Home Automation Using PIR Sensor And Arduino Board

Ms Bharathi K[1], Mr B Sunder Ganesh[2], Mr Indra Keerthi B[3], Mr Mohammed Shakeel[4] , Prof. Mrs Anusuya Patil[5]
[1,2,3,4] Student, EE, Rao bahadur y. Mahabaleshwarappa engineering college.
[5] Professor, EE, Rao bahadur y. Mahabaleshwarappa engineering college.

Abstract- *Home Automation deals with monitoring and controlling of electrical appliances like fans, Air conditioning, Lights, Refrigerators, Water heaters etc., based on various parameters like climate, Home security, Decision making etc., The aim of Home Automation is to provide flexible, efficient and smart home. In this project, Home Automation is to carried out by using PIR sensors and Arduino Board, which results in energy efficient system. The use of PIR sensors is to conserve the electricity as it is mandatory, due to energy crisis.*

Keywords- Home Automation, Automatic switch, PIR sensors, Arduino uno board, Internet of things (Iot), Esp8266-01, PIC Microcontroller, Wi-Fi Network.

I. INTRODUCTION

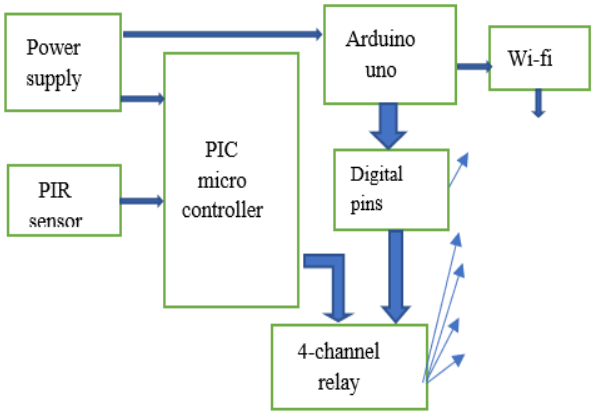
Home Automation is gaining more beneficiaries day-by-day, as it allows the system to be "smart" which provides easy access and control, over almost all electrical appliances in the home remotely when connected with internet (internet of things). The possibilities of Home Automation are virtually limitless. Automation refers to the ability to program and schedule events for the devices on the network. The programming may include time related commands and non-scheduled event, when security system alarm is triggered. This project uses first generation (wireless technology with proxy server Esp8266-01) of automation using Arduino board in addition, it uses PIR switch which automatically detects the presence of human beings in a predefined area and automatically turn on or turn off electrical appliances. The main objective of using PIR sensors is to conserve the use of electricity and contribute to develop an energy efficient system, as we cannot imagine our life without electricity, because electricity has become necessity, without which day-to-day life chores and daily activities become stand still. Due to depletion of non-renewable resources, conservation is mandatory by doing so we can reduce electricity bills as well.

II. PROPOSED SYSTEM

The proposed system uses PIC Microcontroller, Arduino uno, 4 channel relay, 16x2 LCD display, Esp8266 connecting a local Wi-Fi. All these require a power supply of 12V DC. The power from the mains (230V AC) has to be converted into 12V DC and 5V DC by rectifier circuit using regulator IC 7812 & 7805 respectively. The system has an automatic switch which detects the presence of human being in a predefined area. PIR is an electronic sensor which sense the movement of human beings and animals by measuring the infrared radiation emitted by the objects in the form of heat energy. It can detect the motion up to 6 meters. The PIC board contains PIC16F877A/874A, 16 bit Microcontroller. On receiving the signal from PIR sensor, (shown in block diagram), the PIC will turn on or turn off the electrical appliances, depending upon whether the output of PIR is high or low respectively. A four relay channel is used, Which connects four electrical loads like fan, lights, air conditioner, TV to Arduino Uno with digital input/output pins. Arduino Uno has ATmega328 processor. It has 14 digital inputs, 6 analog inputs and programmable with Arduino IDE. ATmega328 provides serial communication, which is available on digital pins 0 (RX) & 1 (TX). The relay takes low current and voltage and triggers the switch (up to 10A,250V) which is connected to high voltage. These devices are connected with local Wi-Fi using a communicating module Esp8266. Wi-Fi will provide a hotspot through which the communicating module can connect. The router will assign IP address to the module for establishing connections with the smart phone through android application.

III. BLOCK DIAGRAM

Home Automation using PIR and ARDUINO BOARD



APPLICATIONS

- Home automation is widely used for lighting control. It controls almost all kind of lights like wall switches, lamps, staircase switches and blinds.
- Home automation ensures continous real time monitoring of the network. Hence it is used in CCTV cameras for surveillance.
- automation using Arduino finds applications in lawn irrigation systems (outdoor automation).
- HVAC regulation reduces electricity bills.
- Home automation using PIR results in an energy efficient system.
- It plays a major role in monitoring children and are being used in play schools, kinder garden etc.,
- Used for remote control applications like burglar alarm, Car door alarm, calling bell, security systems etc,.

ADVANTAGES

- Home automation serves physically changed and disabled people through android mobile or smart phone.
- It ensures higher reliability, smarter communication, flexibility and accuracy/
- Easy to access and control as it is connected to one common device.
- This project helps in conserving electricity.
- It helps in managing home systems remotely from the comfort space of the person and enhances the lifestyle.
- Saves time and effort in managing the repetitive task.

DIS-ADVANTAGES

- A wi-fi network connected to the internet can be vulnerable to hacking.
- Technology is still in its infancy.
- Lack of technical standards and it also suffers from fragmentation.

IV. CONCLUSION

This paper entails, the process of monitoring and controlling the electrical appliances remotely and also brief out the need of conserving the electricity to obtain an energy efficient system. Home automation using Arduino board and PIR sensors have wide variety features. There is an easy access of the electrical appliances because wi-fi is easily available in all places like colleges, office, residential and industrial buildings. Home automation results in flexible and secure network because of real time monitoring and operating remotely. On an overall note home automation results in an energy efficient and secure system which increases the comfort zone and saves electricity, time and effort. Its improving technology will have an impact on economic development of the society.

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