FIRE FIGHTING ROBOT USING NIGHT VISION CMERA

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Abstract

Controlling things through wireless communication is the need of today's era. Here as a wireless communication we are going to use is the most commonly way of communication i.e. wireless mobile phone communication. We are going to control the robotic car using wire mobile phone which is almost possess by all the people now a day. Heart of above project is Microcontroller AT89C51. The Wireless control system is designed using DTMF Decoder IC MT8870. This double tone multiple frequency IC will decode the coming tone frequency in the Binary digit form. This binary data is unique for the key pressed from the mobile phone. The binary data is fed to the microcontroller using the interfacing of this IC to the microcontroller. On the behalf of the coming data from the IC the microcontroller perform the particular task assigned to it. After getting data from the IC the microcontroller send signal to current drivers IC's to which the DC geared motors are attached. The DC motors will work according to the data provided to the current driver IC's to which these motors are attached. The current driver or motor driver IC is used here is L293d. The robotic car can move in any direction. The power of the robotic car is in the back wheels and the front wheel is a caster wheel. We can control the device in two modes i.e. by using only one mobile phone which is at the circuit or by using another mobile phone which at a distance place. The devices can be controlled from anywhere in the world. The must requirement of the design system to work properly is the presence of the signal (Tower range).The concept of this system can be extended in future by deploying the technology in defense areas where we need to control the robots, vehicles in the sensitive areas where human presence is dangerous..

Keywords: 8051 microcontroller, DTMF, RELAY

1. Introduction

Today's era is the era of automation. Automation plays a predominant role in the modern scientific world. Our project is also a step forward in the atomization of modern era. It utilizes the concept DTMF IC which is capable of resolving the tone coming out when button of the mobile phone is pressed. Here we are designing an switching system which can be operated from a far off place by giving directions through the mobile of the user. By employing this technology we can switch on and off the AC operated appliances from the distance places using the mobile phone. Physically challenged people can use this device at home to on and off the home appliances otherwise which is a difficult task for them. To explain the concept of this project we are going to take the water pump as a device which we need to switch on and off using mobile phone.

Uses

The DTMF controlled WATER PUMP presents a wireless control system which can be utilized at different places in different ways to on off the water pump. Few fields where it finds application are given below:

1. Agriculture.
2. Home.
3. Factories.
4. The places where human entry is dangerous

2. LITERATURE SURVEY

[1] Kalaivani AP Perumal 8-9 March 2019

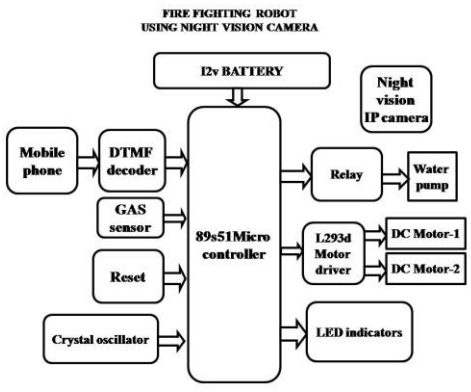
Fire fighter robot is a machine developed by humans to guard human live, because the accidents happening during the fire extinguishing process is uncountable. This robot main function is to detect fire and move towards the fire automatically to extinguish it from a safe distance

using water. This robot's movement and behavior will be fully controlled by a programmable raspberry pi. This robot which will be in a form of vehicle will move right, left, front and back to detect and extinguish the fire. This fire fighter robot will also have a thermal camera and an infrared camera mounted over it. The purpose of thermal camera is to detect fire and the temperature and the infrared camera is to provide night vision imaging which will do live recording of the entire process of extinguishing. This live recording can be viewed in PC reference which comes along with a log in system as well.

