Smart Home Control System by Internet of Things Based on WIFI Module

M.Sangeetha[1], C.Udhayanila[2], G.Gayathri[3], N.Rakshana[4]

Assistant Professor, Dept. of ECE, Kathir College of Engineering, Coimbatore, Tamil Nadu, India[1]

Dept. of ECE, Kathir College of Engineering,   Coimbatore, Tamil Nadu, India[2,3,4]

ABSTRACT: Internet of Things is the latest and emerging technology**,** which will enable physical objects used in day to day life to connect to the internet and exchange data. In this paper, Smart home control system using IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home**.** This system uses PIC controller interfaced with ESP 8266 using AT COMMANDS and sensors that enables wireless communication and remote control of various electrical appliances with in their home. This system also provides security systems with low cost RFID technology.

KEYWORDS: IoT, RFID, PIC, ESP8266,AT COMMANDS

I.INTRODUCTION

Homes of the 21st century will become more and more self-controlled and automated due to the comfort it provides, especially when employed in a private home and security currently become a very important issue in public or private institutions in which various security systems have been proposed and developed for some crucial processes. Security systems are vital for protection of information, property, and prevention from theft or crime in home.

A smart home is a network of various sensors and controllers integrated together to provide the user with remote control of various devices within their home using IoT. The sensors sense various changes, monitor them, store the data and display them in order for analysis and control. This helps us customize our home to fit every family's way of life. This is a cost effective system made from locally available components like PIC controller, light sensors and PIR sensors which allows us to control the appliances of our house. The Internet of Things is connecting everyday objects intelligently to the Internet to enable communication between things and people, and between things themselves. For the Objects to collect and exchange data electronics, software, sensors and network connectivity are embedded into them. This technology has endless possibilities and infinite applications. Everyday devices are made smart and intuitive and by enabling them to share data intelligently they can be used to improve people's lives. IOT has made a huge impact in the way people live, work and communicate.

IoT mainly has the following three characteristics: comprehensive perception, which means that entity's information can be obtained at anytime and anywhere; reliable transmission, which means that entity's sensory information is required to pass out accurately in real-time; intelligent processing, which means that the mass of information can be analyzed and processed efficiently, then the entity's intelligent control is realized.

This paper describes a smart home where lighting system of the house is monitored and controlled remotely by establishing a remote server.

II.LITERATURE REVIEW

A .*DESIGN OF SMART HOME CONTROL SYSTEM BY INTERNET OF THINGS BASED ON ZIGBEE*

In this paper a smart home control system by Internet of Things based on ZigBee is designed. In this system, LM3S8962 processor is preferred for the replacement of the traditional 8-bit or 16-bit MCU. LM3S8962 processor is based on the ARM Cortex-M3 core, specifically for embedded application and development of 32-bit flash processor; LM3S8962 processor is used as an embedded WEB server to respond requests from the WEB browser. The ZigBee wireless communication module is used to receive and transmit control commands, and monitoring information of the home appliance will be collected and transmitted to the control board at the same time. Common Gateway Interface (CGI) is a standard for the communication between Web servers and external programs. Thus, it can do information exchange between the client side and the server side. This system enables the users can access WEB browser through the Internet at anytime and anywhere to view the information of home appliances

B. *Home automation using Internet of Things*

This paper proposes home automation system (HAS) using Intel Galileo that employs the integration of cloud networking ,wireless communication, to give the user with remote control of various light, fans and appliances with in their home and storing the data in the cloud. The proposed systems consist of servers and sensors. Server controls and monitors more hardware interface module(sensors). The Galileo development board, with built in Wi-Fi card port which the card is inserted, act as web server. This system can accessed from web server of local PC or remotely from any PC or mobile handheld device connected to the internet. The system will automatically change on the basis of sensors data. This system is designed to be low cost and expandable allowing a variety of devices to be controlled.

C. *Internet of things based on home automation*

This paper describes home automation system by Raspberry Pi 2 model B is used which is controlled by a Linux distribution of the Deben operating system, making use of an ARM architecture. All the components are connected to the Raspberry Pi which controls their functioning. The objective is accomplished by using a Raspberry Pi which is connected to different sensors and run by python program. The lights are programmed to turn off automatically if there is no one inside the room or if a person enters the room but the room is bright. Raspberry Pi acts as a web server and an application using java script is run to control the relay. Wi-Fi is used for communication between the devices.

