# Home Automation using Arduino and IOT

Priyanka G.Gawade

Department of Electronics and Telecommunication Engineering.
Sou. Sushila Danchand Ghodawat Charitable Trust's and Group Of Institutions
Kolhapur, Maharashtra,
India.

Prajakta D.Jadhav

Department of Electronics and Telecommunication Engineering.
Sou. Sushila Danchand Ghodawat Charitable Trust's and Group Of Institutions
Kolhapur, Maharashtra,
India.

Madhavi B. Danane

Department of Electronics and Telecommunication Engineering.
Sou. Sushila Danchand Ghodawat Charitable Trust's and Group Of Institutions
Kolhapur, Maharashtra,
India.

**Abstract:- Home automation is a Automation technology which makes the work easier in all aspects related to home. There are different methods in wireless technology such as Bluetooth, WIFI and GSM.As we are entering in a new era of technology home automation has more significance. Automated home is also called as smart home. In this paper we have presented a Home automation using Arduino and IOT. Our project proposes a low cost solution and Home automation is done using IOT system which uses mobile devices to control an analyze the basic home functions and features automatically through internet from any corner within short span of time. ATMEGA 328 arduino microcontroller is used to upload computer code to the physical board and controls sensors, relays as well as actuators.**

*Keywords:- ATMEGA 328 microcontroller, WIFI module, MQ2 gas leakage sensor, PIR sensor, Buzzer, LCD.*

## I. INTRODUCTION

Home automation allows to control house appliances like door, light, fan, oven and so on. It also provides emergency system and home security. It enables the consumer more control of his home it facilitates many conditions, for example if the consumer is on his way for the work and forgot to switch off the light then he or she can control it through the web page on the basis of IOT, many manual actions is replaced by home automation which reduce human efforts and time saving.

The main purpose of this project is to develop a home automation system using Arduino and Webpage through IOT. In this project we have used buzzer for indication, MQ2 sensor is used to detect the gas leakage in home and PIR sensor is used to detect the presence of unknown person which also ensures the safety of home.

This paper is organized in following manner. Section I starts with the brief introduction to our project that is home automation and the need to built it, Section II contains the existing work of home automation to control various appliances, security and control over it. Proceeding ahead, Section III describes proposed system and it include system overview. Finally, Section IV concludes research work with future directions.

## II. RELATED WORK

This home automation system includes MQ2 sensor which detects the gas leakage in home such as LPG and gives indication through the buzzer. PIR sensor is used to detect the presence of unknown person . The data of MQ2 sensor and PIR sensor is displayed on LCD and as well as on Webpage through WIFI module. The initial conditions of these sensors and home appliances can be controlled and changed with the help of webpage which is based on internet.
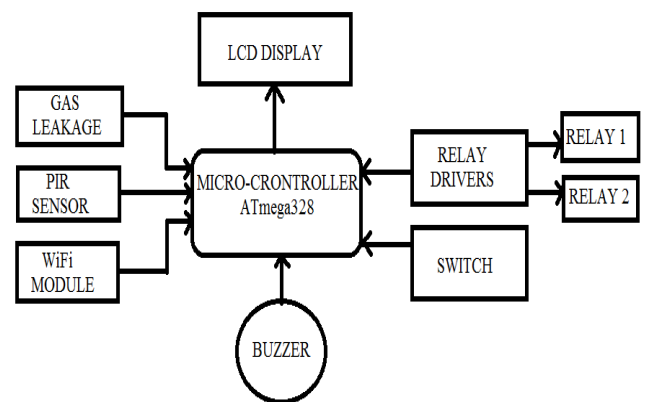
*A. Proposed Algorithm*



