Home Automation Using Arduino And IoT

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Abstract- *To improve the human living standard , reduces human efforts, energy and for the time saving smart home is the need of the times.The cost of project is low and the system offers a home security using Arduino microcontroller, Wi-Fi.Wi-fi is use foe access and the control appliances using Smart devices(smart phones,i-watch,PC,etc) application.*

The proposed system is being used to control the devices of people's daily needs by using nternet of things. We can use any electrical home devices like light,fan,fridge, tv,etc.for controlling with the help of web-browser, smart devices.

This system helps us to control different electrical devices such as light, fan, detection of gas leakage and vibration in home.

Keywords- Arduino ATmega328, ESP8266-01 vibration sensor, MQ6 gas sensor,light,fan,IOT

I. INTRODUCTION

The project aims at designing an advanced IOT based home automation system using web server and Wi-Fi technology. The devices can be switched ON/OFF using a smart devices. Automation is the need of hour.Wi-Fi is a technology that helps control the equipment of the house. Bluetooth and Zigbee are used to in most wireless networks [1]. In the system we will take ESP8266-01 Wi-Fi module in it we have put programming of Arduino uno to control electrical equipments.

The controlling device for the automation in the project is Arduino UNO. Arduino UNO reads the data,after that it decides the switching action of electrical devices which connected to it through Relays[2]. This proposed system is a combination of Android smart phone and embedded system which include Arduino Uno Board, Wi-Fi module and Relay circuit.[11] In our project , we used a Wi-Fi wireless technology to monitor the device. An android application is installed in a mobile device i.e android smart phone.With the help of this application we can control devices individually. The signal given from our smart devices received by Wi-Fi module through the cloud.

As per instructions given bythe user, the relay circuit switched ON/OFF the particular devices.The purpose of using Wi-Fi wireless technology is it provide a high range an.[3]

II. LITREATURE REVIEW

Through detailed study of "Home Automation Using Internet of Thing" proposed by Shopan Dey, Ayon Roy and Sandip Das,they explains, that they have used Raspberry pi module to connectESP8266-01 module to the internet.

Through this module they are controlling various device through web page and also through android application [1]. K. Venkatesan and Dr. U. Ramachandraiah explains in their paper Zigbee module in Arduino mega through which they are controlling devices. They have used various sensors for various purpose. Also they have provided real time notification, feedback on web-server in which customers can see what is happening in their home [2].

"Programmable Infrared Accessory Light Switch" by Warsuzarina Mat Jubadi and Normaziah Zulkifli explains how TV remote is used to control room light and other appliances. Here IR remote and one IR receiver is used and programmed it stores the frequency of the existing remote and use them directly to control appliances [3].

Twinkle Gondaliya proposed,A Survey on an Efficient IOT Based Smart Home [4] in that an efficient implementation for IoT for monitoring and automation system and it uses the portable devices as a user interface. Portable devices use for communicate with home automation network through an Internet gate, by means of low power communication protocols like zigbee, Wi-Fi etc.

This project aims at controlling home appliances via Smartphone using Wi-Fi as communication protocol and arduino uno. The user here will move directly with the system through a web-based interface over the web whereas home appliances like lights, fan etc. are remotely controlled through easy website.

"Vaibhav4, Vinay Dhakad Kunal1, Dhake Tushar2, Undegaonkar Pooja3, Zope Lodha5" explains "Smart Home Automation using IOT "[5].A System hardware is divided into three parts i.e. PCB, humidity sensor, and Arduino controller.

Relay, LPT port, transistor, diode resister are integrated on PCB. They have connected two devices to the PCB i.e. fan and light. Humidity sensor is connected to Arduino .It will sense humidity and temperature as well.

Arduino and PCB are connected to PC..Arduino and PCB will interact with each other through PC. They have measured temperature and humidity. They have set time by which it continuously senses temperature and humidity. In the screenshot, it continuously senses temperature and humidity after every 5 seconds. ADVANTAGES (a) Adds Safety Through Appliance and Lighting Control (b) Secures Home Through web control Increases Convenience through Temperature Adjustment (c) Save time (d) Save money and increase convenience (e) Allow to appliances control when out of town.

H.Santhi,Gayathri.P,explains in paper [6] that the Home automation or automation of an office is done so with electronics and communication advancement.
Platforms based on cloud computing help to connect to the things surrounding 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 exciting opportunities yet to increase the connectivity and relationship of home devices automation purposes to the internet.

D.Maheshkumar explains in paper [8] about ideas, movements, technical approaches and considerations for strategic planning for the Internet of Things.

It was a simple review of research in IoT models, privacy issues and considerations for businesses to include in their way forward for IoT. Attempts are being made to harness the seismic shift caused by the IoT movement. While unification or standardization is lacking it seems like it may be left to economic competition on what moves forward.
This paper was a very small fraction of what IoT literature provides and was meant to educate individuals as it has done for the author in order to initiate discussions at their organizations. Prof .S A Jain.Stevan Maineka, Pranali Nimgade,explains in paper [9] The Internet of Things (IoT) is an atmosphere in which objects, animals or people are make available with distinct identifiers 'Internet of Things' defines a number of skills and research disciplines that allow the Internet to reach into the real world of physical objects. Technologies like short-range wireless communications, RFID, ad hoc and wireless sensor networks (WSNs) which is the part of Internet of Things (IoT).. This paper describes the concept of WSN, IoT and architecture of Home Automation.
Arun Cyril Jose1 and Reza Malekian2 in paper [10] Various Home Automation Methodologies Analyzed from a Security Standpoint and Challenges in Home Automation Security. Various home automation technologies considered in this work include context-aware home automation systems, central controller-based home automation systems, Bluetooth-based home automation systems, Global System for Mobile communication or mobile-based home automation systems, Short Messaging Service-based home automation systems, General Packet Radio Service-based home automation systems, Dual Tone Multi Frequency-based home automation systems, and Internet-based home automation systems.

