

SMART HOME AUTOMATION SYSTEM

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ABSTRACT-Smart home automation system is a web based application that allows user to monitor home appliances using mobile devices. This system established for the entire home user after gaining access from administrator. This system includes remote control and monitoring domestic appliances, security and energy management. Once all the appliances in home are automated and connected it important to consider issue of security authentication and access control.

Keywords-Home automation, Security, Energy efficiency, appliances

I. INTRODUCTION

Home automation refers to the use of computer and information technology to control home appliances and features (such as windows or lighting). Systems can range from simple remote control of lighting through to complex computer/micro-controller based networks with varying degrees of intelligence and automation. Home automation is adopted for reasons of ease, security and energy efficiency. This project argues that home automation can make a difference regarding better energy management and usage of renewable energy sources. People are more sensible to the need of using energy and other resources more rationally but do very little to that end on their daily lives at home.

The implementation and design of this project done by using three methods, motion sensor technology, RF remote control and Wi-Fi Router hand held to control of the selective home devices. The software consists of assembly language for programming microcontroller and visual basic language that use to communicate between transmitter and receiver model. The system is low cost and flexible with the increasing variety of devices to be controlled.

In simple installations, automation may be as straightforward as turning on the lights when a person enters the room. In advanced installations, rooms can sense not only the presence of a person inside but know who that person is and perhaps set appropriate lighting, temperature, music levels or Television channels, taking into account the day of the week, the time of day, and other factors.

II. LITRATURE REVIEW

Sr. No	YEAR	INVENTION	DESCRIPTION	LIMITATION
1	1920	Invention of home appliances	The first engine-powered vacuum cleaner, refrigerators clothes dryers, washing machines, irons, toasters, and so much more	Devices are in their primary stage
2	1966	ECHO IV and The Kitchen Computer	It was the first smart device Clever device could compute shopping lists, control the home's temperature and turn appliances on and off	Cost and size is high so they never sold commercially
3	1998	Smart Homes	A viable technology for consumers Domestic technologies, home networking began to appear on store shelves.	Dedicated for only one purpose i.e. Automation
4	2015	Today's Smart Homes	Today's smart homes are more about security and living greener Current trends in home automation include remote mobile control, automated lights, automated surveillance.	Internet connection is required

VI. SYSTEM OVERVIEW

III. PROBLEM STATEMENT

During the information stage main problem statements for current systems are as below:

- a) A common property of successful inventions is the abilities to make life easier. For example Washing Machine, making washing less burdensome.
- b) Tragedies happen such as thefts especially late at night when the users are not at home. This is because home does not provide any secure system.

IV. Objectives

Home automation various application makes lifestyle comfortable and easier way such as

- To reduce the power consumption.
- To do work effectively and timely manner.
- To help the physically challenged peoples.
- It is helpful for the security purpose.

V. SCOPES

- Counter can be used for the counting the number of person entering and leaving the house.
- Looking at the current situation we can build cross platform system that can be deployed on various platforms like iOS, Windows.
- Security cameras can be controlled from other places, allowing the user to observe activity around a house or business.
- With the help of IP camera, video of rooms or certain area of a house can be recorded. This helps to provide security. Scope of this project can be expanded to many areas by not restricting to only home.

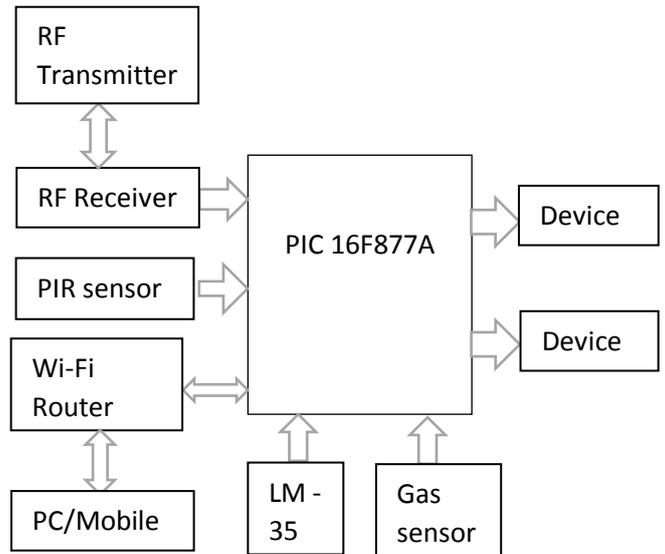
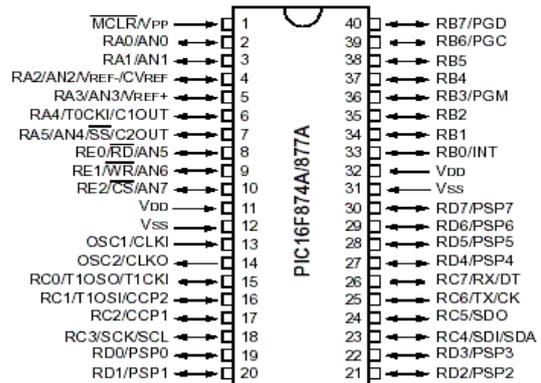


Fig. 1 Functional block diagram of the system.

