International Islamic University Chittagong

Department of Computer Science and Engineering

Project Proposal

Course Code - EEE-2422

Course Title - Electrical Drives and Instrumentation Lab

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Semester - 5AF

Project Proposal-1

Smart Home Automation System

Tentative Outline:

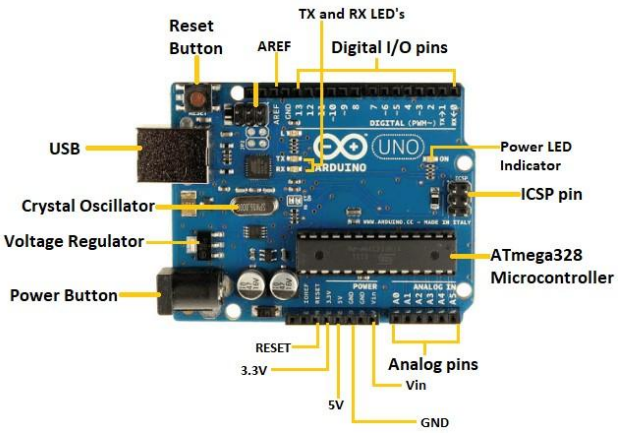
1.	Objective
2.	Equipment • Requirement Table • Arduino UNO Pin Diagram • HC-05 Bluetooth Module Pin Diagram
3.	Block Diagram of Smart Home Automation System
4.	Circuit Diagram of Smart Home Automation System
5.	Working Principle • Load Values of the App Buttons • A Brief Explanation on how the System works

Project Objective:

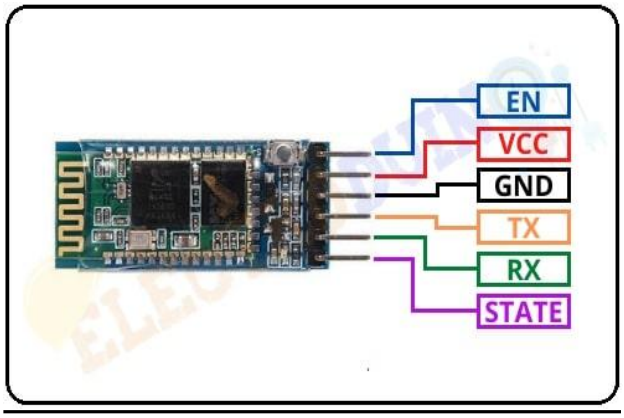
The objective of this project is to implement a cost-effective, reliable, and scalable **Home Automation System** that can be used to remotely switch on or off any household appliances. This project helps the user to control all the electronic devices using his/her smartphone via Bluetooth. Users can turn on/off their home appliances in the range of Bluetooth.

Project Equipment:

Products	Quantity
Arduino UNO	1
PCP Prototyping Board	1
4 Channel Relay Module	1
HC-05 Bluetooth Module	1
AC Bulb with Holder and Wire	4
Smart Phone	1
Bluetooth Controller App	1
220V AC Power Supply	
Connecting Wires	
9V 1amp Adapter	Required
External DC Power Supply for Operating Arduino	

