Android Operated Intelligent Fire Extinguishing Vehicle

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***Abstract*— We design the fire discovery system using four flame sensors in the fire sensing and putting out (flames) machine made to act like man, and program for fire discovery and putting out (flames) way using sensor based careful way. The fire fighting machine made to act like man is got ready with four thermistors/flame sensors that as an unbroken stretch old flat warship the temperature. If the temperature increases beyond the pre-selected board forming floor of doorway value, make sound of bee sounds to near the event of fire smash. A suggestion note will be sent to the separate personnel in the industry and to near fire station with the GSM part of a greater unit on condition that to it. Fire sensing and putting out (flames) machine made to act like man as an unbroken stretch computer looking-glass the temperature at four sensors and if fire smash is true the machine made to act like man moves to the direction to which the temperature is recorded to be relatively greatest point among the four sensors and puts out (flames) the fire with water pump on condition that to it after putting out (flames) fire machine made to act like man comes back to first position.**

***Index Terms*— DC motors, Fire sensors, Fire Sensing, Fire Extinguisher, GSM, Microcontroller.**

I. INTRODUCTION

It uses thermistors or ultraviolet or able to be seen sensors to discover the fire smash. A machine made to act like man able of putting out (flames) and acted the part of ways under (earth, river) fire, industry fire and military applications are designed and made. UV sensors/thermistors/flame sensors will be used for first discovery of the flame. Once the flame is sensed, the machine made to act like man sounds the danger sign with the help of make sound of bee on condition that to it, the machine made to act like man actuates an electronic valve freeing, letting go sprinkles of water on the flame. This machine made to act like man provides fire system of care for trade when there is a fire in a way under (earth, river) or in an industry by using automatic control of machine made to act like man by the use of micro-controller in order to made lower, less loss of living and property damage. As soon as microcontroller gets the sign a make sound of bee sounds, the buzzer sound is to intimate the occurrence of fire accident. After the sounding of the buzzer, micro-controller actuates the driver circuit and it drives the robot towards fire place, as the robot reaches near the fire micro-controller actuates the relay and pump switch is made ON and water is sprinkled on the fire through the sprinkler. The project helps to generate interests as well as innovations in the fields of robotics while working towards a practical and obtainable solution to save lives and mitigate the risk of property damage. Fire fighters face risky situations when extinguishing fires and rescuing victims, it is an inevitable part of being a fire fighter. This robot uses dc motors, castor wheel, microcontroller, sensors, pump and sprinkler. Microcontroller is the heart of the project. Microcontroller controls all the parts of the robot by the use of programming. In this robot as the fire sensor senses the fire, it sends the signal to microcontroller; since the signal of the sensor is very weak the amplifier is used so that it can amplify the signal and sends it to microcontroller. Fire fighters face risky situations when extinguishing fires and rescuing victims, it is an inevitable part of being a fire fighter. In contrast, a robot can function automatically or can be controlled from a distance, which means that firefighting and rescue activities could be executed without putting fire fighters at risk by using robot technology instead.

II. DESCRIPTION OF VARIOUS PARTS, BLOCK DIAGRAM, CIRCUIT DIAGRAM, WORKING

2.1 The brief descriptions of the parts are as follows:

2.1.1 Microcontroller

Microcontroller is a general-purpose device, which integrates a number of the components of a microprocessor system on to single chip. It has inbuilt CPU, memory and peripherals to make it as a minicomputer.

A microcontroller combines on to the same microchip:

1. Memory (both ROM and RAM)
2. Digital I/O lines
3. CPU

Microcontroller combines other devices such as:

1. A timer module to allow the microcontroller to perform tasks for certain time periods.
2. A serial I/O port to allow data to flow between the controller and other devices such as a PIC or another microcontroller.
3. An ADC to allow the microcontroller to accept analogue input data for processing.

