Development of Cell Phone Based Remote Vehicle Control System

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Abstract—From the day of emergence of DTMF (Dual Tone Multi-Frequency) technology in the Telephone and Mobile communication, Its application in the Modern world for control systems were not utilized up to what it can be.

In the existence of wireless technologies like WiFi and Zigbee and Bluetooth and other wireless protocols used for automation which are costlier having limited range of operation and difficult in implementation in day to day life due.

This project paper emphasis on the use of DTMF technology in the Remote Vehicle Control System Prototype which can change the way the cars are driven or parked safely from a far away distance or for Military aspects for disposing of live bombs and spying purposes.

Keywords—DTMF, WiFi, Zigbee

I. INTRODUCTION

As mentioned 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, working range as large as the coverage area of the service provider, no interference with other controllers and up to twelve controls. Surveillance, Espionage or spying involves individual obtaining information that is considered secret or confidential without the permission of the holder of the information. Our aim in building this project is to create a wireless controlled robotic vehicle prototype with obstacle detection sensors which can be operated through cell phone which can eliminate the fuss to remove the car from a parking lot when there is not sufficient place for driver to enter inside the car.

II. OVERVIEW

In this paper "Cell Phone Operated Remote Vehicle Control System", the robot is controlled by a mobile phone that makes a video call to the 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 DTMF. The robot perceives this DTMF tone with the help of the phone stacked in the robot. The received tone is processed by the micro-controller with the help of DTMF decoder MT8870. The decoder decodes the DTMF tone into equivalent binary digit and this binary number is sent to the micro-controller. The Micro-controller is programmed to take a decision for any given input and then it outputs its decision to motor drivers in order to drive the motors in forward direction or backward direction or to steer the vehicle. The mobile phone that makes a call to mobile phone stacked in the robot act as a remote. The video call made to the vehicle helps perceive the surrounding obstacles and route accordingly.

III. WORKING

The Prototype is controlled by a mobile phone that makes a video call to another mobile phone attached on the robot. In duration of this call, if any key is pressed a tone corresponding to the key pressed is heard at the other end called Dual Tone Multiple frequency (DTMF) tone. The robot receives these tones with help of phone stacked in the robot. The received tone is processed by the Micro-controller with the help of DTMF decoder IC CM8870.

This IC sends a signal to the motor driver IC L293D which drives the motor forward, reverse and steer accordingly.

The micro-controller output is not sufficient to drive DC motors, a high voltage and high current drivers are required. The L293D is a quadruple high current half H driver designed to provide bidirectional drive currents of up to 600 mA at voltage from 4.5 V to 36V. It will become easier to drive dc motor with such driver IC.
Solar Cell of 5 Watts 12 Volt is used for backup. The Video call made to the Vehicle helps to detect the path. The Obstacle sensor interfaced is used to detect obstacles and to stop the operation in case if the obstacle is detected to avoid any damage to the vehicle and circuitry.

IV. ALGORITHM

STEP 1: Start
STEP 2: Clear all the registers
STEP 3: Turn off all the motors
STEP 4: Initialize LCD
STEP 5: Display ‘WELCOME’ message on LCD
STEP 6: Auto Receive the voice or video call.
STEP 7: Check the DTMF input.
STEP 8: If DTMF input=2 then, drive the motors in the forward direction.
STEP 9: If Obstacle detected stop the motors and display “OBSTACLE DETECTED.”

STEP 10: Again check the DTMF input
STEP 11: If DTMF input=8 then, drive the motors in the backward direction.
STEP 12: Else if DTMF input=5 stop the motors.
STEP 13: Else if DTMF input=3 steer towards right.
STEP 14: Else if DTMF input=1 steer towards left
STEP 15: Repeat the sequence from Step 7 as per the inputs.

V. COMPONENTS USED
1) 12 Volt DC battery.
2) Solar Cell 5 Watt 12Volts.
3) Micro-controller.
4) DTMF decoder IC
5) Motor driver IC
6) Filter Capacitors
7) Resistors.
8) Diodes.
9) Voltage Regulators.
10) Heat sinks.
11) Mobile phone with Video call support.

VI. ADVANTAGES

VII. DISADVANTAGE
The only disadvantage is that Mobile Network is required for operation of the Vehicle.

VIII. APPLICATIONS
[1] Parking operations

IX. CONCLUSION
Using the DTMF remote control and sensors to sense the path and obstacles, controller program is designed so as to enable the micro-controller to control robot, using DTMF remote and movement of the robot and move when there is no obstacle in the following path. The program could also read data from sensors and produce the controlling actions respectively.
The Prototype designed can be proven as a boon for Military as well as Commercial applications in the future as the limited connectivity issue by other available technique is successfully eliminated in this design.

X. RESULT

The Prototype designed can be proven as a boon for Military as well as Commercial applications in the future as the limited connectivity issue by other available technique is successfully eliminated in this design.

The project has been accomplished with the help of KEIL compiler and ISP programmer.

The project has been tested successfully.

REFERENCES


[6] National conference on Machine Intelligence Research and Advancement (NCMIRA, 12)