this DTMF code mode camera so, this can be used to make aware of new places all time and all over the world collecting information. Andalso here introducing the 4 wheel driving of the robot,

This method of controlling used to turn the vehicle more sensitively and accurately. speaker output itself can be used. Output of speaker is connected to IC MT8870 which is DTMF decoder IC. It is used widely to decode DTMF code. It gives 4-bit digital output Q1,Q2,Q3,Q4 according to the received key following figures shows the equivalent digital output for eachkey.

BINARY CODE FOR EACH KEY

Table.2. Binary code for each key

key	Q1	Q2	Q3	Q4
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
9	1	0	1	0
0	1	1	0	0
*	1	0	1	1
#	1	1	0	0

III. METHODOLOGY

The block diagram of the project is as shown in fig. It consists of DTMF Decoder (MT8870), Raspberry Pi (B+), relay's, wireless camera module, Two mobile phones (one mounted on the module and other with the user) and user PC. The method of project operation is explained below. Here, the robot is controlled by a mobile phone attached to the robot. In the course of a call, if any button is pressed, a tone corresponding to the button is heard at the button is heard at the other end of the call. This tone called DTMF tone.

IV. BLOCK DIAGRAM

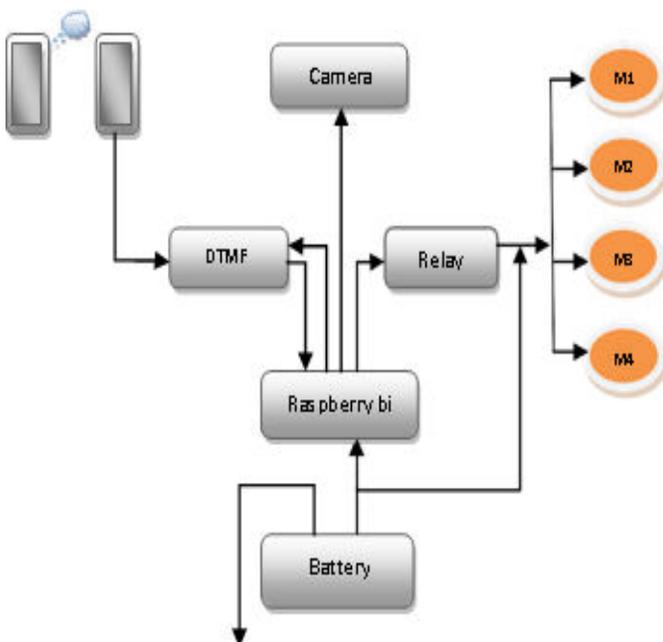


Figure.1. Block diagram of the DTMF robot

V. CIRCUITDIAGRAM

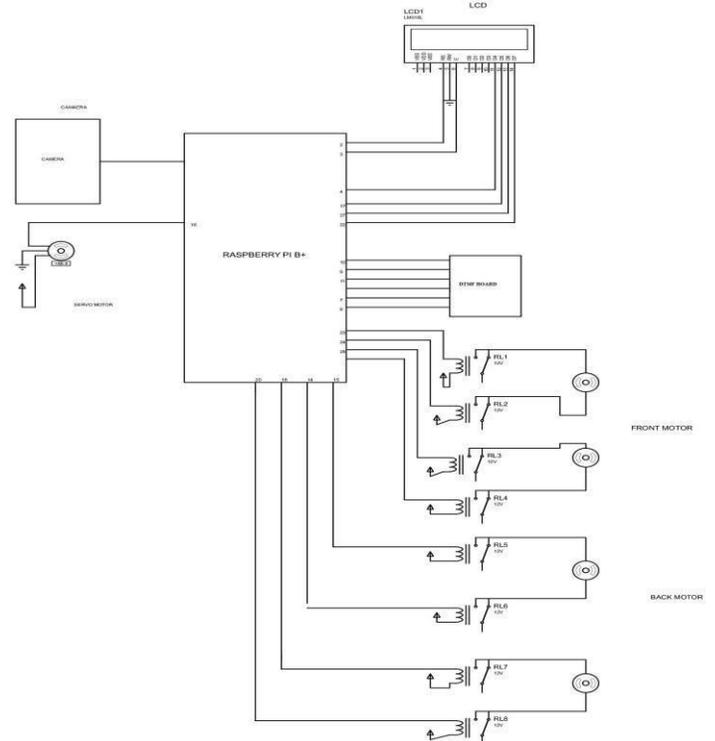


Figure. 2. Circuit diagram of the DTMF robot

VI. HARDWARE REQUIREMENTS

Table.3. Hardware Materials

S.NO	PARTS NAME	QUANTITY
1	DTMF board	1
2	Raspberry Pi-(B+)	1
3	Night vision camera	1
4	LED bulbs	4
5	16*2 LCD display	1
6	USB cable	1
7	5V relay board	1
8	Motor	4
9	Audio cable	1
10	Memory card	1
11	6V battery	1
12	Vehicle wheels	4

VII. SOFTWARE REQUIREMENTS

- Moba Xterm.
- Python.
- Advanced IP Scanner.
- Automatic Call Attending System.
- Raspberry Pi- (B+)software.