Microcontrollers are:

1. Smaller in size

2. Consumes less power

3. Inexpensive

The small-scale controller having the inside memory to store the facts or written program by the user and also having the control system to control the input and output facts being like (in some way) to the inside program written by the user. All the parts like humidity sensor, temperature sensor, person driving journeys round and put on view will make connection to the small-scale controller with the help of connecting lines, small-scale controller is a separate unit, which can act group events on its own without anything needed for addition of hardware like I/O harbours and outside memory. The heart of microcontroller is the CPU core AT89C51 is the 40 pins, 8-bit micro controller made by Atmel group. It is the sudden bright light sort reprogrammable memory. More chances of his come suddenly to light memory is we can take out the program within few minutes. It has 4 kb on bit broken out ROM and 128 bytes inside male sheep and 32 I/O pin as ordered as opening in ship 0 to opening a ship 3 each has 8-bit bin. Port 0 have within 8 facts line (D0 to D7) as well as low order lines (A0 to A7). Port 2 have within high order house lines (A8 to A15). Port 3 has in its special purpose register such as one after another input receiver register SBUF, electric button INT0, INT1 and timers T0, T1 many of the pins have more than one or two purposes, uses which can be used as general purpose I/O pins (or) special purpose, use can be decided by the knowledge processing machine expert it-self.

The specifications of microcontroller are as follows:

4K Bytes of In-System Reprogrammable Flash Memory, Endurance: 1,000 Write/Erase Cycles

1. Fully Static Operation: 0 Hz to 24 MHz

2. 32 Programmable I/O Lines

3. Two 16-Bit Timer/Counters

4. Six Interrupt Sources

5. Programmable Serial Channel

6. Low Power Idle and Power Down Modes

2.1.2 Electrical Components:

A nominal voltage of 12 V at most will be use by the components like Fire extinguisher system, microcontroller and DC motors. Maximum power of 65 W and an average power of 7.8 W is provided by the battery itself.

2.1.3 Features of the fire sensing and extinguishing robot:

1. The fire from the 2 m away can be easily detect by the fire sensors.
2. For a continuous time, the fire extinguisher works till the tank becomes empty.
3. The movement of robot on a flat surface is at 2.5 ft/sec and accelerate from 0 to 1 ft/sec in two seconds.
4. In order to minimize possible impact area, the turning of robot will be within a 6” radius and it will utilize the circular or octagon design.

2.1.4 Programming Algorithm:

Before listing of knowledge processing machine orders the AT89C51, the address, facts and control

signs should be put up according to the come suddenly to light listing of knowledge processing machine orders form table and form 3 and 4. To program the AT89C51, take the useful steps.

1. Input the desired memory location on the address lines.

2. Input the appropriate data byte on the data lines.

3. Activate the correct combination of control signals.

4. Raise EA/VPP to 12V for the high-voltage programming mode.

5. Pulse ALE/PROG once to program a byte in the Flash array or the lock bits. The byte-write cycle is self-timed and typically takes no more than 1.5 m.

2.1.5 Programming Interface:

In the Flash array, every code byte can be written and the entire array can be erased by using the appropriate combination of control signals. The write operation cycle is self-timed and initiated once, will automatically time itself to completion. All major programming vendors offer worldwide support for the Atmel microcontroller series. Please contact your local programming vendor for the appropriate software revision.

2.1.6 Fire sensors:

By using a UV sensor, the size of the flame of a single candle can be seen Five meters away. The Trekker utilizes a Hamamatsu UV sensor that is mounted onto the Trekker sweeping sensor brackets. The area is scan by the trekker and finds an open flame. The Hamamatsu UV TRON Flame Detector is light weight and has low current consumption, and operates as high sensitivity UV Sensor.

Fire sensing can be done in this way like, if fire accident occurs in an area where temperature increases anonymously. Thermistors can be used to detect the temperature. Thermistors have negative temperature coefficient i.e., resistance of thermistors decreases when temperature increases i.e., the output voltage from the thermistors decreases. Giving the output voltage of thermistor as one of the input to the comparator and other input of the comparator a threshold voltage value the occurrence of fire can be detected.

2.1.7 GSM Modem:

To intimate the occurrence of fire accident via SMS, a GSM modem is used. Using this, a predetermined message can be send to required persons and also to fire station so that they get alerted and reach the place quickly where fire broken out.

2.1.8 Driver Circuit:

Generally, one transistor and one relay forms a driver circuit. The driver circuit is mainly operated by the Micro Controller. The Micro Controller is used to change the state of the output pin from the low to high (level to the 1 level). By using this sequence, we can control the base of the transistor. The transistor will act as a ON/OFF switch corresponding to the input of the base.

2.1.9 DC Motors:

DC motors are generally more powerful than servos in terms of speed and torque. Microcontroller could not accurately control DC motors without a motor controller. Therefore, motor Controllers are needed. An encoder used to get feedback from the DC motor.

