Mobile Based Surveillance Robot Control System

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Abstract— Robotics is an interesting field where every engineer can showcase his creative and technical skills. Pleasing aspect of robotics is that a robot can be made indigenously by any one. Mobile phones today become an essential for all and so, for any mobile based applications there is great reception. In this scenario making a surveillance robot control system using wireless communication is good idea. Conventionally, wireless-controlled robots use RF circuits, which have the drawbacks of limited working range, limited frequency range and limited control. Use of a mobile phone for robotic control can overcome these limitations. It provides the advantages of robust control.

Key words: Microcontroller, DTMF Decoder

I. INTRODUCTION

A Robot is an electromechanical machine which is guided by mobile or electronic programming, and is thus able to do tasks on its own. Conventionally, wireless controlled robots use RF.

Circuits, which have drawbacks of limited working range & frequency range, use of mobile phones can overcome this limitationMobile phones today become an essential for one and all and so, for any mobile based applications there is great reception [5]. In this scenario making a surveillance robot control system using wireless communication is good idea. Here is a Mobile operated surveillance robot circuit which can be controlled by using mobile phone. It can capture audio and video information from the surroundings and can be sending to a remote station through RF signal. The camera attached on robot has been designed in such a way that it can fulfill all the needs of military, police and also for personal security. It has countless application and can be used in different environments and scenarios [1] .The another application can be to provide up to date information in hostage situation. The robot is made for purpose by military operation spy robot.

The mobile operated robot is a very small application of DTMF technology. Here we are using DTMF for decoding. The robot is operated by mobile phone. As mobile phone is used in this application the range for communication is wide.

In this project, we are working on robot which can do the surveillance, and combat operation. The GUN is attached to robot and it is controlled by a mobile phone that makes a call to the mobile phone attached to the robot. During 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 receives this DTMF tone with the help of the phone stacked in the robot. The received tone is programmed by the Microcontroller with the help of DTMF decoder MT8870. The decoder decodes the DTMF tone into its equivalent binary digit and this binary number is sent to the Microcontroller. The Microcontroller is already programmed to take decision for any given input. The control signal generated by microcontroller is given to motor drivers in order to drive the motors for forward or backward motion and to turn the motor wheel in 3600. The call is made by mobile which acts as a remote control to the mobile phone attached to car.This simple robotic project does not require the construction of receiver and transmitter units.

II. OVERVIEW OF STATE OF ART

In surveillance robot, the controlling and operation of robot is done by making use of mobile phone. We are using wireless camera and mobile phone for this operation. We have use mobile phone as it has great advantage of unlimited range. The RF circuits canalsoused but they have limited working range [3].

III. PROPOSED WORK

A. *Block Diagram:*

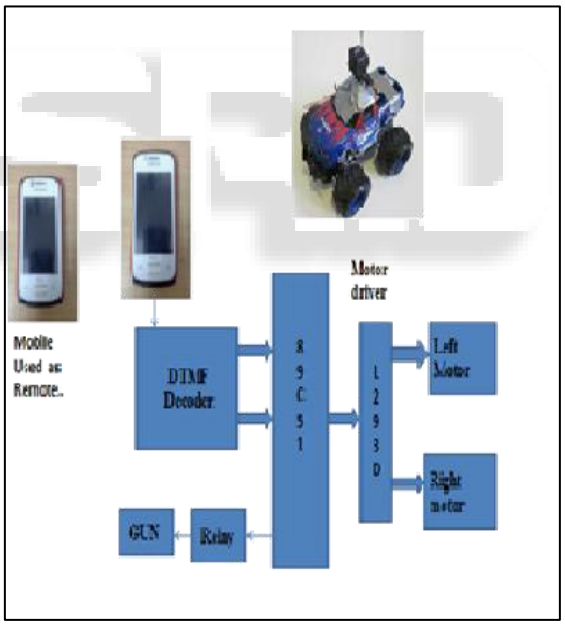

Fig. 1: Block Diagram [2]

Two mobiles are used; one is used as a remote while other is fitted to car which acts as a robot.The mobile attached to car gives signal to DTMF decoder, when button of mobile used as a remote is pressed. The tone is produced in DTMF decoder which decodes the tone in to binary digits which is further send to micro controller 89C51.Micro controller 89C51 is already pre-programmed to take decisions for given input signal and output is given to motor driver L293D in order to drive motor. Relay is been connected which acts as switch through which we can control thegun[1].

- Component List:
- Camera
- DTMF decoder.

- Microcontroller
- Motor driver.
- Relay and GUN

B. Camera:

Camera contains two parts; one is transmitter part while other is a receiver part. The receiver part is called as AV receiver, which is connected to laptop through TV tuner.