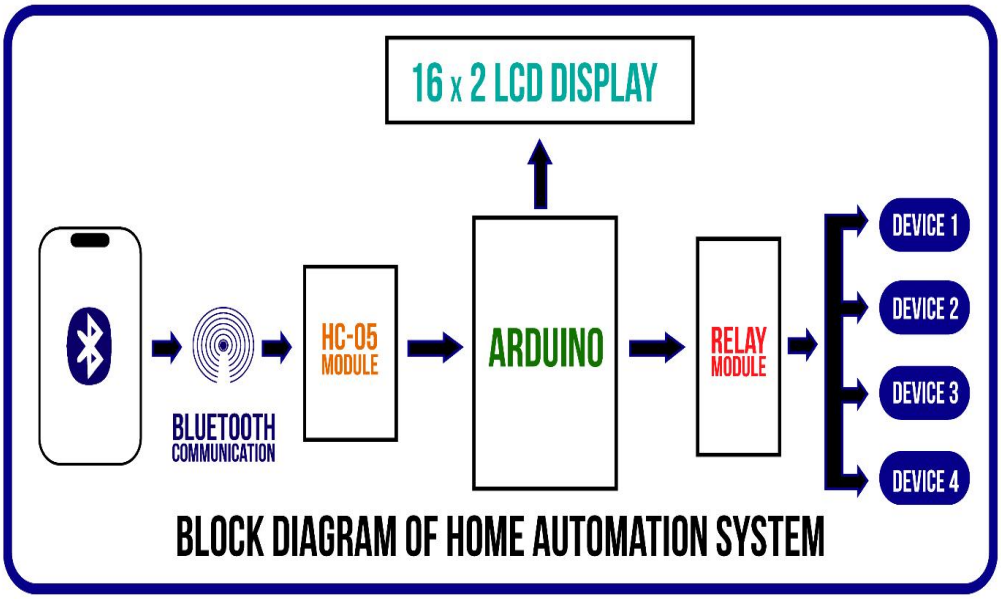


Arduino UNO

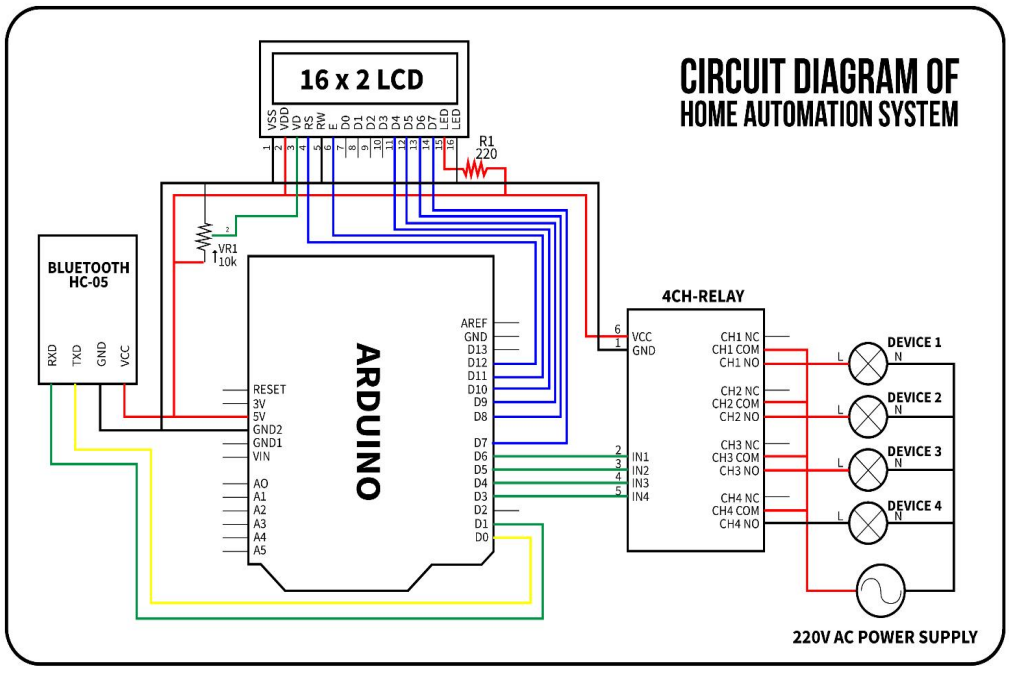


HC-05 Bluetooth Module

Block Diagram:



Circuit Diagram:



Working Principle:

After completing the App setup/configuration, now we need to identify the load values of the App button. The app transmits Different load values when different buttons are pressed. When we will press a button on the app, the app sends a particular Load value to the Arduino through the Bluetooth module. These Lode Values are used in Arduino code to control a particular device by a particular app button. The Load values of the App buttons and their use is described in the below list.

