Home Security Systems using Internet of Things

Sk.Muntaj[1], P.Srilatha[2], N.Jahnavi[3], T.Mahitha[4], M.Jassica[5], A.Madhubala[6]

Assistant Professor, Dept of ECE, Bapatla Women's Engineering College, Bapatla, India[1]

B. Tech Students, Dept of ECE, Bapatla Women's Engineering College, Bapatla, India[2,3,4,5,6]

Abstract: Now a day's Security has become an important issue everywhere. Internet of things can prove that technology has rapidly increasing day by day. Nowadays, the usage of internet had been widely used around the world. A development of home security system using internet of things with sensors need PIR (Passive Infrared Sensor), fire detection sensor, and temperature sensors are needed. The PIR sensor will detects a human being moving around within approximately10 m from the sensor. Fire sensor is used to detect the fire from the long distances about 4-6 km. Arduino is a micro controller board based on the ATmega328p. It has 14 digital input and output pins. In home security system the sensing range of temperature sensor is 45- 85 degrees.

Keywords: Internet of Things, ATmega328p Controller, PIR Sensor, Fire Detection Sensor, Temperature Sensor

I.   INTRODUCTION

The "Home security system" concept has existed for many years. The Terms "Smart Home", "Intelligent Home" followed and has been used to introduce the concept of Networking appliances and devices in the house. Home Security Systems (HSSs) represents a great research opportunity in creating new fields in engineering, and Computing. HSSs   includes centralized control of lighting, appliances, security locks of gates and doors and other systems, to provide improved comfort, energy efficiency and security system.   HSSs becoming popular nowadays and enter quickly in this emerging market. However, end users, especially the disabled and elderly due to their complexity and cost, do not always accept these systems. Due to the advancement of wireless technology, there are several different of connections are introduced such as GSM, WIFI, and Bluetooth.

II.   PROPOSED SYSTEM

The android OS provides the flexibility of using the open source. The inbuilt sensors can be accessed easily. We have built an application with   features. Android Phone acts as a client and data are sent via sockets programming.

1.   Switch Mode
2.   Voice Mode
3.   Video Mode

Switch mode: This mode provides the user on/off buttons to control the required home appliances.

Voice mode: This mode provides the user to give the speech feedback to the applications. The speech data or processed and required appliances are controlled.

Video mode: This mode displays the video of the IP cameras connected at the rooms of the home.

All the devices are connected to a common network. Smartphone, raspberry pi and IP camera are connected to the common network Router is used to create a common network. Wi-Fi Adapter is used to connect raspberry pi to the network. Raspberry pi is used to maintain the server. The pi collects the data analyses it and further activates GPIO pins as necessary. The GPIO pins of raspberry pi are connected to the relay. Relay switch are used to connect the home appliances. This security camera can offer you the freedom to get your home or business surveillance via network anytime and anywhere. It comes with alarm function, when somebody appears on the camera under alarm function, it will take a picture or sound the alarm and email the pictures to you immediately.
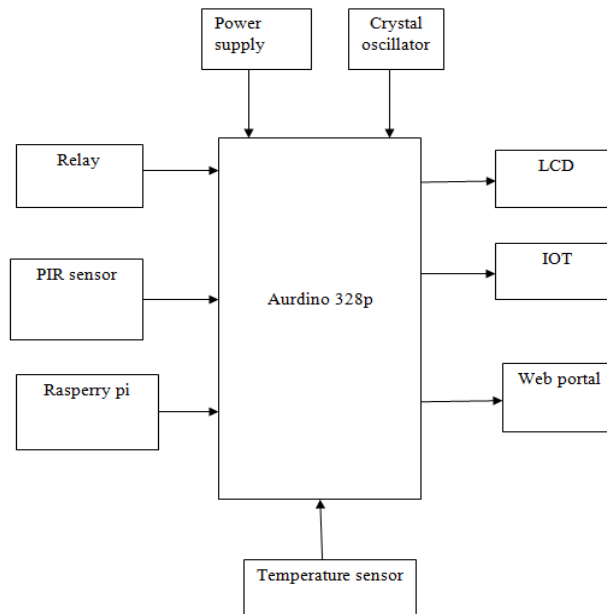
III. BLOCK DIAGRAM