VIII. ALGORITHMSTEPS

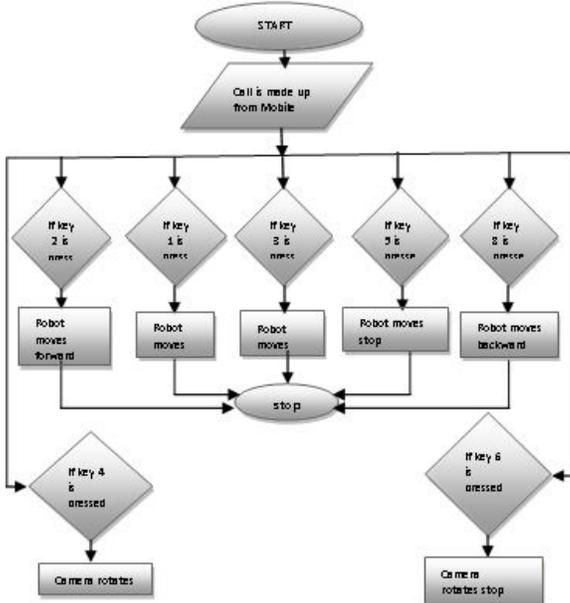
The working of the project can be explained in the following steps:-

- Initially power supply given to the DTMFrobot.
- Call is made from another mobile and viewing

connected by the IP address.

- Call is picked by the robot automatically for the particular number.
- Directions are given by the operator using mobile and laptop viewer.
- When key 2 is pressed by the operator, robot moves forward.
- When key 8 is pressed by the operator, robot moves backward.
- When key 1 is pressed by the operator, robot moves left.
- When key 3 is pressed by the operator, robot moves right.
- When key 5 is pressed by the operator, robot moves stop.
- When key 4 is pressed by the operator, robot camera rotates.
- When key 6 is pressed by the operator, robot camera rotation stop.

