

Home Security and Automation using IoTPrajakta Patil¹, Akshat Yadav², P. Raja^{3*}*1, 2 Student, Lovely Professional University, Phagwara, Punjab, 144411.**3 Assistant Professor, Lovely Professional University, Phagwara, Punjab, 144411
prajaktapatil150@gmail.com, akshatyadav002@gmail.com, raja.21019@lpu.co.in***Abstract**

the development of a society is boon for the people of that vicinity but even after this development people are unable to shield their home while they are outside or even when they are inside. The cases of burglary are increasing day by day in India. We daily have a number of news about pilfering. According to survey chances of a breaking in reduces by 300 percent if there is any sort of security appliances. Even after all this only 17 percent of people in India have a home security system. Around 60 percent of burglar changes their mind of breaking in if there is just an alarm installed. The main reason of people not having any security appliances is its cost. A typical home security circuit and its installation cost is sky high. Economy of our country is improving but it is not that well that people can afford to spend an extortionate amount on security appliances. For the above reasons we have designed a economical circuit using some basic components such as PIR, hex keypad, Arduino, alarm etc. This circuit is designed in a way which provide user or owner the ability to decide when to activate the system and when not. The cost of the circuit is only around one thousand rupee. Due to this cost effectiveness a large portion of the society can install this circuit in their accommodation. The circuit is designed so that it is sheltered and effortless to manoeuvre.

Keywords—security, economical, extortionate, manoeuvre, Arduino, PIR, hex-keypad.

1. INTRODUCTION

Day by day increase in the crime rate of breaking in houses[1] and looting all that a person have earned after years of hard work is a big motivation for this project. There are many other home security appliances and circuit present in the market and many more for home automation such as circuit which have GSM module, voice recognizer, eye scanner, fingerprint scanner and many more but their circuit is more complex and require more capital to manufacture as well as in installation and maintenance of the circuit[3] but there is a need to come up with a circuit that works for both home automation as well as home security within an economical range so a wider group of people in society can buy the device or circuit any install it in their homes. The circuit is made with the help of Arduino, PIR (passive infrared sensor), hex-keypad, and buzzer. The circuit is designed with such a basic methodology so everyone can understand in some ways it is same as taking out money from

ATM. The circuit is made in such a way that further a number of feature can be added in it such as limiting the time period we want to keep appliances active once the PIR sensor stops to get any change in infrared radiation this in turn will make the circuit more efficient as well as conserve electricity. The circuit can be made to work using battery, electricity or both in case of any power failure so that the safety of home and the people sustain. In this circuit first user or owner have to power ON the system and then have to enter a password for example assume password for turning circuit into home automation is 1234 and for home security it is 4321, when user will enter 1234 the circuit will work as home automation circuit. In this case whenever there will be any change in infrared radiation of if anything passes through active zone of PIR the respective appliances will turn ON. On the contrary if owner entered the password as 4321 it will turn the circuit in home security system and it will ON the buzzer as soon as there is any change in infrared radiation. There can be a third case, when owner enters a wrong password in that case for safety reasons the circuit will remain in home security mode. The circuit can serve as base for designing future well equipped security devices.

II. HARDWARE REQUIREMENT

A. Arduino

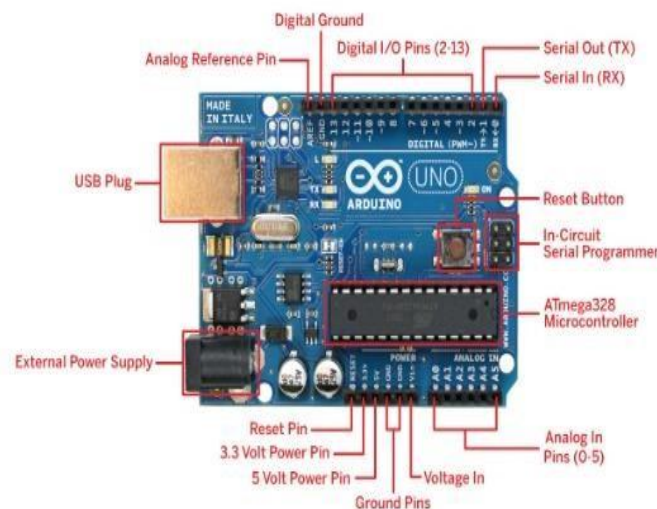


Figure 1: Representative Image of Arduino UNO

Arduino is an open source hardware which means anyone can redesign manufacture and implement it wherever they feel suitable without seeking any permission. Arduino board design uses a variety of microprocessors and controllers. They have digital and analog input/output pins which are used to communicate with external devices. Most Arduino board consist of an Atmel 8-bit AVR microcontroller (ATmega8, ATmega168, ATmega328, ATmega1280, ATmega2560) with varying amount of memory, pins and other different features. There are different Arduino board such as Arduino RS 232, Arduinodiecimila, Arduino UNO R2, Arduino Pro, Arduino Mega, Arduino Due, Arduino Yun etc.

Arduino UNO is a microcontroller board based on AT Mega 328 and have 14 digital input/output pins. It also has 6 analog pins and works with a 16 MHz crystal oscillator, a USB connection, a power jack and a reset button. It is programmable by Arduino IDE (Integrated Development Environment) through a type B USB cable. Arduino works within 7 and 20 volts [5].