Fig 1:- block diagram

Above block diagram gives the representation of Home automation using arduino and IOT. Figure shows the connection between sensors, WiFi module and microcontroller. When gas or person is detected the information will be displayed on LCD and buzzer will be on. Using microcontroller information will be updated on webpage with the help of WiFi module.
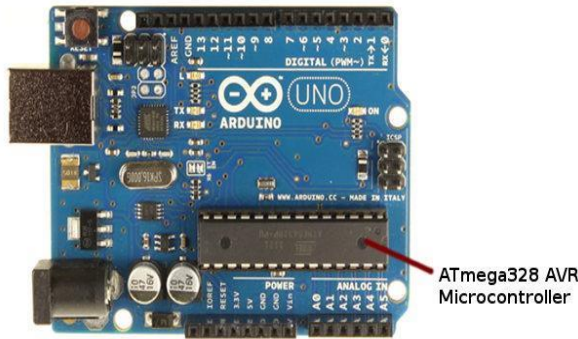
*B. Atmega328*



Fig 2:- Atmega AVR Microcontroller

The high-performance Microchip 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching1MIPS per MHz, balancing power consumption and processing speed.

*C. MQ2 Gas Sensor*



Fig 3:- MQ2 Gas Sensor

The Grove - Gas Sensor(MQ2) module is useful for gas leakage detection (home and industry). It is suitable for detecting $H_2$, LPG, CH4, CO, Alcohol, Smoke or Propane. Due to its high sensitivity and fast response time, measurement can be taken as soon as possible. The sensitivity of the sensor can be adjusted by

potentiometer. This is an Analog output sensor. It needs to be connected to any one Analog socket in Grove Base Shield.It is possible to connect the Grove module to Arduino directly by using jumper wires. The output voltage from the Gas sensor increases when the concentration of gas increases. Sensitivity can be adjusted by rotating the potentiometer. The best preheat time for the sensor is above 24 hours.

*D. Pir Sensor*



Fig 4:- PIR Sensor

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) radiation being emitted from objects in its field of view. They are most often used in PIR-based motion detectors. When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves.

*E. Esp8266 Wifi Module*



Fig 5:- WiFi Module

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community. This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.



Fig 6:- circuit representation

Above figure shows the circuit arrangement of all the components used in Home automation using arduino and IOT.
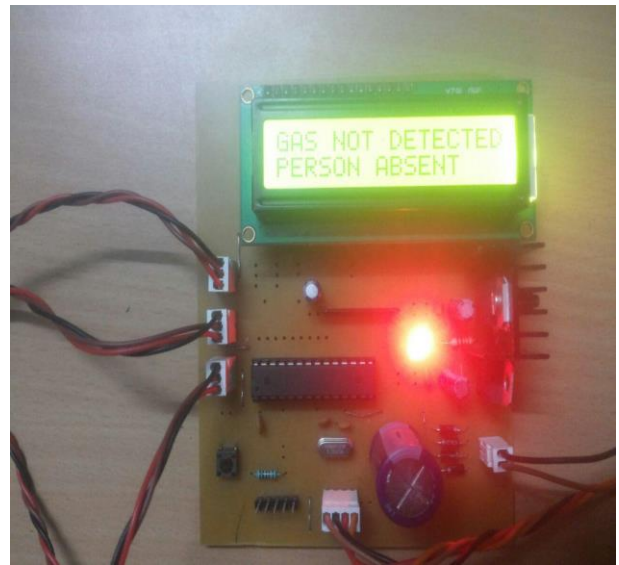
## III. OUTPUT



Fig 7:- Information represented by LCD.