AV receiver is a consumer electronics component used in home theater system. Its basic purpose is to amplify sound from possible audio sources and route audio/ video signals from various sources to the user's laptop, television etc.

Fig. 2: Camera as a Transmitter

C. DTMF Decoder:

The DTMF tone is decoded by DTMF decoder that is MT8870 that gives a four bit data at the output of decoder. All types of the MT8870 series use digital counting techniques to detect and decode all the 16 DTMF tone pairs into a 4-bit code output [2]. These 4-bit code is transferred to microcontroller. Now this four bit data can be used for making the decision as for e key pressed on the mobile keypad the data have different for a different key.

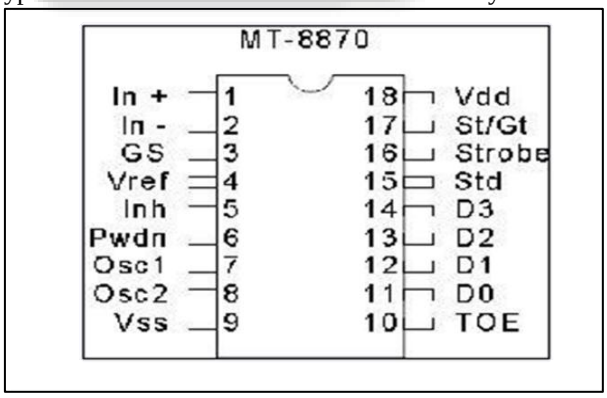

Fig. 3: DTMF IC (MT8870)

D. Microcontroller:

It is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash Programmable and Erasable Read Only Memory PEROM)[2].The device used in our project is manufactured by Atmel's high-density non-volatile memory technology and is compatible with the MCS-51™ instruction set and pin out. Output of microcontroller is transfer to motor driver.

Controller Port	Port pin	Motor Driver
Port0	P0.0	Motor 1
Port0	P0.1	Motor 1
Port0	P0.2	Motor 2
Port0	P0.3	Motor 2

Table 1: Connections between Controller and Motor Driver

E. Motor driver:

The motor driver L293D is a quad, high-current, half-H driver designed to provide bidirectional drive currents of up to 600 mA at voltages from 4.5V to 36V. It helps it easier to drive the DC motors. The L293D has four drivers.

Pins IN1 through IN4 and OUT1 through OUT4 are input and output pins, respectively, of driver 1 through driver 4. The enable pin 1 (EN1) and pin 9 (EN2)is used to drive driver1 and 2 and driver 3 and 4 , respectively. Drivers 1 and 2 are enabled when enable input (EN1) is high and the outputs corresponding to their inputs are active. Similarly, enable input EN2 (pin 9) enables drivers 3 and 4.

IV. ADVANTAGES

Robot has ability to survey the environment or situation at certain place using wireless camera. This project will build a robot that has ability to detect obstacle and stop moving. this project will build a robot with wireless visual system that the user can observe and control the situation via computer and mobile. Robotic systems can perform many security and surveillance functions more effectively than humans; Giving us information that humans can't get [1].Firstly the technique of surveillance was only used in malls and homes nowadays they are also used in public places for security at a reasonable cost. It also has a great advantage due to real-time monitoring system. It has helped a lot in big organizations have always had the benefits of video surveillance manned by security professional [6].

V. PROJECT SETUP

Fig. 4: Project Setup

VI. APPLICATIONS

Robot controlled by wireless mobiles can be used in the borders for displaying hidden Land mines

- The robot can used for surveillance.
- The robot can be used anywhere there is the service provider tower of the connection provided that is mounted on robot.
- Robot is small in size so can be used for spying[2].
- Military purpose
- Traffic monitoring
- Home security[4]

VII. CONCLUSION

The aim of the project is to provide safety and security in dangerous situations and it has great advantage of real time video capturing and with better range and efficiency[7]. The Wireless camera Robot has been designed in such a way that it can fulfil the needs of the military, the police and armed forces. It has countless applications and can be used in different environments and scenarios[1]. While another application can be to provide up to date information in hostage situation. The purpose of the mobile phone operated robot with DTMF decoder is to know the information or do surveillance in the places where we are not able to go. The robot

VIII. FUTURE ENHANCEMENT

In future we can increase the transmission range of camera which will have greater advantage of long distance communication[7].The robot technology is used in many different manufacturing company. In near future productivity in industries will depends on large part on flexible automation through robotics. And further future enhancement are:-Compact design, Quick movement, Improved reliability, Night vision camera, Replacement of transmitter with low power transmitter & receiver with highly sensitive to reduce the power consumption or Robotic arm can be attached[1].

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