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IOT Home Automation using Bluetooth

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***Abstract:** With the advancement of technology, there has been a rapid development of internet of things and everyday more and more objects are being connected to the internet. Because of this, the quality of our daily life has been improved greatly.[2] This research paper aims to specify the controlling of home appliances and building a smart home system using Bluetooth as a communication protocol. We are proposing a system with some improvement in previously existing system by using Arduino Uno as the Microcontroller. Here, the system receives the command sent over Bluetooth which is connected to microcontroller through an interface. From this we can control and manage home appliances and devices at our need.*

I. INTRODUCTION

This research paper is based on IOT based Home Automation will enable the user to use Home appliances conveniently and efficiently. The modern homes and their appliances are controlled through Bluetooth. The user send commands through input which will be obtained by the Bluetooth module. The Microcontroller has an interface with this module. Wireless Smart Home and Home automation are the dual aspects of this paper. Owner can make arrangements such as switching ON various appliances inside the house, which are connected and controlled by the microcontroller. User will be at full comfort zone as there is no need of manual controlling of appliances; it is like changing to the favorite T.V. channel with the help of TV remote. Thus using the same set of sensors the problems of home security can be solved [3].

The IOT based Home Automation will enable the user to control Appliances and devices conveniently. This paper provides the solution of the problem where the user needs to control the devices physically and due to any issue there maybe delay in switching ON/OFF the devices that causes energy wastage. This system provides a better way to save energy in efficient way with use of latest technology. [1]

II. LITERATURE REVIEW

A. Wi-Fi Based Home Automation system Using Cell Phones

Wi-Fi based home automation system consists of the server, the hardware module, and the software package. Wi-Fi technology is used by server and hardware to communicate with each other. The same technology is used to login to the server. The server is connected to the internet so that remote users can access a compatible web browser. Software is split to server application software, and Arduino part.. The Arduino software is built using C language. The server application software can be accessed from internal network. Server application software maintains the whole home automation system, setup and configuration. [6]

B. Home Automation Using Android ADK

The devices of home are linked to the ADK and the Connection is established between the Android device and ADK. The devices of house are linked to the input/output ports of the board. Arduino has a USB host connection to link with Android based phones. The two important features are: It has audio output that is from the Android device to the component and it also support for the component serves as one or more Human Interface Devices. This paper depends upon Android and Arduino platform including motion sensors for safety systems which will detect an unauthorized action and notice the security system. [6]

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C. GSM Based Home Automation system Using Cell Phones

Because of the mobile phone and GSM technology, the GSM based home automation is beneficial to research. It shows how the home sensors and devices interact with the home network and communicates through GSM and SIM (subscriber identity module). The model use transducer which convert machine function into electrical signals which goes to Arduino. The sensors of system convert the sound, temperature and other factors into voltage. The Arduino examines all signals and convert them into command so that GSM module can interpret it [6].

D. Bluetooth Based Home Automation System Using cell Phones

In Bluetooth based home automation system the home appliances are connected to the Arduino UNO at input output ports using relay. The program of Arduino UNO is based on high level interactive C language .The communication medium is Bluetooth. Password protection is provided so that only authorized user can access. The Bluetooth connection is established between Arduino UNO and phone for wireless communication. [6].

E. Cloud Based Home Automation System

Home Automation uses a gateway to collect data about data from home appliances and then sends it to the cloud-based data server so that it can get stored on Hadoop Distributed File System. This system consists of three important units: the first part is cloud server, second is the interface module which implements the relevant connection to the actuators and sensing devices. And third part is Home Server, which comprises the hardware device. The system is made up of various client modules for various platforms.

1) Cloud server Cloud Server is a central server who is the data respiratory system and brain. The server takes data from the devices and send current status to the mobile device and vice versa.
2) Embedded Program for Hardware Circuit Microcontroller.
3) Internet Client for any desktop or mobile phones.[6]

F. Zig-bee Based Home Automation System Using cell Phones

In Zigbee based home automation system the appliances are connected through ZigBee. The performance is recorded and stored. Here Wi-Fi network is used, which uses the standard wireless ADSL modern router. The network and security parameter are preconfigured. Over Zigbee network, Zigbee controller sent messages to the end. Zigbee communication is helpful to reduce the overall cost. [6]

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G. Home Automation using Radio Frequency Module

The important goal of Home Automation System is to build a system using a RF controlled remote. Today traditional wall switches situated in various parts of the home makes it practical for the end user to go near them to control it. In order to accomplish RF Technology which is convenient, a RF remote is combined to the microcontroller that sends ON/OFF signals to the receiver where devices are connected. By operating the remote switch on the transmitter, devices can be turned ON/OFF globally [6].

