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Smart Home Automation Using Internet of Things (IoT)

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Abstract: **-- Internet of things is a concept to control objects or things through the internet. When we control every home appliances using the internet then we can say it as IoT based home automation. Home automation is one of the smarter, easier to control and non-human interference technology. With the number of users of internet increases and the speed of response and data transfer increases in the past decade. In this home automation system using a raspberry pi by with help of internet to control home appliances like fans, lights, AC, TVs, refrigerators and to watch live security camera which can also be stored in the cloud system. This system is developed at low cost and can control every appliance in the home. IoT is one of the internet technology growing every day between industries and consumers goods to share information and increases the speed of response0.**

Index Terms: - Internet of things (IoT), Home automation, Raspberry pi, Cloud technology, Relay.

I. INTRODUCTION

A. Overview:

This 21st century became more comfort with automatic controlling the things with a simple click. A smart home automation is nothing but a user allows to control every appliances in home of varying kind.Smart home automation using cloud technology makes everything in the control wherever you are by connecting internet to our controlling module which is a common thing for every user now a days. In physical construction of building, if we install communication system using a wire based between users and appliances will be very high cost. Automation which uses wireless technologies like IR, Zigbee, Wi-Fi, GSM, Bluetooth, etc., for achieving remote operation will reduces the human effort as well as the installation cost and power consumption.

B. Advantages:

In the present scenario wifi is one of the most regular and common network using in every home all over the world. Using this wireless technology we can take several advantages which we cannot achieve with wired technology. Lower cost for installation because of no cabling is necessary. Now internet have the speed of response and data transfer increases which leads to attain the higher speed in controlling the things that we want to control. Using wireless networks, mobile devices like PDAs and Smartphones in the automation system has been possible everywhere and at any time, with help of internet connection throughout the globe.

Last but not least of Global scale in Home Automation Market was valued at $39,607 million in 2016, and is projected to reach at $81,645 million by 2023.

For all these reasons, wireless technology is one of the safest and speed technology that we can implement, which can reduce the human effort as well as interference.

II. LITERATURE REVIEW

Smart home automation using internet is started from the past decade having related work [1] Using low cost Wi-Fi module ESP8266 along with AT mega 328 MCU, user ca remotely operated every appliances in home including doors, lights, fans etc., [2] The interference between electrical appliances and smart phones can deals with protocol, capabilities with raspberry pi, sensors, cameras and home appliances etc., [3] Architecture with embedded IoT technology help especially in cities. These are implemented to make vision of city help of most advanced communication. [4] Review of past smart home research and newly related innovation compared with past and also inform about future smart home automation. [5] IoT as frame work, utilizes by connecting with android devices which can control home essentials and industrial surveillances and more with help of internet at anywhere and anytime around the globe. Taking all in to the aspects, a smart home automation system should consists of both controlling advantages and used as well as security purpose.

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So, implementing both controlling sensors and surveillances camera will give the safer and smarter home automation system based on internet.

Figure 1: Controlling components using smart phone

III. SYSTEM IMPLEMENTATION

A. Proposed Home Automation System:

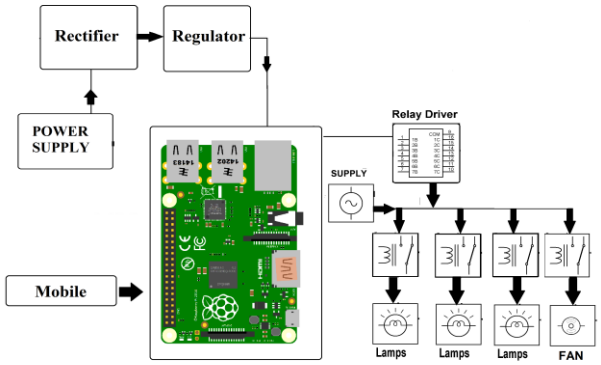

Figure 2: Home Automation System Proposed Scheme

The Home automation system proposed scheme is as shown in figure 1. This model consists 3 lamps and a fan as output connected to the 4-channel relay. Raspberry pi which is the main processor connected with a website which is nothing but internet or wi//fi to receive data from cloud storage. Input will be given by the user and data will transfer to cloud storage and transferred to raspberry pi which will control all the outputs according to the coding we have given. Every input signal will be stored in the cloud storage. In the proposed model the doors, fans, lights etc., in the house is monitored. The operation of control appliances is stored in cloud for analysis. Surveillance is one of the part in project and a live camera can be inbuilt to product at last we can watch surroundings of home in mobile. The lights are turned on/off automatically by detecting the light outside the house. The user monitor the electric appliances through the internet via web server. If the lights or any electrical appliances are left on in hurry can be seen and turned off remotely through simply typing the IP address of the web server.

