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Smart Home using Internet of Things

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Abstract - *Home Automation using IoT can play an vital role in 21st century. One can achieve home automation by simply connecting home appliance electrical devices to the internet or cloud storage. Platforms based on cloud computing help to connect to the things surroundings everyone so that one can find it easy to access anything and everything at any time and place in a user friendly manner using custom defined portals.The reason for this surge demand of network enabled home automation is reaching the zenith in recent days for its simplicity and comparable affordability. Home automation is a topic which gaining popularity day by day, because of large advantages. The proposed system is server independent and uses Internet of things to control human desired appliances starting from industrial machine to consumer goods. The user can also use different devices for controlling by the help of web-browser, smart phone or IR remote module. It helps the user to control various appliances such as light, fan, TV and can take decision based on the feedback of sensors remotely. We have tested our system through conducted experiment on various environmental conditions.*

Key Words: **Arduino Uno Controller, Internet of things (Iot), Esp8266-01, Wi-Fi network, Home automation system.**

1. INTRODUCTION

Complete solution is presented in this paper Internet has become an important part of human's social life and educational life without which they are just helpless. The Internet of things (Iot) devices not only controls but also monitors the electronic, electrical and various mechanical systems which are used in various types of infrastructures. These devices which are connected to the cloud server are controlled by a single user (also known as admin) which are again transmitted or notified to all the authorized user connected to that network Various electronics and electrical devices are connected and controlled remotely through different network infrastructures. Web browser present in laptop or smart phone or any other smart technique through which we can operate switches, simply removes the hassle of manually operating a switch. Now a day's although smart switches are available they proves to be very costly, also for their working we required additional devices such as hub or switch As there is rapid change in wireless technology several connectivity devices are available in the market which solves the purpose of communicating medium with the device and the micro-controller. Starting from Bluetooth to Wi-Fi, from ZigBee to Z-wave and NFC all solve the purpose of communicating medium. RF and ZigBee are used to used in most wireless networks in this project we have taken ESP8266-01 Wi-Fi module which is programmed through Arduino UNO to control various devices.

Thus using the same set of sensors the dual problems of home security and home automation can be solved on a complementary basis. The provision for sending alert messages to concerned security personnel in case of critical situation is also built into the system. The currently built prototype of the system sends alerts to the owner over voice calls using the Internet if any sort of human movement is sensed near the entrance of his house and raises an alarm optionally upon the user's discretion. Wireless Home security and Home automation are the dual aspects of this project. Channel for an example. On the other hand if the owner identifies that the person entering his house is not an intruder but an unexpected guest of his then instead of triggering the security alarm, the user/owner can make arrangements such as opening the door, switching on various appliances inside the house, which are also connected and controlled by the micro-controller in the system to welcome his guest. The same can be done when the user himself enters the room and by virtue of the system he can make arrangements from his doorstep such that as soon as he enters his house he can make himself at full comfort without manually having to switch on the electrical appliances or his favourite T.V.

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

Besides, people are concerning over costs. For this, cost is highly reduced. In home automation system internet access is used to control from far away. Besides, for manual labour engaged to control appliances waste energy in cases. Home automation does that challenging work.

2. RELATED WORK

2.1 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.

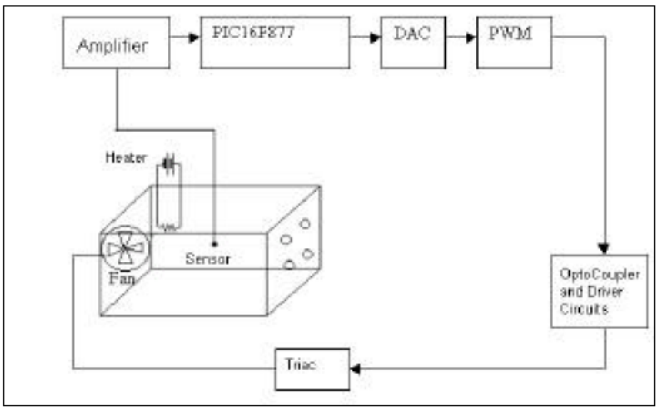

Figure 2.1. Temperature control of the existing system

2.2 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.