Fig1: Block diagram

ARDUINO CONTROLLER:

▸ IC number of arduino is ATmega328p**.**
▸ It has 14 digital input/output pins and 6 analog input pins.
▸ Dc current per input /output pins is 40mA.
▸ ROM - 8KB.
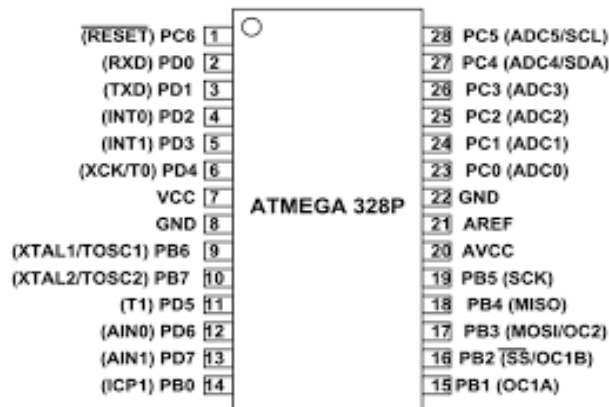▸ SRAM(static random access memory) -1KB.
▸ It has 64 pins.

Fig2: Pin diagram

PIR SENSOR:

The PIR motion sensor stands for passive infrared sensor. It can detect the presence of human or animals. The output voltage of the sensor is 3.3V.

Fig3: PIR sensor

TEMPERATURE SENSOR

This sensor is used to measure the temperature of its surroundings. The output voltage is linearly proportional to centigrade temperature. The operating voltage is 4-30V, and it is an analog sensor. At TE connectivity we design and manufacture a board portfolio of temperature sensors.
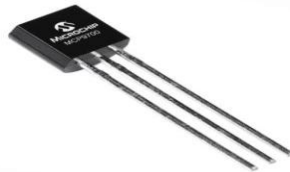

Fig4: Temperature sensor

CRYSTAL OSCILLATOR:

Crystal oscillator circuit usually works on principle of inverse piezo-electric effect. The applied electric field will produce a mechanical deformation across some materials. Thus, it utilizes the vibrating crystals mechanical resonance that is made with a piezoelectric material for generating an electrical signal of a particular frequency.

Fig5: Crystal oscillator

LCD:

It is a flat panel display or other electronically modulated optical device. That uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome.
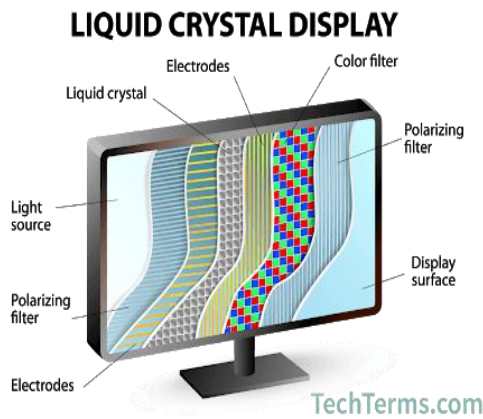

Fig6: LCD

WORKING:

Any electronic device operated on dc power supply and electrical device operated on ac power supply.

DC power supply of 5v is required to operate a circuit diagram. Firstly the 230v ac power supply is transformed to 5v dc voltage (not completely) by using step down transformer. After that by using regulators and filters the pure dc voltage is generated, this is the required voltage. In electronics there are two types of transformers they are

1. step-up transformer
2. step-down transformer

Step-up transformer is used to convert low voltage to high voltage and step – down transformer is used to convert high voltage to low voltage.

IV. RESULTS

Fig 7, 8 shows the condition of the circuit when it is OFF and ON. In figures 9,10 it is observed that the magnetic strip is acting as a door .If the door is open the result is displayed as '1' and in closed condition it displayed as '0'. The obtained results are shown in below figures.