2.1.10Power Supply:

Rechargeable batteries were the power supply of choice for the robot. Combined with basic line regulation rechargeable batteries provide clean, reliable power, and allowed reuse of the batteries when depleted. The selection between different types of batteries was made based on size and power requirements.

2.1.11 Chassis:

Another word for chassis is base. All components of the robot are attached directly to the chassis; therefore, a strong yet light chassis will be ideal. Chassis can be made from many different types of materials, some common types are aluminum, steel, acrylic, plastic, and high density polymer.

2.2 Block Diagram and Circuit Diagram:

2.2.1 BLOCKDIAGRAM:

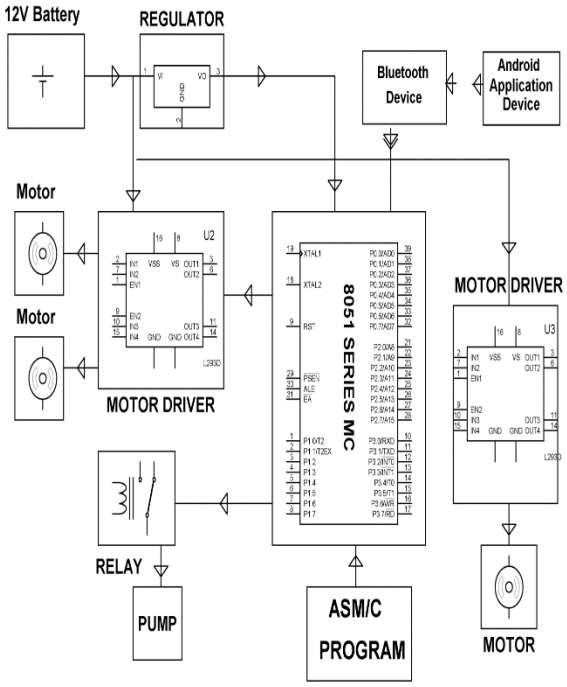

Figure 1: Block Diagram

2.3 Working of GSM Based Fire Sensing and Extinguishing Robot:

HT12E Encoder is used in this project which converts 4-bit data to serial output which is then fed to the RF module for transmitting the same to be received by the receiver RF module then the output of which is fed to HT12D, i.e., serial decoder IC, the output of which is then fed to controller. The transmitting end MC is connected to a set of pushbutton.

Thus, while a particular button is pressed then the program executed that delivers corresponding 4-bit data which are then transmitted serially at port 1.

The data which is received at the receiver end of port 1 operates the motor through motor driver IC L293D as required being interfaced from the MC's output port 2. The transmitter is powered by a 6V battery in series with a silicon diode to develop the required voltage for microcontroller circuit finally.

The receiver is powered by a 12V battery in series with a silicon diode to protect the circuits from accidental reverse battery connection. 5V DC out of the 12V available from regulator IC 7805 is fed to the controller, decoder, the motor driver IC L293D pin 8 for operation of the motor.

When the fire is present then it will go high. The micro controller will always scan the input signal of sensors. If the sensors give the data about fire to the micro controller, then it finds the movement to reach the fire by calculating the input data.

A predetermined warning message will be sent to respective personals to intimate the occurrence of fire accident. The micro controller drives two motors.

One motor is used to provide movement to the Robot to move in all the directions to reach the destination point and the other is used to sprinkle the water on fire. After extinguishing fire, the robot will go back to the original position.

III. ADVANTAGES, DISADVANTAGES

3.1 Advantages:

1. Prevention from dangerous incidents

2. Minimization of

–ecological consequences
–financial loss

–a threat to a human life

3.2 Disadvantages:

1. Doesn't predict nor interfere with operator's thoughts.
2. Cannot force directly the operator to work.
3. Due to environmental conditions, camera failed to respond.

IV. CONCLUSION

This paper provides a detailed mechanism about the robot that continuously handles all the operations, intimates the respective personnel and extinguishes

the fire. If any fire accident occurs in an industry, there is a need of person to monitor continuously and correct it. In this process, if delay happens then irreparable loss occurs since it is a cotton industry.

V. FUTURE SCOPE

In the current condition, it can extinguish fire only in the way and not in all the rooms. It can be converted to a real fire extinguisher by replacing the water carrier by a carbon-di-oxide carrier and by making it to extinguish fires of the entire room using microcontroller programming. Also, the robot could not be run through the batteries because at some conditions the current requirement for the circuit rises to about 0.8A which is very high and cannot be obtained using batteries.

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