App Buttons	Load Values	Device status	Control Relay (Relay Pin)
Button 1	**1**	Device1 On	Relay-1 (IN1)
	A	Device1 Off	
Button 2	**2**	Device2 On	Relay-2 (IN2)
	B	Device2 Off	
Button 3	**3**	Device3 On	Relay-3 (IN3)
	C	Device3 Off	
Button 4	**4**	Device4 On	Relay-4 (IN4)
	D	Device4 Off	
on All	**9**	All Devices (1, 2, 3 & 4) On	Relay-1, Relay-2 Relay-3, Relay-4 (IN1, IN2, IN3, IN4)
off All	**I**	All Devices (1, 2, 3 & 4) Off	

When we pressed any button of the App, the App sends a unique load value according to the button. The HC-05 Bluetooth Module received this unique load value and send it to the Arduino. Then, the Arduino compares the value with the predefined value of the button. If this value is matching then Arduino sends operating voltage to the relay module. also, we can see the Device status (on or off) on the 16×2 LCD Display.

For example, when we Press the App “Button 1“, then the app sends Load value “1” to the Bluetooth module. Then the Arduino gets this value through the Bluetooth module. Then the Arduino sends Low (0) input voltage to the Input-1 (IN1) pin of the relay module. Now the relay is in on mode. So, the Device1 will also turn on, which is connected to the relay-1 of the relay

module. At the same time, the “D1 (Device 1) is ON” status print on the 16×2 LCD Display Module.

when we again Press the App “Button 1“, but this time the app sends Load value “A” to the Bluetooth module. Again, the Arduino gets this value through the Bluetooth module. But this time the Arduino sends a High(5v) input voltage to the Input-1 (IN1) pin of the relay module. Now the relay is in Off mode. So, the Device1 will also turn off, which is connected to the relay-1 of the relay module. At the same time, the “D1 (Device 1) is Off” status print on the 16×2 LCD Display Module.

Discussion

The smart home automation system has been experimentally proven to work satisfactory by connecting sample appliances to it and the appliances were successfully controlled from a wireless mobile device. We will be learning so many skills from this project such as soldering, wiring the circuit and other tools that we use for this project and was able to work together as a team during this project. Thus, a low-cost home automation system will be successfully designed, implemented and tested.

Project Proposal-2

Smart Blind stick

Tentative outline	
1.	Objective
2.	Equipment
3.	Block Diagram of Smart Blind stick
4.	Working Principle
5.	Circuit Diagram of Smart Blind stick
6,	Discussion

Objective:

We all have seen blind people? Their life is full of risk, even they can't walk on their own. That's why these people are always dependent on other persons or use a walking stick. The main aim of this project is to help a disabled person to live a normal life using advanced technology.

Here we will build a " **Smart Blind Stick Using Arduino and Ultrasonic Sensor"** device which will help blind people to walk with ease independently. This Device will warn blind people whenever any obstructed comes on their walking path.

The smart stick for the blind as the name suggests is a device for the visually impaired to guide the user to respective destination and avoiding to collide with the obstacles. It uses an ultrasonic sensors HC SR 04 to detect the obstacles in between.

Equipment:

Product	Quantity
Arduino Nano R3	1
Ultrasonic Sensor - HC-SR04 (Generic)	1
Buzzer	1
9V battery (generic)	1
9V Battery Clip	1
Pushbutton Switch	1
Vibrating Motor	1
Jumper Wire	1
Stick	1
Glue	1
Scotch tape	1

Block Diagram:

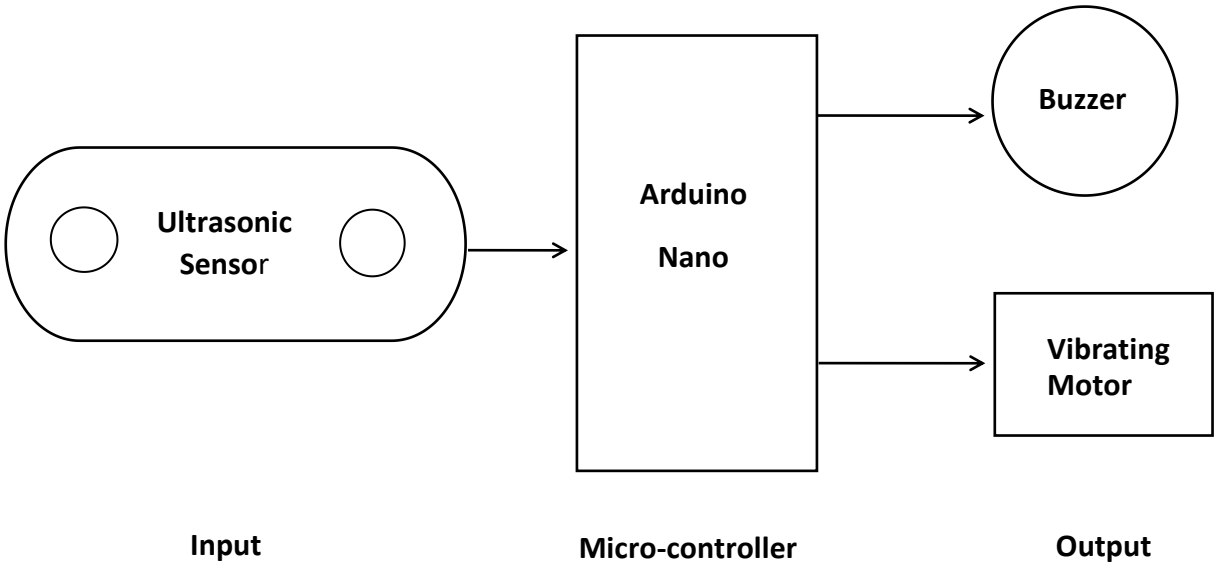


Fig: Block Diagram of the Circuit

Working Principles:

This project is build based on a simple concept. Five key components are needed to build this project, An ultrasonic Sensor , an Arduino board, Buzzer, a Vibration motor and a Battery.

The ultrasonic sensors work based on a principle which called “The Time of flight” using the speed of sound. A rang of pulses between (20 KHZ to 200 KHZ) is emitted by the sensor. The time difference between the outgoing signal and the reflected signal known as (Δt) and the speed of sound at 20oc is equal to 343.5m/s.

When we turn on the circuit power supply, at the same time the Ultrasonic sensor is transmitting ultrasonic sound waves from the transmitter parts. when any objects come in front of the sensor, then the ultrasonic sound waves reflect back from the object surface to the sensor receiver part, then the sensor receives this wave and generates Output.

This output data goes to the Arduino Nano. It uses Arduino as the main controller.Then the Arduino calculates the distance between the sensor and the objects.

If the sensor detects the distance is less than 30 cm. Then the Arduino sends operating voltage to the Buzzer and the Vibrating motor. Now the buzzer generates sound and the motor start Vibrating.

When the sensors do not detect an object. In this condition, the buzzer and the motor are stopped.