D. *DESIGN AND IMPLEMENTATION OF DOOR ACCESS CONTROL AND SECURITY SYSTEM USING IOT*

This paper presents the design and implementation of an interactive home applications security system using biometric with IoT Server. IoT based monitoring and control of equipment is forming a trend in automation field. The sensors send the signal to the processor during hazardous situations. Buzzer will ring whenever sensors get activated or when unauthorized persons try to open the door. Working of IoT based door locking system has two processes, at system and at IoT Server. In order to open the door, the user must place finger on the biometric scanner. It checks in the database whether the entered user finger prints is already stored or not, if finger print does not match then again the user must place finger for authentication. After 3 unsuccessful attempts buzzer will ring and send a message to the already registered phone numbers. If user's finger print is matched, then he/she has to enter the password on the system, if password is correct then security question will be entered. If finger print, password and security question are all correct then door will open and the data will be send to the IoT Server.

E. *SMART HOME SYSTEM BASED ON ARM AND ZIGBEE*

 In this paper home automation by using combined technology of Zigbee, GSM and ARM is implemented. ARM9 is the central controller of the smart home system. this controller achieve the automatic monitoring of home devices and take control of individual sensors in monitoring household, once exceeding the preset threshold value it will automatically send

an alarm message to registered mobile phone. Besides it completes the task of sending alarm messages through the GSM network, achieving the authentication and authorization of short messages which come from the mobile phone sending to the control center. The monitoring of all devices and sensor is completed by the device monitoring process with the receiving sensor data of all endpoints of Zigbee network. The Zigbee gateway is initialized to create a network and wait for the end points and routers to join after loading the device drivers.

III.PROCESS DESCRIPTION
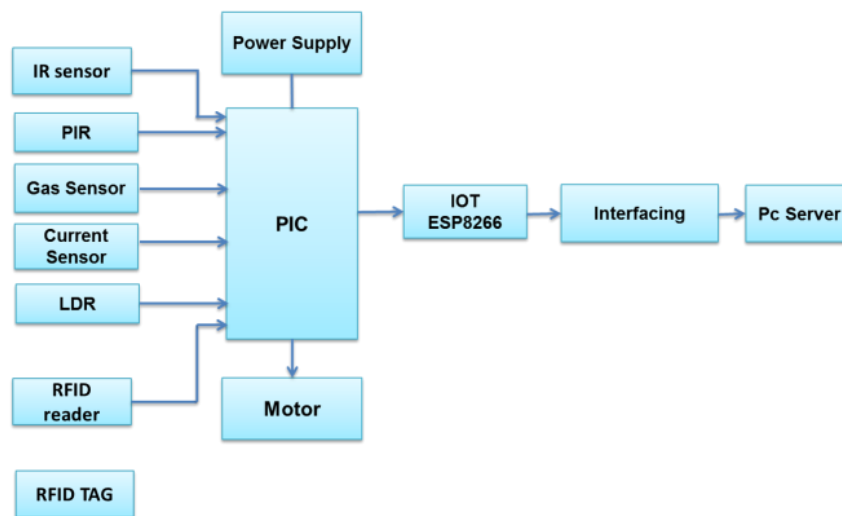
Figure 1: Block diagram of smart home control system based on PIC microcontroller and ESP8266

Home automation system has capabilities to control the following components in users home and monitor the following alarms:

- Motion detection
- Fire and smoke detection
- Light level
- Lights on/off/dim
- Fan on/off
- On/off different appliance

The model consists of several sensors like gas, PIR, IR, current and LDR. Initially the PIC controller connects to the internet through Wi-Fi module ESP8266 using AT COMMANDS. All the components communicate with each other using the wireless protocol
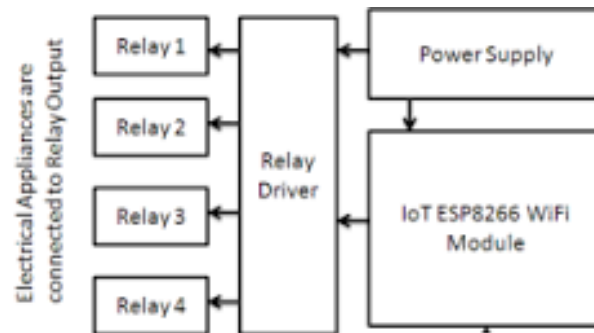
Figure 2: Process description of ESP8266