Fig7: Home security system circuit when it is in off condition

Fig8: Home security system circuit when it is in on condition

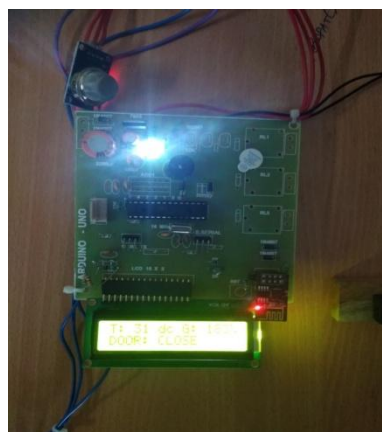Fig9: Home security system when door is open

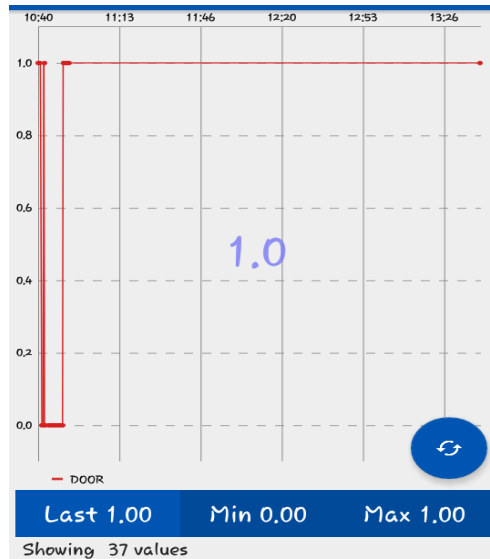Fig10: Home security system when door is closed.
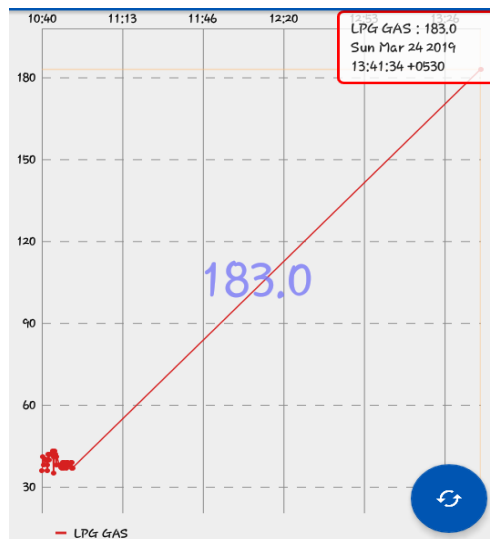
Fig11: Door Opened

Fig12: Gas Leakage Diagram

Fig13: Temperature Graph

Here the main purpose of home security system is to provide security to home when gas leakage occurred and the temperature exceeds above the room temperature. The results obtained in the graph sheet depends on the code dumped in the IC 328P. The overall result is shown by using the THING VIEW APP.

V.   FUTURE SCOPE OF HOME SECURITY SYSTEM

The end goal of Internet of Things is to bring all things we use in day to day life over network and can be accessed across the world over internet. That means every objects/gadgets we use in a day to day life will have to be identified over a network and its information can be obtained via Laptop, Tablet, mobile and smart watches. Why we should do it - the first and foremost thing is automation. In a typical day, we all have a 24 hours - 1/3 of time goes in bed, 1/3 of time goes in office/school and 1/3 third of time we have to spend for ourselves. Due to the busy schedule of a human being time became the most valuable one with the help of technology we can manage all the things easily, for such kind of users IOT is the most preferred one.

VI.   CONCLUSION

When security mode is turned on, any recognized harmful activities that occurred within the house will be detected through installed sensors and automatically forward the alert message to the homeowner through the internet. The data from sensors will constantly be stored in the cloud storage and interact with the custom web-based application that enables it to display the data in a website, and this allows the homeowner to have an advantage to monitor any potential harmful activity that might occur within the house in real-time. Another additional feature of security in this project is Access Control Technology; this system uses the (NFC) "Near Field Communication" approach to provide access to the recognized individuals (guests or family members) with the rights to enter the house. The android OS provides the flexibility of using the open source. The inbuilt sensors can be accessed easily. We have built an application with features. Android Phone acts as a client and data are sent via sockets programming.

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