B. PIR



Figure 2: PIR (Passive Infrared Sensor)

PIR stands for passive infrared sensor is an electronic sensor that measures the infrared light being emitted by an object. They are generally used for motion detectors. PIR is used to detect movement. An individual PIR sensor detects change in amount of infrared radiation when some object comes and pass there is change in infrared radiation which change into an output voltage and this trigger the detection[7]. PIR have an angle of detection of 120 degree for sensing any change in infrared radiation. In this circuit as soon PIR senses any kind of change in heat radiation it makes output high which is given to Arduino as an input and further depending upon whether circuit is working in home automation or home security is will switch ON appliances or buzzer respectively.

C. Hex-keypad



Figure 3: Hex-Keypad

It is 7 pin ribbon cable which is used to take input for the device or applications. It can be of different type. In this circuit we have designed hex-keypad is used to input password which will be as an input to Arduino which further according to the program will select or choose whether the circuit will work as home automation or home security.

D. Buzzer



Figure 4: Buzzer

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical or piezoelectric.

Piezoelectric element can be driven by an oscillating electronic circuit or other audio signal source [6]. Buzzer works as an output device in this circuit in home security mode whenever there is any detection or change in infrared radiation it will turned the buzzer ON.

III. SOFTWARE REQUIREMENT

A. ARDUINO IDE



Figure 5: Arduino IDE

Arduino integrated development environment (IDE) is a cross platform application. It is an open source application which means anyone can download it for free and program it as per their will.

The Arduino IDE supports the languages C and C++ using some set of rules. Arduino IDE is used to upload program an Arduino and make circuit and devices that help in development of the society. In this project Arduino IDE is used to write code for the circuit in two half one is for home security and other is for home automation basically the program is same as in C for if else block, first input password will match to password which is saved in program and if it matches to whichever block it will work accordingly [8].

IV. METHODOLOGY

The circuit is made to work for both home automation and home security system. It's solely depends on the owner or user in which mode he want to switch the circuit. The circuit will ask the user to enter a password through hex-keypad after punching the password the circuit will check or match the entered password with the password that is saved in database or program if the password matches with that in program it will start working as home automation in which whenever a PIR sensor senses any heat signature or change in infrared radiation the respective appliances with turn ON. On the other side when the password matches to that to activate home security or the password didn't matches to any of them the circuit will automatically switch to home security in this case if any PIR sensor senses any change in heat signature or infrared radiation the circuit with turn the buzzer on.

A. ALGORITHM

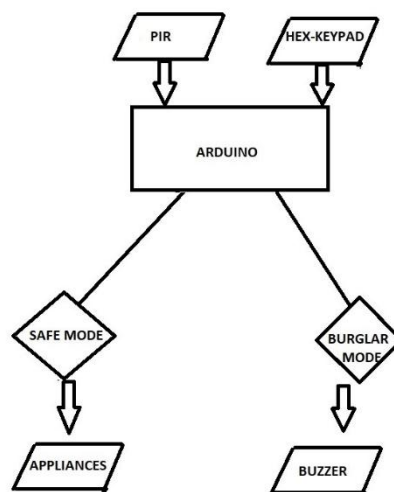


Figure 6: Process Flowchart

- i. First the Arduino will collect input from all PIR sensors and hex-keypad. Collecting input from PIR means the initial heat signature of the sensors and input from hex-keyword will be the password for selecting between safe mode and burglar mode.
- ii. Depending upon the input password from hex-keypad Arduino will decide whether the circuit will act as safe made that means home automation or burglar mode which means home security system.
- iii. In home automation, when PIR will sense any movement or change in any heat signature it will on the respective appliances of that room. On the other hand in home security or burglar mode if anyone of the PIR sensor senses any change in heat signature it will turn the buzzer ON.

VI.CONCLUSION AND FUTURE IMPROVEMENT

A. CONCLUSION

Day by day increase in house invasion cases have become a major concern for the society. To avoid or stop burglar we must need to install home security appliances/system if not too advanced such as in banks still something economical that provide security to our home. There have been many researches in this but all those are not economical to the most of the people in society. So in order to develop an efficient and economical home security system we have designed a circuit using Arduino, PIR, buzzer, hex-keypad etc. The whole circuit cost around 1000 rupee. The system provides full accessibility and safety. Owner decides when to activate and when to deactivate the functioning of circuit.

By installing this system owner or the user can be sure and confident about the safety of his family and his home.

B. FUTURE IMPROVEMENT

Even this system will work efficiently and is trustworthy still there is room for improvement. The system can be made more efficient by adding few more equipment in it such as fingerprint scanner which will take fingerprint as an input and match it with pre-recorded fingerprint rather than taking input from hex-keypad which in turn will decrease the chances of getting system hacked, GSM by using it we can send SMS to the owner about the system as if they are switched ON or OFF in home automation of in home security mode, voice detector which will take some specific command as an input and match the pitches to the already recorded pitch in program and if matches the circuit will work according to it etc. by adding all these, the circuit will for sure become more reliable but it won't remain economical for most of the society. We can add this equipment by finding a better and cheap substitute for it.

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