When the connection established it will start reading the parameters of sensors. The threshold value for different sensor is set. The sensor data are sent to the web server and stored in cloud. The data can be analyzed anywhere at any time. If sensor parameters are greater than the threshold level then required actuation is done for the controlling of parameter. The motion detection is stored in cloud for analysis. If there is any leakage of gas then it shows the notification in the web server, then it will remotely controlled through internet. The required lights are turned on/off automatically by detecting the light outside the house. the user can also monitor the electric appliances through the internet via web server. if the light or electrical appliances are left on in hurry can be seen and turned off remotely through simply typing the IP address of the web server.

IV.SOFTWARE DESIGN

HTML is a format that tells a computer how to display a webpage. The documents are plain text files with special "tags" or codes that a web browser uses to interpret and display information on your computer screen.HTML acronyms as Hyper Text Markup Language; HTML file is a text file contains small markup tags. The markup tags tell the web browser how to display the page, An HTML files must have an .htm or html file extension.
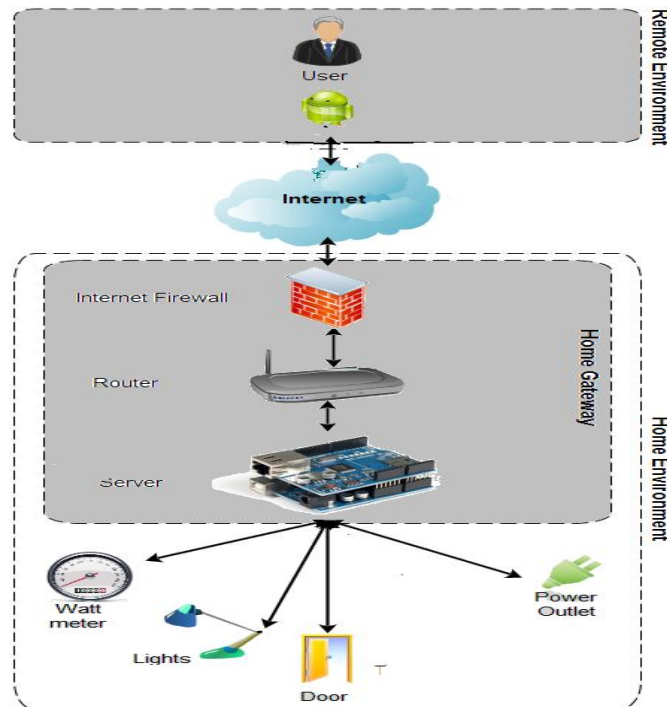
Figure 3: Flow chart for smart home control system using internet of things

IV.OUTPUT ANALYSIS

A webpage has been created to continuously monitored the home appliances through internet and it it enabled by ESP8266 wifi module. The sensors such as gas , PIR, LDR and current senses the data, it will be displayed on the webpage and the user can control these data through the internet.

Figure 4: Webpage creation for smart home

V. CONCLUSION

In this paper we proposed system that allows to monitor and control various home appliances through this concept. We can control various appliances from anywhere through internet in case of any emergency situation so that we will be able to control the appliances safely from remote area through internet of things.

REFERENCES

[1]. Luo Ke.The Design of Home Control System Based on Embedded System and GSM[D].Southwest Jiatong University 2009

[2] Pavithra.D.Ranjith Balakrishnan "IoT based monitoring and control system for home automation", Proceedings of 2015 Global Conference on Communication Technologies 2015

[3] Zong-Liang Wiu,Nobuo Saito,"The Smart Home", Proceedings IEEE,Vol.101,No.11,November 2013

[4] Dae-Man Han,Jae-Hyun Lim,"Design and Implementation of Smart home energy management system based on Zigbee", IEEE Transaction on Consumer Electronics,vol.56,No.3,August 2013

[5] Basma M.Mohammed Ei-Basioni, Sherine M. AbdEl-Kader2 and Mahmoud Abdelmonium Fakhreldin 3 "Smart Home Design using Wireless Sensor Network And Biometric Technologies" at Volume 2, Issue 3 March 2016

.