PIC 16F877A:

40-Pin PDIP



Program Memory Type	Flash
Program Memory (KB)	14
CPU Speed (MIPS)	5
RAM Bytes	368
Data EEPROM (bytes)	256
Digital Communication Peripherals	1-UART, 1-A/E/USART, 1-SPI, 1-I2C1-MSSP(SPI/I2C)
Capture/Compare/PWM Peripherals	2 CCP
Timers	2 x 8-bit, 1 x 16-bit
ADC	8 ch, 10-bit
Comparators	2
Temperature Range (C)	-40 to 125
Operating Voltage Range (V)	2 to 5.5
Pin Count	40

PIR sensor- The PIR (Passive Infra-Red) Sensor is a pyro electric device that detects motion by measuring changes in the infrared (heat) levels emitted by surrounding objects. When motion is detected the PIR Sensor outputs a high signal on its output pin. This logic signal can be read by a microcontroller and can be used to control other circuitry. The delay time / blocking time are adjustable using the potentiometers on-board. It can detect the signal from 10-12 feet. Its operating voltage is 5V DC. This sensor can be used to detect theft in a home when owner not present.



Fig. 2 PIR sensor

Temperature Sensor-LM 35 is an integrated circuit temperature sensor which can be used to detect the temperature in a centigrade scale (-55°C to 150°C). The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry it draws only 60mA from its supply, it has very low self-heating. In this system, it is used to adjust the HVAC (Humidity, Ventilation and AC) system in a home. LM 35 is less prone to oxidation and can measure high voltage range than that of thermocouples.

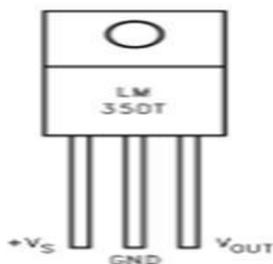


Fig. 3 LM35 Temperature sensor

Gas Sensor: Gas detector is a device that detects the presence of gases in an area, acts as part of a safety system. This type of component is used to detect a gas leak and interface with a control system so the process can be automatically shut down. A gas detector sound an alarm to user in the area where the leak is occurring, by giving them the opportunity to leave. These type of device is important because there are many gases that may be harmful in a life, such as humans or

animals or living things. Gas leak detection is the process of identifying dangerous gas leaks by sensors. These sensors usually employ an audible alarm to alert people when a hazardous gas has been detected. Common sensors include infrared point sensors, ultrasonic sensors, electrochemical gas sensors, and semiconductor sensors. Recently, infrared imaging sensors are come into use. All of these sensors are used for a wide range of applications and they found in industrial plants, refineries, waste-water treatment facilities, vehicles, and homes.



Fig. 4 MQ-6 LPG Gas sensor

RF Transmitter and Receiver-This RF module, as the name specifies, operates at Radio Frequency. The frequency range varies in between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This type of modulation is known as Amplitude Shift Keying (ASK). Transmission through RF is much better than IR (infrared) due to many reasons. Firstly, signals through RF can pass through larger distances making it suitable for long range applications. Second IR mostly operates in line-of-sight mode; Radio Frequency signals can travel even when there is an obstacle between transmitter & receiver. Next, RF transmission is stronger and reliable than the IR transmission. Transmitter receives data serially and transmits it wirelessly through RF by its antenna. The transmission of RF signals occurs at the rate of 1Kbps - 10Kbps. The transmitted data is received by RF receiver operating at the same frequency as that of the transmitter.

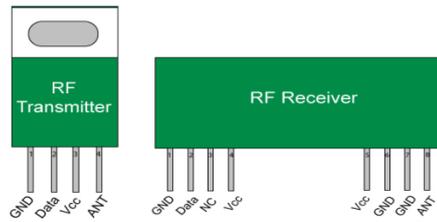


Fig. 5 RF transceiver

Wi-Fi Router: Wireless router is the device that performs the functions of a router and includes the functions of a wireless access point. It is used to provide Internet access or a private computer network. It can be used in a wired LAN (local area network), in a wireless LAN (WLAN), or in a mixed wired and wireless network, depending on the manufacturer and model. Wireless models are the common type of internet router. Basically internet data comes in to the router from the phone and is converted into radio signals. This signal is then catches up by the network card in our computer, Smartphone and translated into internet data again. Wi-Fi routers are comes under wireless broadband packages category, and are important in homes where more devices are connected to the internet at the same time. Provide wireless internet to wireless enabled devices such as computers, laptops, and gaming consoles.

VII. CONCLUSION

In this paper we presented an architecture and implementation of a modular smart home automation system for energy efficient housing that was optimized for low-cost, flexibility of system configuration, and interoperability with other technologies. All described system components were tested in a prototype implementation of the smart home automation system. The experimental tests showed that the proposed architecture and components were well chosen both in terms of achieving the low cost of the overall solution and satisfactory system performance. Beside the basic system core described in this paper, we plan to extend the basic system functionality by providing additional modules and services, such as smart entry control subsystem, human behaviour patterns learning and monitoring, remote access system control, configuring and controlling system configuration over smartphone or tablet etc.

VIII. ACKNOWLEDGMENT

It gives us great pleasure to submit this paper for the project on “**Smart home automation system**” as a part of curriculum. We express our sincere gratitude towards our project guide **Prof. Javed Shaikh** for his valuable guidance. We would

like to thank our Head of Department **Prof. R.M.Thadi** Department of E&TC, for his constant encouragement and support. We also thankful to our Principal **Dr.M.S.Rohokale** and the management for their valuable support. We take this opportunity to thank all of those, who have helped us in various ways, for preparing our project. Last but not least, we are thankful to our college faculty and friends, for their encouragement, inspiration and constant support.

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