Circuit Diagram:

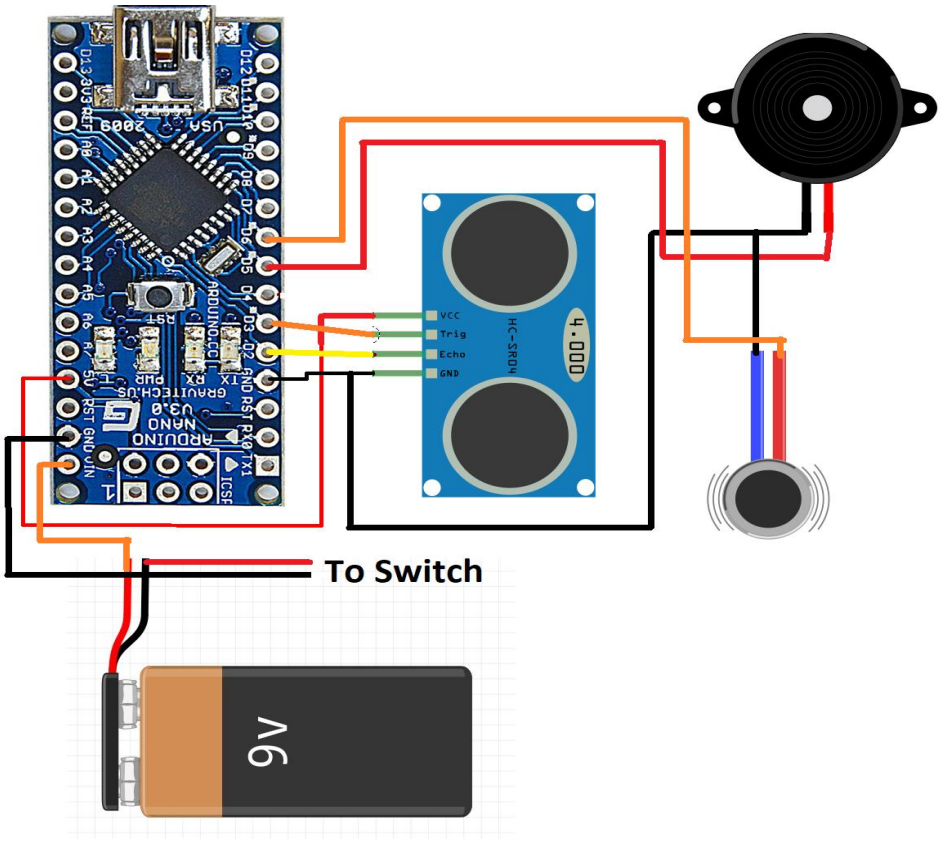


Fig: Diagram of the Circuit of the Smart Blind Stick

Discussion:

In this Project, We will be creating a **Smart Blind Stick** that will help the blind people to move from one place to another without others help. this could also be considered a crude way of giving the blind a sense of vision. this stick reduces the dependency of visually impaired people on other family members, friends and guide dogs while walking around.

the proposed combination of various working units makes a real-time system that monitors position of the user and provides dual. the smart stick detects objects or obstacles in front of users and feeds warning back. the advantage of the system lies in the fact that it can prove to be a low cost solution to millions of blind person worldwide.

Project Proposal-3

Fire Detector Alarm System

Tentative Outline:

1.	Objective
2.	Equipment • Requirement Table
3.	Block Diagram of Fire Detector Alarm System
4.	Working Principle
5.	Circuit Diagram of Fire Detector Alarm System
6	Discussion

Project Objective:

The objective of this project is to implement a cost-effective, reliable **Fire Detector Alarm System** that can be used significantly reduce damage and maximize fire control efforts. If anyone is sleeping or busy working, early fire detection will warn them and help them respond quickly so they'll be out of danger.

Project Equipment:

Products	**Quantity**
Arduino UNO	1
Solderless Board	1
MQ-5 GAS Sensor	1
16*2 LCD Display	1
100R Resistor	3
4.7k Resistor	1
1k Resistor	1
LED Green	1
LED Red	1
Buzzer	1
Male-to-Male Jumper Wires	Required
Battery clip	1
Battery 9V	1

Block Diagram:

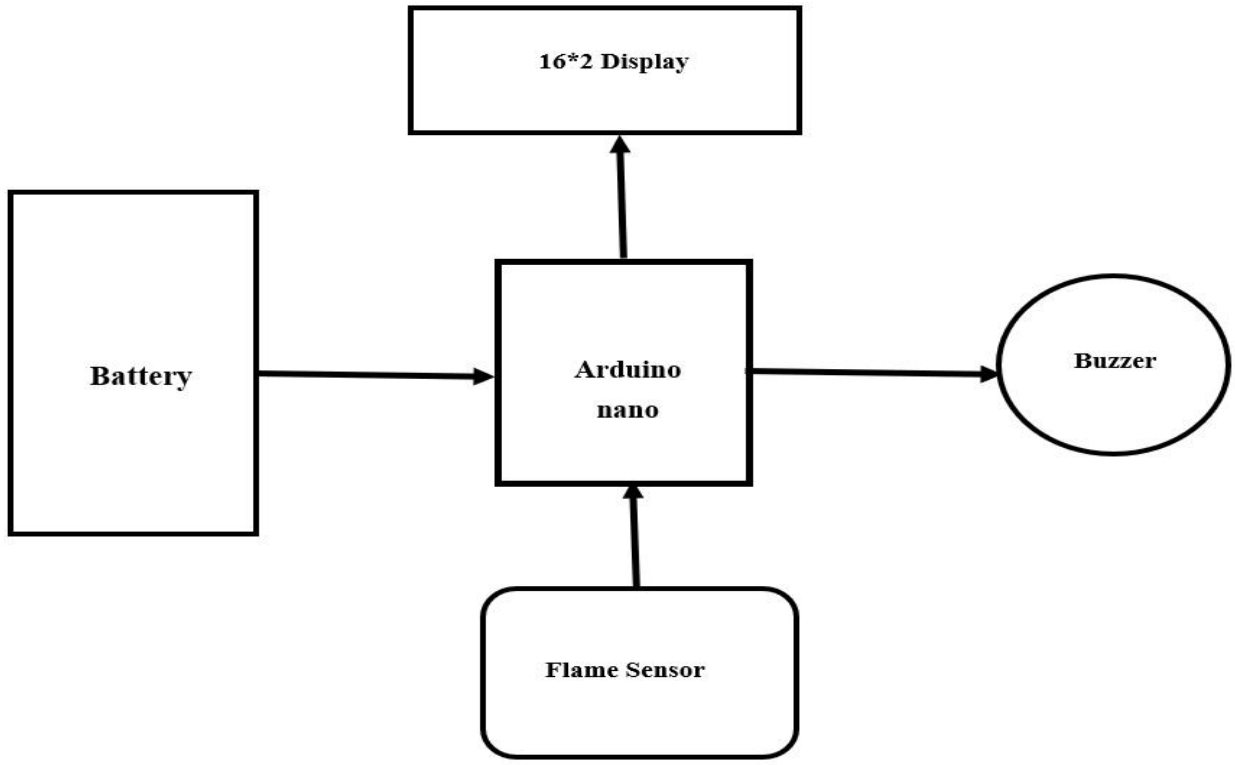


Fig: Block diagram of the Fire Detector Alarm System

Working Principle:

For building up a Fire detector alarm system, we need a 9V battery which will Arduino nano and flame sensor. The flame sensor will be connected with Arduino nano's A0 pin. Then a 16*2 LCD display will be used, in which a contrasting pin will be associated with the positive side of the 4.7k resistor, and a 1k resistor will be connected with the ground. In display, backlit pins 15,16 are anode and cathode, respectively.

A flame sensor module consists of a flame sensor (IR receiver), resistor, capacitor, potentiometer, and comparator LM393 in an integrated circuit. It can detect infrared light with a wavelength ranging from 700nm to 1000nm. The far-infrared flame probe converts the light seen in the form of infrared light into current changes. Sensitivity is adjusted through the onboard variable resistor with a detection angle of 60 degrees.

The working voltage is between 3.3v and 5.2v DC, with a digital output to indicate the presence of a signal. Sensing is conditioned by an LM393 comparator.