[2] Rajshree Nikhare 4, April 2016

The intention of this paper is to increase security of the border and to reduce human victim in rival attack in the war field. To overcome this problem we have designed the RF based War field spying robot which involves wireless night vision camera along with the fire extinguisher. So, from this we can examine rivals when required. This robot can enter into enemy area and send us the information via night vision wireless camera in nights also. Fire sensor senses the fire in rival attacks in the war field and quickly sends the signal to the fire extinguisher and water pump will turn on when required. The moment of this robot is wirelessly controlled by a hand held RF transmitter to send command to the receiver mounted on the robot. This robot can also be used in shopping malls, star hotels and residential areas etc. where there can be threat from terrorist.

3. Implementation:

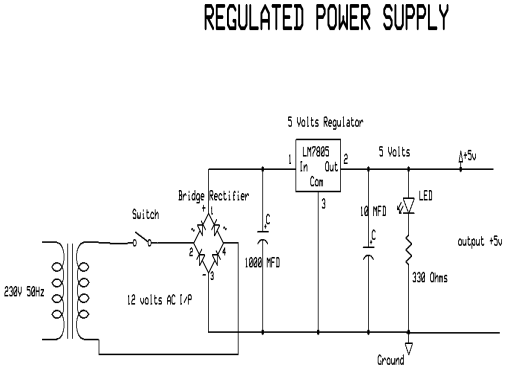


Here the working starts with the directions given by the user through the mobile. Here, the two mobiles are utilized. One is to send the DTMF signal and the other to receive these signals. The signals are nothing but the mixer of the double tone multiple frequency signals. A mobile phone lead is utilized at the receiver circuit to feed the signals from the mobile to the DTMF circuit. The DTMF(double tone multiple frequency) IC is capable of resolving the different-different signals coming from the mobile when different-2 keys are pressed So when a particular key is pressed say 1 is pressed then the LED corresponding to the key1 will glow. The instruction signal goes through the mobile to the DTMF IC. It modulates the signal over another frequency and this combination represents a unique signal and thus a unique instruction. DTMF gives input to the microcontroller which process the signal coming from the DTMF IC to allow switching of the relay to which we have connected the WATER PUMP. A regulated power supply is there to give a constant DC level required for the project. The relay needs higher voltage then the microcontroller. So, we provide 12v to relay for its activation and de-activation. The drivers of the relays are made of the combinations of the transistors.

4. Related Work:

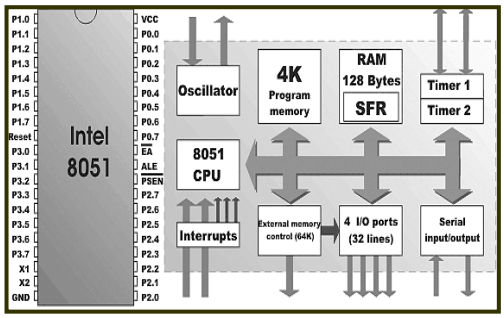
The brief introduction of different modules used in this project is discussed below:

REGULATED POWER SUPPLY:



- Micro controller is a digital device which requires +5v DC for its operation.
- Micro controller is a digital device, it can't work with the analog voltages. Due to this reason the regulated power supply converts analog voltage into digital voltage.
- Regulated power supply block will converts 230v AC house hold supply ac to + 5v DC supply

8051 MICROCONTROLLER:



AT89C51 from Atmel Corporation – Atmel fabricated the flash ROM version of 8051 which is popularly known as AT89C51 ('C' in the part number indicates CMOS). The flash memory can erase the contents within seconds which is best for fast growth. Therefore, 8751 is replaced by AT89C51 to eradicate the waiting time required to erase the contents and hence expedite the development time. To build up a microcontroller based system using AT89C51, it is essential to have ROM burner that supports flash memory. Note that in Flash memory, entire contents must be erased to program it again. The contents are erased by the ROM burner. Atmel is working on a newer version of AT89C51 that can be programmed using the serial COM port of IBM PC in order to get rid of the ROM burner.

- 4 Kb of ROM is not much at all.
- 128b of RAM (including SFRs) satisfies the user's basic needs.
- 4 ports having in total of 32 input/output lines are in most cases sufficient to make all necessary connections to peripheral environment.