III. PROBLEM STATEMENT

When people are pursuing ever-growing high quality of their lives today.This leads to more and more facilities and home appliances include into their building.How to control and manage these versatile facilities and appliances in a house?

When we are outside of the home and gas leakage will happen ,and also whenever earthquake will occur,then what shall we do?

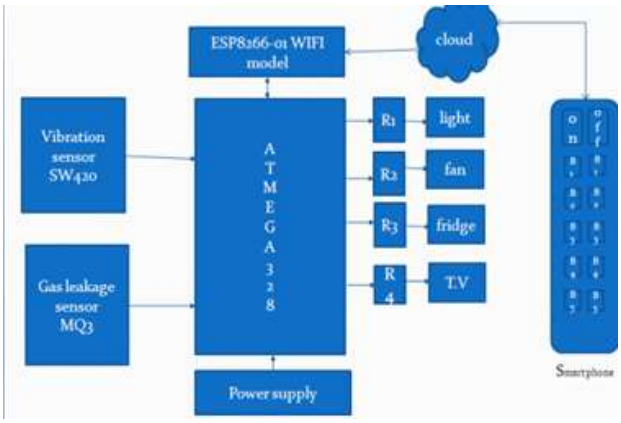
The main aim of this project “automatic home” to minimize the cost & loss electricity and also man power to manually on-off the home appliances.

IV. PROPOSED WORK

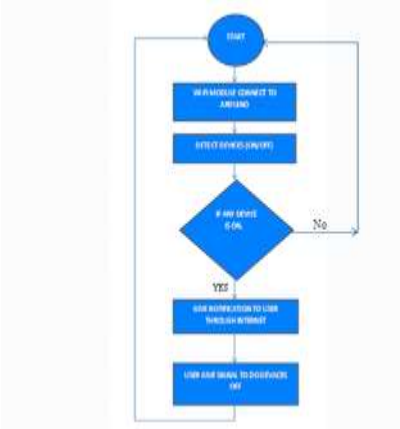
System architecture: This system consists of Arduino controller ATMEGA 328p,powersupply,vibrationsensor,gas leakage sensor,relays,light,fan and smart phone.

The main aim of this project is to build a smart home device which can be used to control the home appliances via internet.

BLOCK DIAGRAM:



FLOW CHART OF WORKING DEVICES:



System working:

vibration sensor and gas leakage sensor connected to the Arduino controller atmega328p and we also used four relays for the light, fan, and by using other two relays we will give OR gate connection to the main switch. When lights, fan and gas is leaked at home, you will get a notification on the smart phone. The device can also connected to an Android App which you can develop on your own using some applications like MIT App inventor etc.

By using this app, we will be able to monitor and control the home appliances from any part of the world with ease. when you get a notification, you can turn off the button in your phone. User give a signal to do devices off. this signal goel to the wifi model through cloud and it will sent to the atmega328p.whenever there is an earthquake, the notification will go on the user's phone, so the main switch will be switched off and short circuits will not happen.

Proposed System Implementation:

1. Start
2. System will be initialized.
3. Initially all control devices will be OFF after power-on.
4. Wi-Fi module will be initialized.
5. Open mobile application on Android smart phone.
6. Establish connection between Wi-Fi module and mobile application on Android Smart phone.
7. Waiting for control command to be received from Android mobile application.
8. Send control command (ON/OFF device) from Android mobile application.
9. Check received control command format.
10. If received command is "ON" then turn ON the particular Device.
11. If received command is "OFF" then turn OFF the particular Device.
12. stop.

ADVANTAGES:

1. Devices can be controlled from long distance.
2. It can be easily situated homes.
3. It can use everyone .only we have knowledge of the text.
4. Format of the text is easy to understand.

DISADVANTAGES:

The system is network dependent. Hence network congestion can reduce the reliability of the system.

V. CONCLUSION

When you are out of the house, you cannot turn off the electrical appliances in the house.Also there is a possibility of fire in the house due to gas leakage and earthquake. So, we are doing "IOT based Home Automation using Arduino Uno" to avoid all this.

Due to this project, when we are out of the house we can turn off electrical appliances in the house. The main switch will be switched off when the gas leakage goes beyond the specified limit, due to the gas sensor. When an earthquake or a big quake occurs, there will be vibration sensor in the house and the main switch will be switched off.

Benefit of this project is, power utilities will not continue unnecessarily. Electricity will be saved. The harm caused by gas leakage can be prevented by the gas sensor. Due to earthquake there will be a short circuit that will be avoided. This project will make people's lifestyle comfortable to some extent.

FUTURE SCOPE

Reducing the time delay to turn on and off of an appliance in the home. Adding speech identification to the system using automatic smart phone detection through Wi-fi such that it will operate the loads automatically when it is in range. Expansion of range of Wi-Fi such that one can operate allowed long distance through smart phone.

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