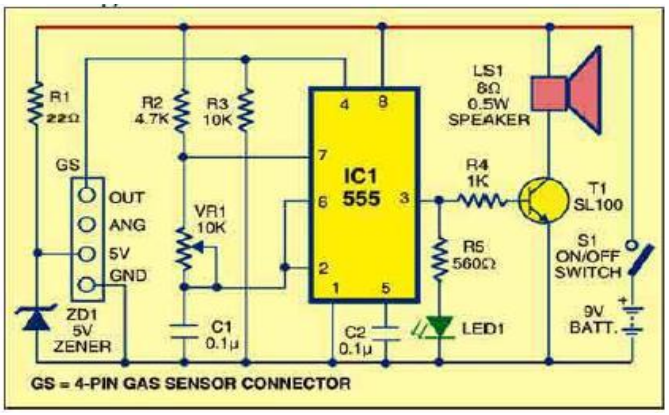

Figure 2.2. Gas leakage system

3. METHODOLOGY

3.1 Block Diagram of Proposed System

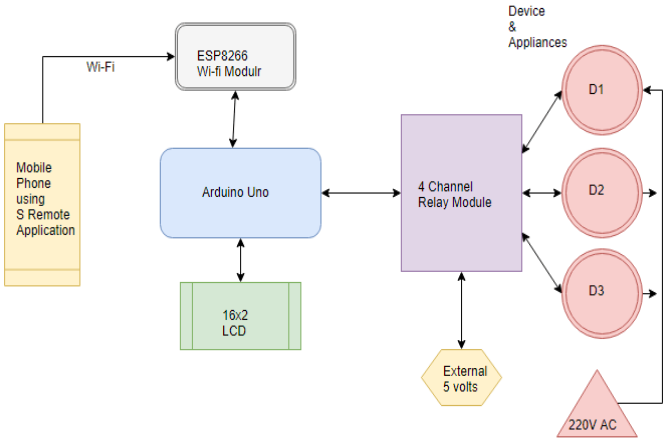

Fig.3.1: Block Diagram of Smart Home Automation System

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.

3.2: System Design

Idea about the operation of home automation system. The four different appliances such as fan, light, room heater and TV are operated remotely using Wi-Fi and through an application installed on android or iPhone. These appliances are connected through Arduino Uno with its digital input/output pins. These devices are connected with local Wi-Fi using a communicating module called esp8266-01.

3.2.1 Arduino UNO

The UNO proves to be Arduino's flagship board for beginner and also for advanced users. The system needs a micro-controller to process data and connects different modules for control. This purpose was solved by Arduino Uno which has ATMEGA328p processor. It has 6 analog input pins and 14 digital input/output pins. It can operate with either 5V from USB plug or 12V from external power supply. In Arduino Uno pin 1 and 0 are used as

3.2.2: 4-Channel Relay

4-Channel relay is connected to the Arduino Uno and its output is connected to the home appliances in a sequence as

(i) Fan

(ii) Light

(iii) Room-heater and

(iv) TV set.

Relay takes low current and voltage and triggers the switch which is connected to a high voltage. 4 input pins of relay are connected to Arduino which takes5V supply from it and can trigger up to 10A, 250V supply (Figure.4).

3.2.3: ESP8266-01

The ESP8266-01 is a highly compact board, used as a peripheral for any board through serial (RX/TX) and also as a standalone board. The board requires 3.3 V and can be programmed with any FTDI operating at 3.3 V. The pins include power (+3.3 V and GROUND), RX / TX, CH_PD to enable the chip and 2 General Purpose Input Output (GPIO) [14].

3.2.4: WIFI

Wi-Fi(wireless fidelity) is a wireless communication technology which is used here to provide a hotspot through which ESP8266-01 module can connect. The router will assign a unique IP address to the module for establishing a connection between smart phone and ESP8266-01.

3.2.5: Gas Sensor

Gas sensor module detects various types of gas in an area. Here the change in value of resistance is used to calculate the gas concentration. Gases like Methane, Propane, i- butane, Alcohol, Smoke, LPG and also hydrogen can be detected using this module. There are 2 output pins (digital one and analog one).

