

Home Automation using IoT

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Abstract

Home automation has become more and more popular in recent years. It aims at helping people manage the home appliances freely and build an autonomous environment in home. The aim of this project is the home automation with full security and controlling the home appliances using wireless communication as Wi-Fi. We design this smart home system with the implementation of related software and hardware. To assure security the PIR and vibration sensors are used to detect the motion and vibration to prevent from theft. It alerts the people by buzzer and starts to record it through HD spy camera. The temperature and humidity of the each room is monitored and maintained at room temperature using temperature and humidity sensors which activates the exhaust fan to maintain the temperature. The water level sensor is used to fill the overhead water tank without wasting the water. For these control purposes Arduino mega 2560 and ESP8266 is used because the arduino has the advantages of ease understandability and easily modifiable. The arduino board is specially designed circuit board for programming and prototyping with ATMEL microcontroller. The microcontroller used in this arduino is ATmega 328 which is in-built in arduino board and the coding are done in java script.

Keywords – IoT, Automation, Home Automation, Home Security

INTRODUCTION

Home automation is providing home safety for dwellers. It automatically turn lights on in closets, stairways, and other dark places. Thus accidentally tripping or running into thing is decreased. Everywhere environmental issues are raised before introducing any technology. In this regard home automation provides a better solution. Devices included in home automation consume less power. Besides, it saves energy. Thus home automation technology is so far environmentally suitable. Moreover, the technology keeps mind in peace. In most cases, guardians face

problems and always they keep tensioning for the safety of their children staying in home.

In home automation system internet access is used to control from far away. For years, internet is used only for surfing pages, searching information and downloading software and other things. Advancement of technology is forcing to make interaction internet with machineries and devices. In home automation system comfort and security of houses have been enhanced. Besides, people are concerning over costs. In offices, a division of people are employed only to make supervision of some manual means typed work. Home automation is replacing those arrangements. For this, cost is highly reduced. Besides, for manual labour engaged to control appliances waste energy in cases. It is seen that appliances continue to run though people are not present in their respective places. For this energy cannot stop consuming. If this happens for a long time then there have possibility to misuse energy in a huge amount. To overcome this obstacle home automation is encouraged to apply. Home automation does that challenging work. That's why; home automation is presented as energy efficient. In recent years home automation is gaining much popularity. The trend is also in favor of using home automation technology. If we look around residences, malls, offices, use of home automation systems will draw attention.

EXISTING SYSTEM

Temperature control using PIC16F877

The system is composed of a 300W heater resistance, a temperature sensor, a measurement amplifier, a controller, a digital/analog converter, a pulse width modulator, a TRIAC triggering circuit and a 220V AC fan. It is shown in the figure 1.

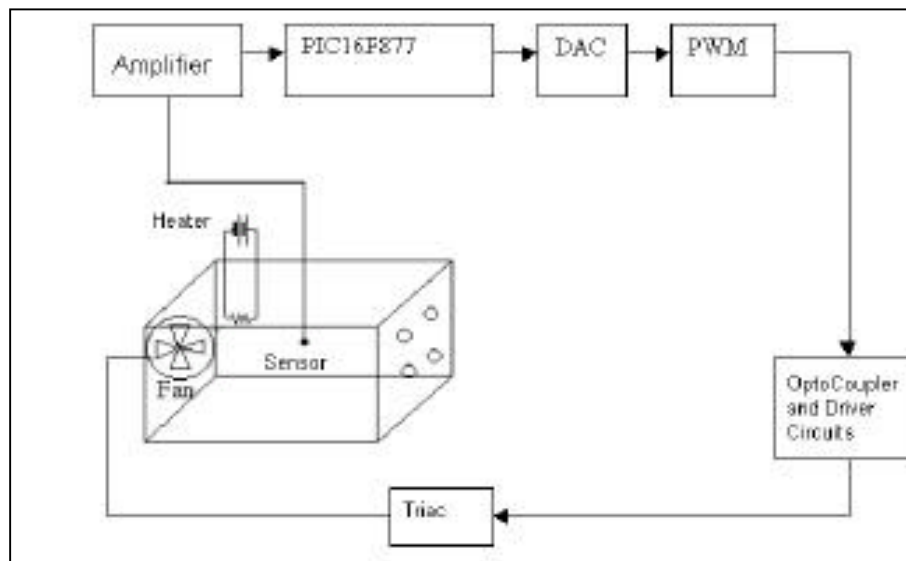


Figure 1. Temperature control of the existing system

Gas leakage system

The gas leakage alarm circuit is shown in figure 2. It operates on a 9V PP3 battery. Zener diode ZD1 is used to convert 9V into 5V DC to drive the gas sensor module. A preset in the module is used to set the threshold. Interfacing with the sensor module is done through a 4-pin SIP header. Whenever there is LPG concentration of 1000 ppm in the area, the OUT pin of the sensor module goes high. This signal drives timer IC 555, which is wired as an astable multivibrator. The multivibrator basically works as a tone generator.