If holding a flame within 1.5 feet in front of the sensor, "case 0" will be activated, and *Close Fire* will be sent to the serial monitor. If holding a flame between 1.5 feet and 3 feet in front of the sensor, "case 1" will be activated, and " Distant Fire will be sent to the serial monitor. If no flame is detected in front of the sensor, "case 2" will be activated, and " No Fire " will be sent to the serial monitor. Arduino reads the signal and provides an alert by turning on the buzzer and LED.

Circuit Diagram:

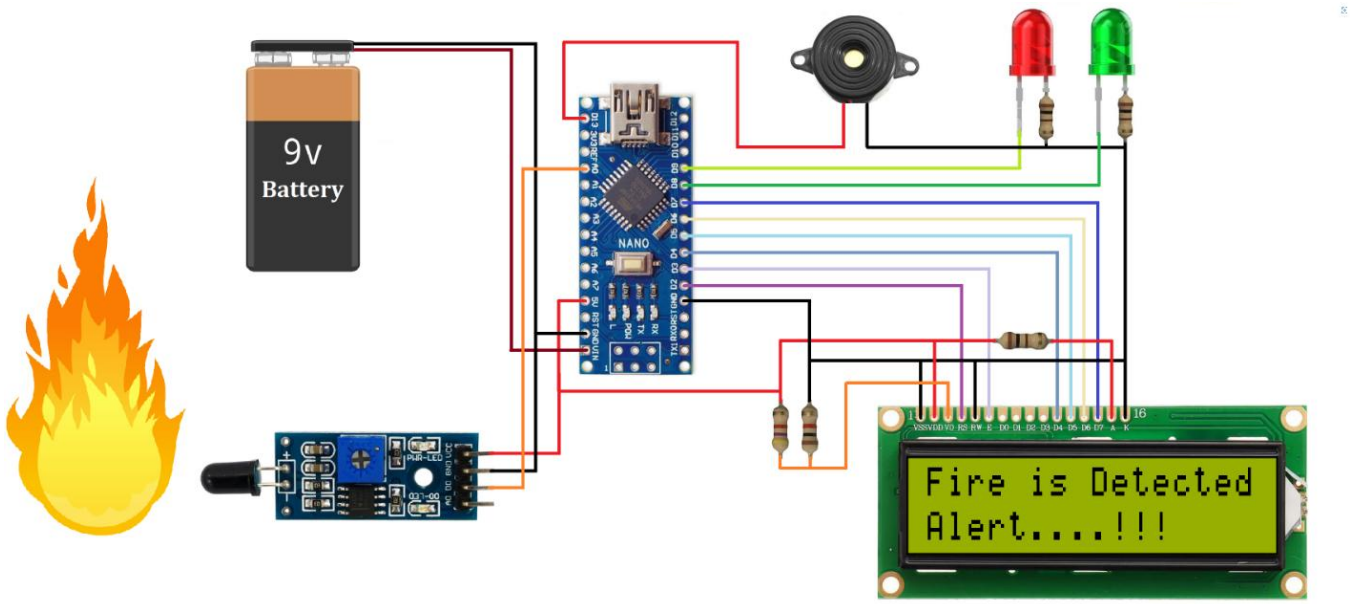


Fig: Circuit diagram of the Fire Detector Alarm System

Discussion:

The designed fire alarm system is simple, but it has a wide area of application in household and industrial safety, especially in developing countries. Using this system, quick and reliable alert response can initiate preventive measures to avert the danger of fire hazards and minimize losses of life and property. This is a cost-effective **fire alarm system** that performs reliably to ensure safety from fire and can be installed in houses, industries, offices, warehouses, etc., very easily. It can be used to detect burnable gas like methane, LPG, etc. as well. The system can be further developed with added features like web server interconnect, fire area tracking and fire extinguisher interfacing, etc.