3.2.6: Temperature Sensor

It can measure temperature as well as humidity present in a room. Its range is less than 20 meters. It has a negative temperature coefficient (NTC) element and a humidity-sensitive element which is used to measure temperature between 0-50 degree Celsius.

3.3: Advantages

(i.) Remote control of home functions

(ii.) Save Energy

(iii.) Increased Energy Efficiency

(iv.) Increased Property Value

3.4: Disadvantages

(i.) Dependency on Internet

(ii.) Dependency on Professionals

3.5: Application

(i.) Lighting Control

(ii.) Smart Home Appliances

(iii.) Smart Energy Meters

4. CONCLUSION

In this paper we focused on different process of operating or controlling electrical and electronic appliances remotely with the help of Arduino. This method of controlling such applications is referred to as automation. The experimental setup which we designed has its focal point on controlling different home appliances providing 100% efficiency. Due to advancement in technology, Wi-Fi network is easily available in all places like home, Office Building and Industrial Building so proposed wireless network easily controlled using any Wi-Fi network. The wiring cost is reduced. Since less wiring is required for the switches. This also eliminates power consumption inside the building when the loads were in off conditions. This system is also platform independent allowing any web browser in any platform to connect ESP8266-01.

REFERENCES

[1] M. D. Celebre, A. Z. D. Dubouzet, I. B. A. Medina, A. N. M. Surposa and R. C. Gustilo, Home automation using raspberry Pi through Siri enabled mobile devices, International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management (HNICEM), Cebu City,(2015), 1-6.

[2] K. Venkatesan and Dr. U. Ramachandraiah, Networked Switching and PolymorphingControl of Electrical Loads with Web and Wireless Sensor Network, 2015 International Conference on Robotics, Automation, Control and Embedded Systems (RACE), Chennai, (2015),1-9.

[3] Mandurano, Justin, and Nicholas Haber. House Away: A home management system, IEEE Long Island Systems, Applications and Technology Conference (LISAT), Farmingdale, NY, (2012),1-4.

[4] R. Piyare, and S.R. Lee, Smart home-control and monitoring system using smart phone, The 1st International Conference on Convergence and its Application, 84, (2013) 83-86.

[5] S. Karaca, A. Şişman and İ. Savruk, A low cost smart security and home automation system employing an embedded server and a wireless sensor network, International Conference on Consumer Electronics - Berlin (ICCE-Berlin), Berlin,(2016), 73-77.

[6] Shih-Pang Tseng, Bo-Rong Li, Jun-Long Pan, and Chia-Ju Lin, An Application of Internet of Things with Motion Sensing on Smart House, International Conference on Orange Technologies, Xian, (2014), 65-68.

[7] ShopanDey,Ayon Roy and SandipDas, Home Automation Using Internet of Thing , IRJET, **2(3)** (2016),1965-1970.

[8] T. Thaker, ESP8266 based implementation of wireless sensor network with Linux based web-server, Symposium on Colossal Data Analysis and Networking (CDAN), Indore, (2016), 1-5

[9] VishwatejaMudiam Reddy, NareshVinay, TapanPokharna and Shashank Shiva Kumar Jha, Internet of Things Enabled Smart Switch, Thirteenth International Conference on Wireless and Optical Communications Networks (WOCN), Hyderabad, (2016),1-4

[10] Warsuzarina Mat Jubadi and NormaziahZulkifli, Programmable Infrared Accessory Light Switch, International Conference on Intelligent and Advanced Systems, Kuala Lumpur,(2007), 1130-1134.

[11] Y. P. Zhang, T. Liu, Z. X. Yang, Y. Mou, Y. H. Wei and D. Chen, Design of remote control plug, 2015 IEEE International Conference on Applied Superconductivity and Electromagnetic Devices (ASEMD), Shanghai, (2015), 29-30.

[12] Zhen Bi, Smart home with ZigBee hardware simulation and performance evaluation, International Conference on Mechatronic Sciences, Electric Engineering and Computer (MEC), Shengyang, (2013), 2139-2142.