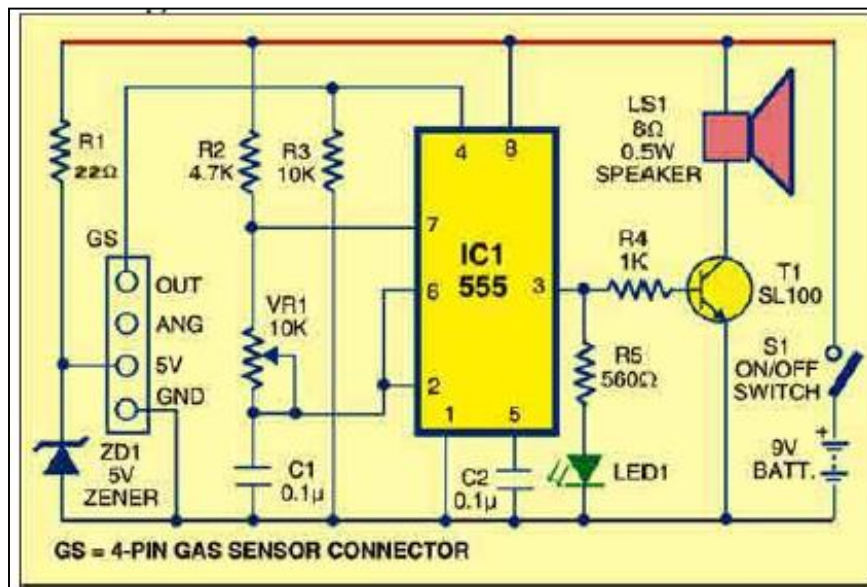


Figure 2. Gas leakage system

PROPOSED SYSTEM

The aim of the proposed system is full security with automation of home also controlling the appliances using WIFI. Temperature and humidity of the each room is monitored. Water level controller also implemented by the use of Ultrasonic sensor. By using PIR and Vibration Sensor Motion detection and thief identification also recorded by HD Spy camera. Room temperature is maintained by using exhaust fan. There is an increase in such kind of Automation all over the world. Our main aim is to give full security and to prevent such type of theft using Arduino Mega 2560 and ESP8266. Camera will reordered automatically during motion detection. Intimates about the Vibration and motion detection by Buzzer. Temperature and humidity is detected and maintained at room temperature. In this system we use arduino and ESP8266 where the software coding is done by normal java script. The main advantage of arduino is the ease of understandability and it is easily modifiable. The arduino board is actually is a specially designed circuit board for programming and prototyping with ATMEL microcontrollers. The micro controller we use is ATmega 328 which is already in-built in the arduino board.

Description of the system and Hardware Model

A *block diagram* is a *diagram* of a system in which the principal parts or functions are represented by blocks connected by lines that show the relationships of the blocks. They are heavily used in engineering in hardware design, electronic design, software design, and process flow *diagrams*. A diagram showing in schematic form the general arrangement of the parts or components of a complex system or process, such as an industrial apparatus or an electronic circuit.