B. Proposed Home Automation System Functions:

The Home automation system can capable to control the home appliances with help of user interference and monitoring in the proposed system as following:

LED lights - on/off
Fans - on/off
Doors - open/close
Live visual security
On/off of different appliances

C. Cloud storage:

Cloud computing is the delivery of computing services—servers, storage, databases, networking, software, analytics and more—over the Internet. Cloud providers and typically charge for cloud computing services based on usage. SaaS can capable the customers to use any application on demand via any device. A simple example of cloud storage is Gmail, where you can access your stored data from any computer with internet access. Here we are using Gmail for the storage of the data.

D. Implementation setup:

IoT implemented home automation will make it as a smart home to control every appliances using a computer or mobile to make a comfortable life by reducing human effort and electric power saving. The simple setup for the smart home automation depends upon the processor which we are using raspberry pi and relay. Raspberry pi is used as personal desktop reducing overall system and controlling android devices and sensors. Rasbian OS is the software used in raspberry pi written in python which is already installed in raspberry pi.

Figure 3: Raspberry pi 3 Model

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The Arduino relay is a wide range of microcontroller with digital outputs which can control large loads and devices like AC or DC motors, solenoids and light bulbs etc.,

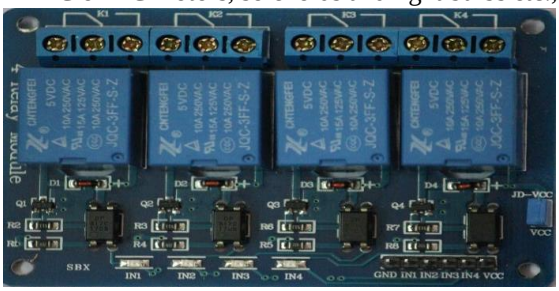

Figure 4: 4 - Channel Relay

The implementation setup with raspberry pi consists of a code which is in html form to control the devices using an android mobile by installing blynk app that can connect with static IP address of raspberry pi and we can save every operation in the blynk server which is free for every user.

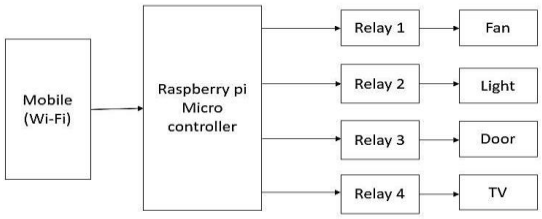

Figure 5: Home automation controlling setup

The simple flow chart of the configuration stage of smart home automation using raspberry pi model is as shown in figure.6

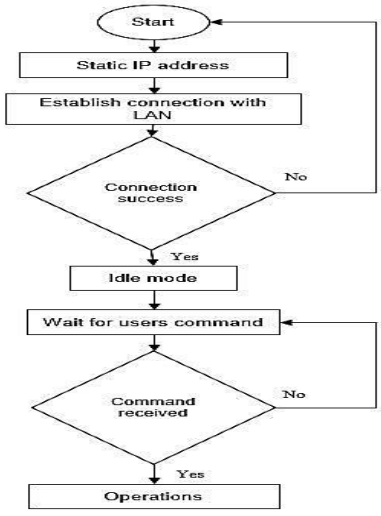

Figure 6: Configuration stage of smart home automation

IV. CONCLUSION

The smart home automation via internet of things has been proving that the satisfactory in work and can control almost every appliances using internet from anywhere which make your home smartly. The designed system will not only control electrical appliances but also helps as surveillance with embedded camera. The 4 channel relay will acts like switch and remotely operates during the command has been initiated by the user. Every operation will be saved in cloud and this will help the user to analyze the various parameters in the home in anytime at anywhere.

Figure 7: Project controlling with single bulb

V. FUTURE SCOPE

Using this home automation system can be expanded to various other option like face detecting and telling the names to the user which are saved and face detecting automatic door open who is familiar and capturing the suspicious person pictures and save in the cloud which reduces the storage of the personal device when compared to CCTV footage. This automation system can integrated at hospitals, industries which are should be more safe and with high technology surveillances.

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