IOT Based Fire Extinguisher Droid

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***Abstract*- According to National Crime Records Bureau (NCRB), it is estimated that more than 1.2 lakh deaths have been caused because of fire accidents in India from2010-2014. Even though there are a lot of precautions taken for Fire accidents, these natural/man-made disasters do occur now and then. In the event of a fire breakout, to**
rescue people and to put out the fire we are forced to use human resources which are not safe. With the advancement of technology especially in Robotics it is very much possible to replace humans with robots for fighting the fire. This would improve the efficiency of fire fighters and would also prevent them from risking human lives.
Today we are going to build a Iot Based Fire Extinguisher DROID, which will automatically sense the fire and start the water pump.
In this project, we will learn how to build a simple robot using Arduino that could move towards the fire and pump out water around it to put down the fire. It is a
very simple robot that would teach us the underlying concept of robotics.

I.INTRODUCTION

Embedded systems do a very specific task, they cannot be programmed to do different things. . Embedded systems have very limited resources, particularly the memory. Generally, they do not have secondary storage devices such as the CDROM or the floppy disk. Embedded systems have to work against some deadlines. A specific job has to be completed within a specific time. In some embedded systems, called real-time systems, the deadlines are stringent. Missing a deadline may cause a catastrophe-loss of life or damage to property. Embedded systems are constrained for power. As many embedded systems operate through a battery, the power consumption has to be very low.

Some embedded systems have to operate in extreme environmental conditions such as very high temperatures and humidity.

Today a lot of industries use embedded systems for process control. These include pharmaceutical, cement, sugar, oil exploration, nuclear energy, electricity generation and transmission. The embedded systems for industrial use are designed to carry out specific tasks such as monitoring the temperature, pressure, humidity, voltage, current etc., and then take appropriate action based on the monitored levels to control other devices or to send information to a centralized monitoring station

II. LITERATURE SURVEY

Today a lot of industries use embedded systems for process control. These Include pharmaceutical, cement, sugar, oil exploration, nuclear energy, electricity generation and transmission. The embedded systems for industrial use are designed to carry out specific tasks such as monitoring the temperature, pressure, humidity, voltage, current etc., and then take appropriate action based on the monitored levels to control other devices or to send information to a centralized monitoring station. In hazardous industrial environment, where human presence has to be avoided, robots are used, which are programmed to do specific jobs. The robots are now becoming very powerful and carry out many interesting and complicated tasks such as hardware assembly.

Almost every medical equipment in the hospital is an embedded system. These equipments include diagnostic aids such as ECG, EEG, blood pressure measuring. Nearly 99 per cent of the processors manufactured end up in embedded systems. The embedded system market is one of the highest growth areas as these systems are used in very market segment- consumer electronics, office automation. Sensors, transducers, special processing and control circuitry may be required fat an embedded system, depending on its application. This circuitry interacts

with the processor to carry out the necessary work. The entire hardware has to be given power supply either through the 230 volts main supply or through a battery. The hardware has to design in such a way that the power consumption is minimized.

III. METHODOLOGY

Hardware Components

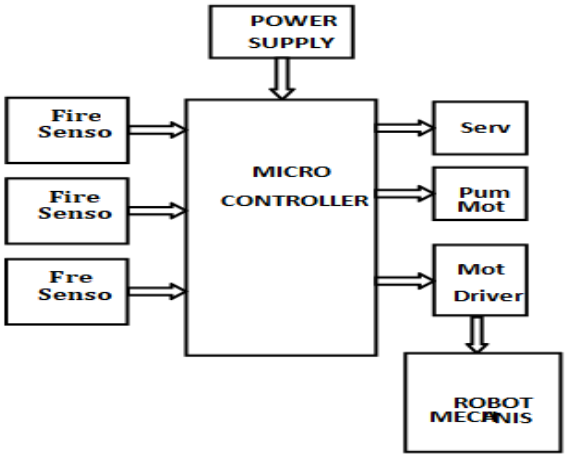
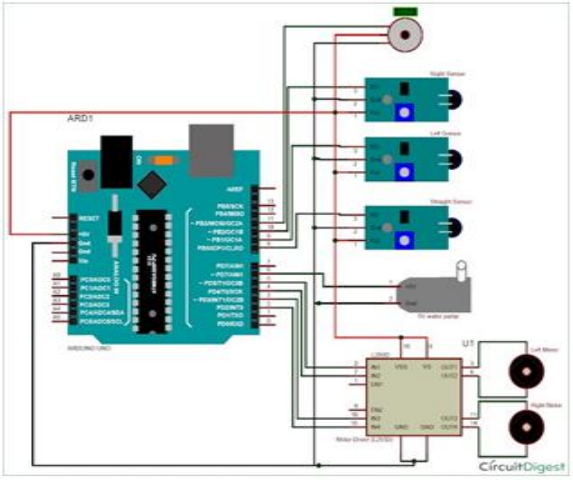