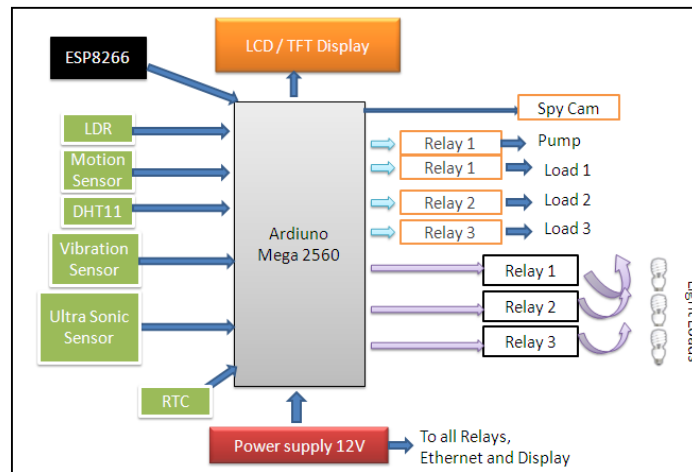


Figure 3 Block diagram of the proposed system

The proposed block diagram is shown in figure 3. The main block of our project is the arduino module which falls next in line. There are two relays to serve the purpose of on and off. The power supply provided for arduino is 5V. It is given through an adapter. The power supply given to the relays is 12V and it is given from a step down transformer. The LCD display is used in future extension of the project. The relays used act as Main Switches. The relays are programmed to operate without delay. The signals for the relay are given from arduino board.

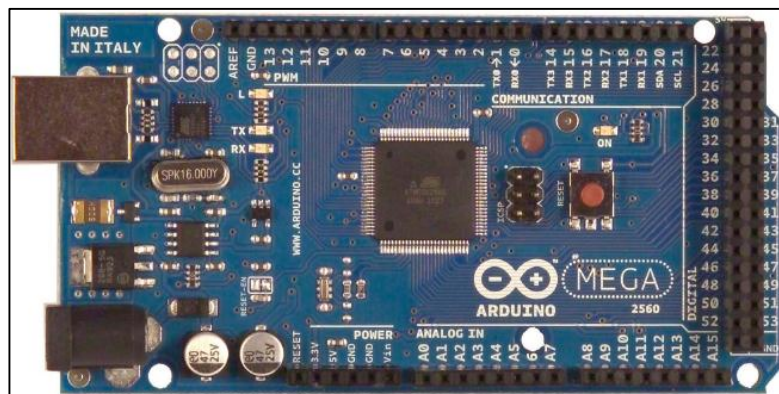
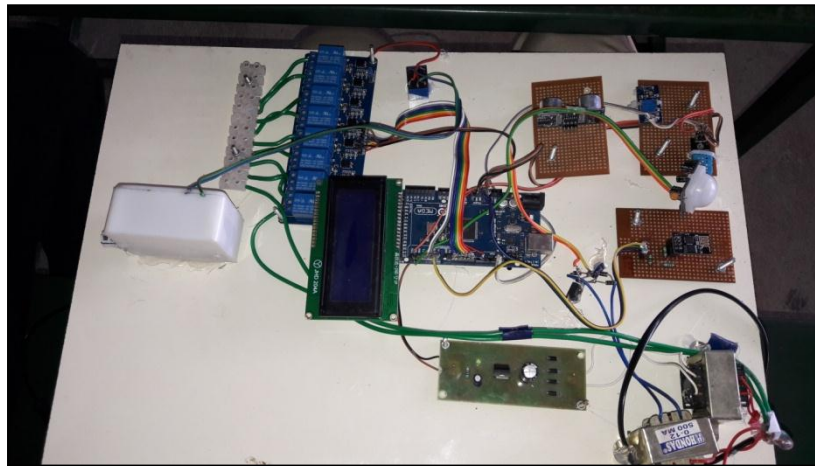


Figure 4. 7 Arduino Mega 2560

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the 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. The Mega is compatible with most shields designed for the Arduino Duemilanove or Diecimila. It is shown in figure 4.



CONCLUSION

Today in this century home and offices are equipped with various machineries. Besides, people have various devices for surfing in web. That's why we have introduced a system that can be accessed from all sorts of devices and database can be updated from anywhere. If particular device works on, the other means of devices will be easily operated. The database is developed such a way that can be accessed from any sort of device that supports internet. In this regard motion and vibration sensor is brought here because of its high quality sensing. The system is very easy to install. For this, just need HD spy camera connection for recording and for motion detection a motion sensor and vibration sensor, the ultrasonic range detector is to detect the distance of the object, temperature and humidity sensors to maintain the room temperature. Water level sensor to filling the overhead tank. These are controlled by arduino controller. Home Automation is definitely a resource which is capable of make a home setting automated. People can be in command of their electrical devices via these Home Automation devices and set up the controlling actions in the workstation. We think this device have high potential for marketing in the future.

FUTURE SCOPE

In real time web based home automation system this project can be extended in future to ensure the high security, the motion and vibration can be monitored through online

via HD spy camera. With this, the system can be incorporated in a whole building of any institution or residential building and can monitor from anywhere. This way, advantages of home automation can be more availed.

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