16x2 matrix is used in Home automation using arduino and IOT. It displays the data given by MQ2 sensor and PIR sensor, it displays the information related to gas detection and presence of a person.
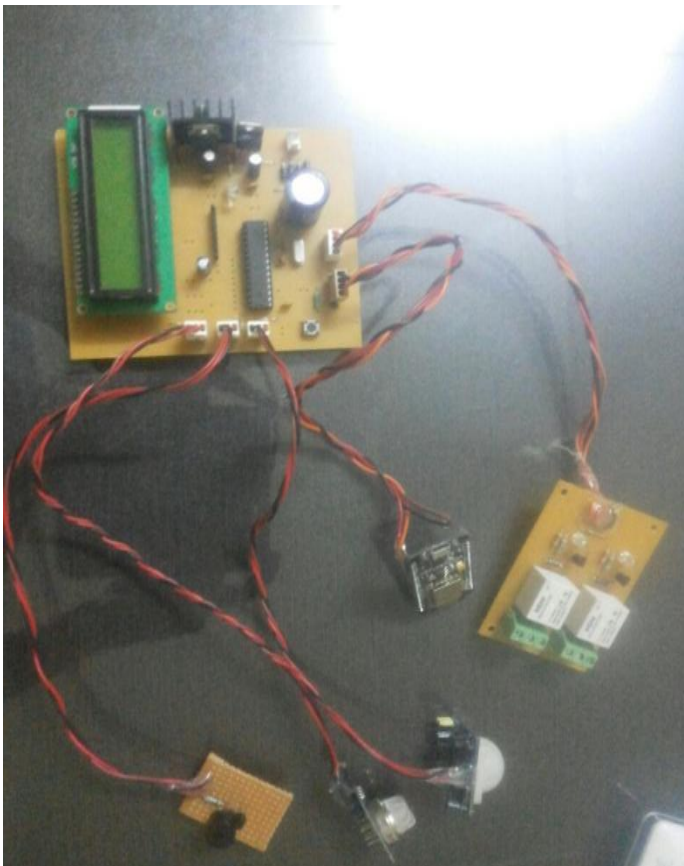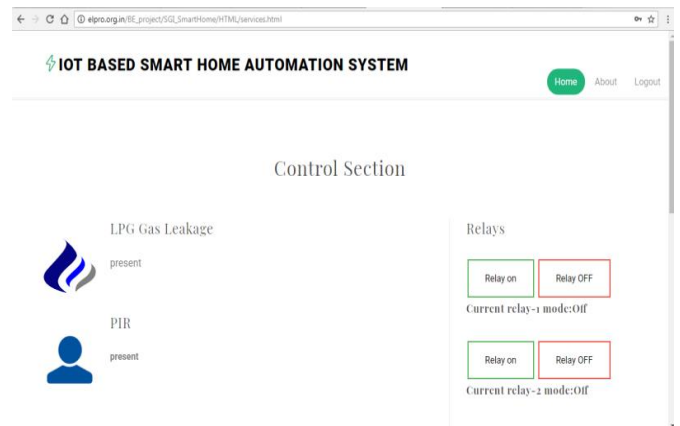


Fig 8:- web page to control appliances

It shows the webpage which is used to control the appliances connected to relays. It also gives the initial status of sensor.

## IV. ACKNOWLEDGMENT

| comparison of different Home automation system | | | | | |
|---|---|---|---|---|---|
| Sr. No. | System | communication interface | controller | user interface | Applications | Benefits |
| 1 | IOT based using Arduino Microcontroller | Internet | Arduino | Web based application, Android phone | Light monitoring, Gas leakage detection, person detection | Low cost, secure, IOT controlled |
| 2 | Bluetooth based using Arduino Microcontroller | Bluetooth | Arduino | Python supported mobile | Controlling | Secured and low cost |

## V. CONCLUSION

In this paper we present a Home automation using Arduino and IOT. Our project proposes a low cost solution and Home automation is done using IOT system which uses mobile devices to control an analyze the basic home functions and features automatically through internet from any corner within short span of time.

## REFERENCES

[1]. Satish Palaniappan, Naveen Hariharan, Naren T Kesh, VidhyalakshimiS, Angel Deborah S, "Home Automation Systems – A Study "International Journal of Computer Applications Vol. 116 , No. 11, Apr. 2015.

[2]. Subhankar Chattoraj ,"Smart Home Automation based on different sensors and Arduino as the master controller" International Journal of Scientific and Research Publications, Volume 5, Issue 10, October 2015

[3]. Abdul Kareem Kasim Abdul Raheem," Al-Mansour Journal/ Issue (27) "