Figure 3. Hardware Specification

CIRCUIT DIAGRAM OF FIRE FIGHTING ROBOT:



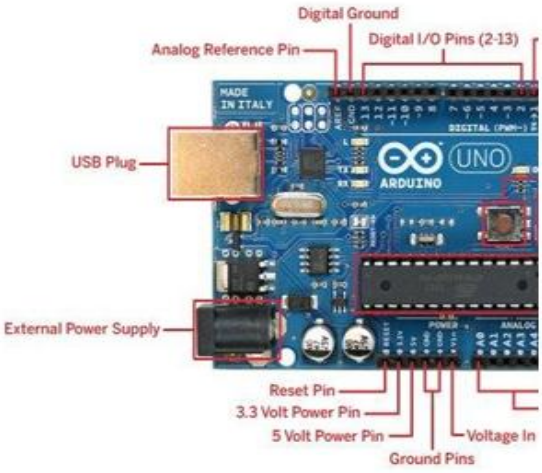
MICRO CONTROLLER:

A Microcontroller (or MCU) is a computer-on-a-chip used to control electronic devices. It is a type of microprocessor emphasizing self-sufficiency and cost-effectiveness, in contrast to a general-purpose microprocessor (the kind used in a PC). A typical microcontroller contains all the memory and interfaces needed for a simple application, whereas a general purpose microprocessor requires additional chips to provide these functions. A microcontroller is a single integrated circuit with the following key features:

- central processing unit - ranging from small and simple 8-bit processors to sophisticated 32- or 64-bit processors
- input/output interfaces such as serial ports
- RAM for data storage
- ROM, EEPROM or Flash memory for program storage

Arduino Uno Board

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again."Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.



ATMEGA 328P FEATURES

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

Fire Sensor

The Fire sensor, as the name suggests, is used as a simple and compact device for protection against fire. The module makes use of IR sensor and comparator to detect fire up to a range of 1-2 meters. The device, weighing about 5 grams, can be easily mounted on the device body. It gives a high output on detecting fire. This output can then be used to take the requisite action. An on-board LED is also provided for visual indication.

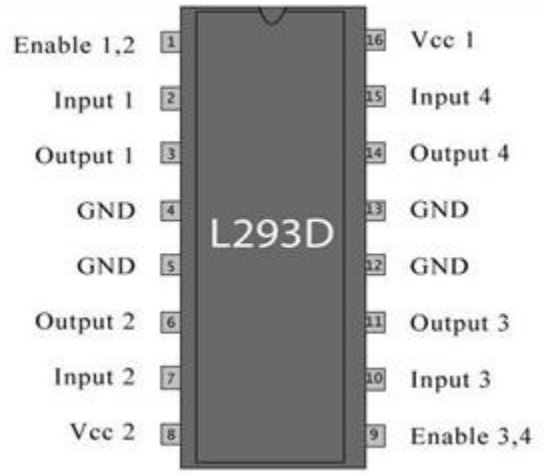
Feature

- Typical Maximum Range : 1 feet .
- Indicator LED with 3 pin easy interface connector.
- Operating Voltage 5v

Servo Motor

Servo implies an error sensing feedback control which is utilized to correct the performance of a system. It also requires a generally sophisticated controller, often a dedicated module designed particularly for use with servomotors. Servo motors are DC motors that allows for precise control of angular position. They are actually DC motors whose speed is slowly lowered by the gears. The servo motors usually have a revolution cut off from 90° to 180°. A few servo motors also have revolution cut off of 360° or more. But servo motors do not rotate constantly. Their rotation is limited in between the fixed angles.

Motor Driver



The 4 input pins for this IC L293D, pin 2, 7 on 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

IV. CONCLUSION &RESULT

It aims to establish technology innovation not only to achieve a responsible but also useful outcome from the various instruments. This autonomous robot successfully performs the task of a fire fighter in a simulated house, office, laboratory, fire etc.

ADVANTAGES

- To detect the exact direction of the fire source.
- Capability of sensing accurately with increased flexibility.
- Reduce human effort.
- Reliable and economical.
- Not sensitive to weather conditions.

DISADVANTAGES

- No monitoring system for the vehicle.
- No remote control for the robotic movement.
- Our system used only for less than 3.5kg application.
- It is not used to put out large fires.

APPLICATIONS

- Can be used in servo motors.
- Extinguishes fire where probability of explosion is high.
- Usable in power plant control rooms, Captain bridges, Flight control centres.
- Disaster area monitoring and rescue

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