IX. FLOWCHART



EXPERIMENTAL AND RESULTS

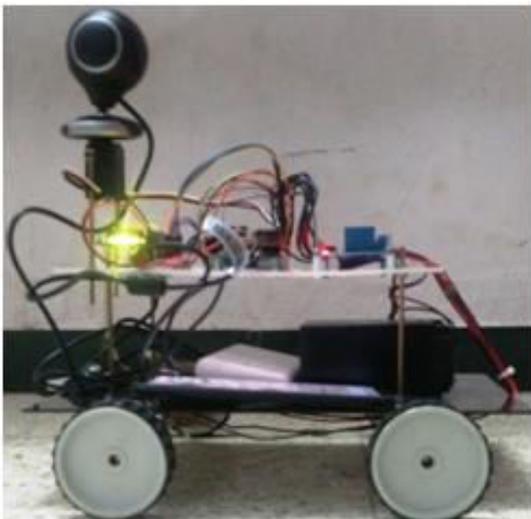


Figure.4. Camera on Day mode



Figure.5. Camera on Night mode

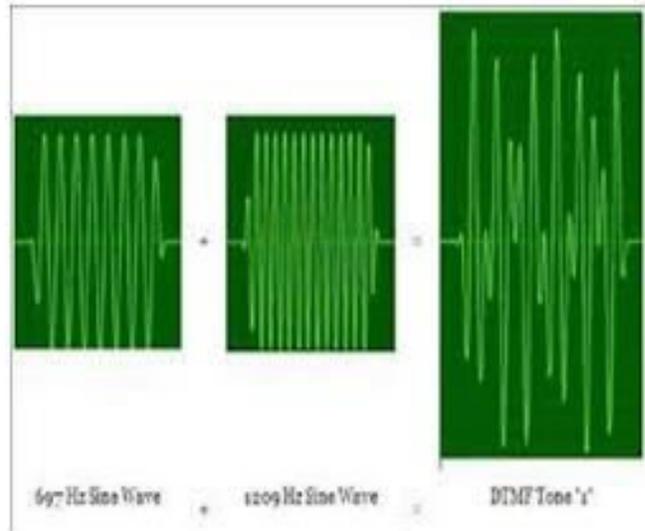


Figure.6. Tone Frequency Level

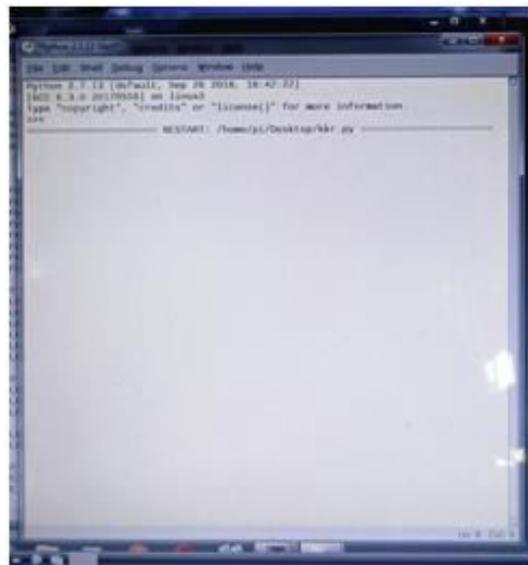


Figure.7. Before running vehicle

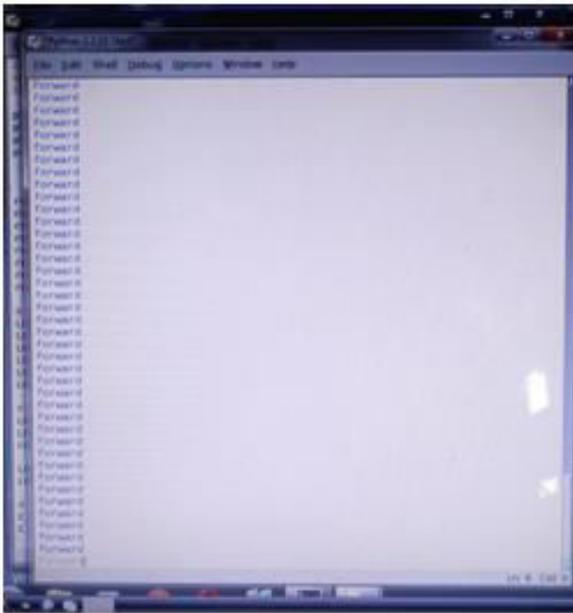


Figure.8. Moves on Forward

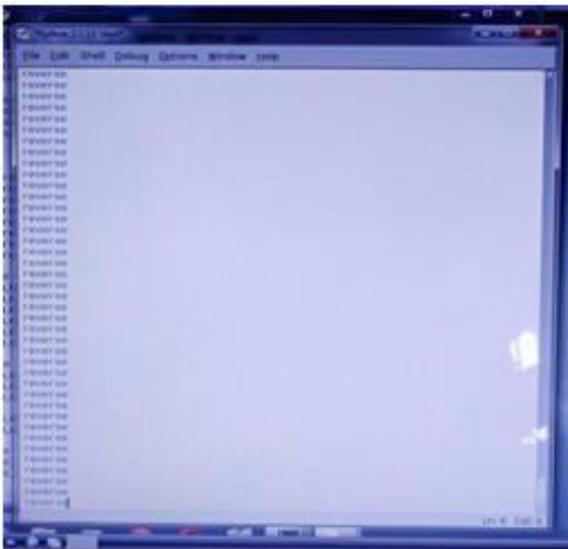


Figure.9. Moves on Reverse



Figure.10. Moves on Left



Figure.11. Moves on Right

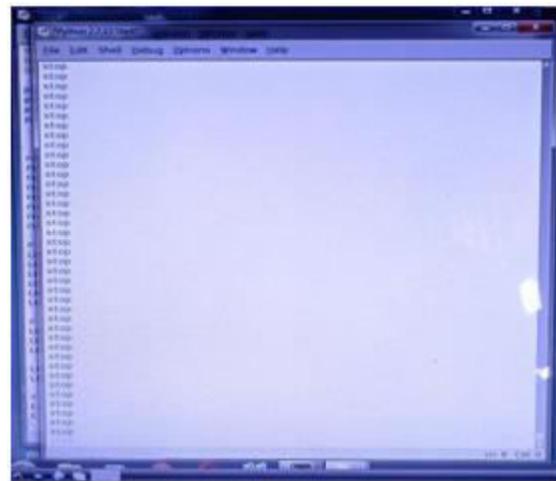


Figure.12. Moves on Left

X. ADVANTAGES

- Wireless control.
- Noiseless operation.
- Vehicle navigation with use of 4-Gtechnology.
- Operation quite and simple.
- Take in use of the mobile technology which is almost available everywhere.
- Less weight.
- The wireless device has no boundary of range and can be controlled as far as network of cell phone.
- Humans are removed from distinct exposure to potentially dangerous situation.
- Robotic system can perform many security and surveillance functions more effectively than humans giving us information that human's cannot get.
- They can perform tasks faster then humans and much more consistently and accurately.
- They can capture moments just too fast for the human eye to get.
- They can entertain us and helps us in certain tasks.

XI. APPLICATIONS

There are wide range of applications which are as listed below,

- Cell phone controlled robot can be used in the borders for displaying hidden landmines.
- The robot can be used for reconnaissance or surveillance.
- Used anywhere there is the service provider lower of the connection provided that is mounted on robot.
- It can be adequately implemented in national defense through military partnership.
- It can be vastly applied in resorts, borders of noted buildings.
- Installation of combat robots in the stadiums, sacred places, government and non-government organizations.

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XII. CONCLUSION

Conventionally, wireless control robots use RF circuits, which have the drawbacks of limited working range, limited frequency range limited control. Use of a mobile phone for robotic control can overcome these limitations. It provides the advantages of robust control, working range as large as large as the coverage area of the service provides. Although the appearances and capabilities of robots vary vastly. All robots share the features of mechanical, movable structure under some form of control. This system has the ability to make in different direction such as left, right, forward, backward, backward and stop also camera rotation according to user's key press and to capture images of remotelocation.

XIII. REFERENCES

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