MT8870 DTMF Decoder:

DTMF (Dual Tone Multi-Frequency) signaling is used for telecommunication signaling over telephone line in the voice frequency band between communication devices (telephone, mobile). It is a set of eight audio frequencies transmitted/received in pairs to represent 16 different signals.The Telephone keypad is 4x4 or 4x3 matrix of push buttons in which rows represents lower frequency component and columns represents higher frequency component which is mapped as follows

Table1: Telephone Keypad Tone Frequencies

FL\FH	1209Hz	1336Hz	1477Hz	1633Hz
697Hz	1	2	3	A
770Hz	4	5	6	B
852Hz	7	8	9	C
941Hz	*	0	#	D

- For each column and row unique frequency is assigned. No frequency is multiple of other.
- pressing a key sends a combination of the two sine frequencies corresponding to row and column.

L293d DC Motor Driver:

Microcontroller cannot supply the current required to run DC motor. So satisfy this requirement IC's are used to drive the motor. The L293 and L293D are quadruple high current half –H drivers.

Working of L293D The 4 input pins for this l293d, pin 2, 7on the left and pin 15, 10 on the right as shown on the pin diagram. Left input pins will regulate the rotation of motor connected across left side and right input for motor on the right hand side. The motors are rotated on the basis of the inputs provided across the input pins as LOGIC 0 or LOGIC 1.In simple you need to provide Logic 0 or 1 across the input pins for rotating the motor.

Relay:

When an electric current is passed through the coil, the resulting magnetic field attracts the armature and the consequent movement of the

movable contact or contacts either makes or breaks a connection with a fixed contact. If the set of contacts was closed when the relay was De-energized, then the movement opens the contacts and breaks the connection, and vice versa if the contacts were open. When the current to the coil is switched off, the armature is returned by a force, approximately half as strong as the magnetic force, to its relaxed position. Usually this force is provided by a spring, but gravity is also used commonly in industrial motor starters. Most relays are manufactured to operate quickly. In a low voltage application, this is to reduce noise. In a high voltage or high current application, this is to reduce arcing.

GAS SENSOR:

This is a simple-to-use liquefied petroleum gas (LPG) sensor, suitable for sensing LPG (composed of mostly propane and butane) concentrations in the air. This sensor has a high sensitivity and fast response time. The sensor's output is an analog resistance. The drive circuit is very simple; all you need to do is power the heater coil with 5V, add a load resistance, and connect the output to an ADC.

Water pump:

Micro dc 3-6v micro submersible pump is a low cost, small size submersible pump motor which can be operated from a 2.5 ~ 6V power supply. It can take up to 120 liters per hour with very low current consumption of 220ma. Just connect tube pipe to the motor outlet, submerge it in water and power it. Make sure that the water level is always higher than the motor.

DC MOTOR:

A **DC motor** is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current in part of the motor.

Night vision camera:

The Smarty HD Pan & Tilt Smart Camera is a simple to use a camera that can be conveniently positioned within the home (within wireless range of your internet router) and remotely controlled from your Smartphone, tablet or computer. You can also use it without any Wi-Fi connection, using AP mode. It features crystal clear picture quality, capturing video in HD 720P at 30 frame per second, includes Pan & Tilt (Left, Right, 355 degree; Up, Down, 60 degree), a built-in microphone and speaker to allow you to listen and speak back to where the camera is located, a memory card socket to capture video 24/7 onto a memory card. And we can see the live streaming on our mobile phone with the help of Wi-Fi.

5 Results:

The fire fighting robot with night vision camera project is successfully designed. Robot controlled by DTME technology. The devices can be controlled from anywhere in the world. DTMF gives input to the microcontroller which processes

the signal coming from the DTMF IC to allow switching of the relay to which we have connected the WATER PUMP.

6. Conclusion:

After working on this project we have reached to the conclusion that this project has proved itself to be very simple, user friendly, cheap in comparison with its utility, accurate and fast. It can be used to establish completely automated control on distanced switching of the motor or other appliances through the mobile of user. This can further give rise to many other applications.

7. ACKNOWLEDGEMENT

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