H. Raspberry pie Home Automation with Wireless Sensors Using Smart Phone

Home Automation System using Raspberry Pi guarantees to be an efficient project for implementing powerful, and economic smart home. This System is efficient and flexibly interactive. In this we send commands to the Raspberry Pi by using the web server (which receives these input commands from the user and appropriately sends it to the client (Raspberry Pi). In this, we will be using input commands to turn a light ON/OFF. When we give the command to turn ON a light by the server side script, the data and information gets relayed to the Raspberry Pi and its GPIO pin will turns ON a relay. The system can send current updates to the server to detect whether the light is ON/OFF. In this way healthy conversation occurs between server side script and Raspberry Pi [6].

I. One View Snapshot of Different Technologies Used

Serial No.	Types	Communication medium	Monitor	Client Interface	Advantages
1	Wi-Fi based	Wireless LAN	Arduino	Web applications	Cheap, secure, remote controlled
2	ADK based	Micro Web Server	Arduino Sheet	Android App	Feasible, Effective
3	GSM based	SMS	Arduino	Mobile App	Simple
4	Bluetooth based	Bluetooth	Arduino	Python based mobile	Secured, low cost
5	Cloud based	Cloud data server	PCB Circuit	Application Software	Cost efficient, less power consumption
6	Zig Bee based	Zig Bee network	Socket	Personal Computer/Smart phone	Convenient, safe and power saving
7	Radio Frequency based	Remote	8051	RF receiver (HT-12D IC)	Convenient, wireless, efficient
8	Raspberry Pi based	Ethernet port	Raspberry Pi	Web server	Wireless, portable

J. Proposed System

In our system we are using a curtain which will work on the principle of DC motor. An LDR sensor will be placed outside the window which measures the intensity of outside light. The working of room light depends on the light that falls on the LDR. Here we are also using the solar cells which will store the sunlight energy during the day time. When it is night and the environment is dark, the resistance of LDR will be high, Due to this the curtain will roll down and the room light automatically turns ON.

This light will operate on the energy stored in solar cells rather than the electricity of the house. This is the best way of utilizing and saving the energy resources. And when its day time, the resistance will decrease, the curtain slides up and the room light turns OFF. Thus, we can save energy by using the sunlight as the main source of light. [7]

We are also using LM35 sensor which is a temperature detecting tool. Here we control the operation of fan which depends on the output of LM35. If the temperature detected is below a certain threshold then the fan will be automatically turn OFF and vice-versa.

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We can also manually operate the light and fans. This gives a cost effective and simple solution for wireless home automation and smart building systems.

1) Advantages

a) It is low in cost.

b) Easy to handle.

c) Helps handicapped and aged people.

2) Disadvantages

a) It has less range than Wi-fi proposed system.

b) We can't customize as we are using HC-05 module, which previously exists on play store.

K. Future Scope

The home automation market is needed for effective solutions in different technologies such as lighting, safety and security etc. Developed countries such as the U.S., the U.K., France and Germany are also contributing towards the growth of home automation. Geographically, North America led the home automation market now and the region is expected to continue its dominance by 2021. Europe and Asia followed North America in the global home automation market to collectively account for more than forty percent of the revenue share.

With the invention of lot of automation technologies featuring Internet of Things and Artificial Intelligence, home automation has become real. One can control several tasks with just a single command. These technologies can used to build fully functional home automation system and control smart home appliances like lights, thermostats, fans and appliances.

There are several new technologies which can become a part of smart homes in near future. One can build several amazing projects using these concepts. There are several projects already done by various developers and are available on the Internet. We can add new ideas and thus build many projects by discovering new areas of the IOT and make the world a smarter place to live.

L. Comparison Between Proposed and Existing Systems

In our system we are using a previously existing application Bluetooth terminal which can be downloaded from the playstore. It consists of HC-05 Bluetooth module is use which itself has two things Bluetooth serial interface module and a Bluetooth adaptor. Generally people use HC-06 Bluetooth classic module for basic Bluetooth communication. The HC-06 can only act as a slave and accepts connection from another device which is the host. The HC-05 on the other hand can be configuring ed to work as both master and slave .HC-06 does not have a button while HC-05 has a small button.

III. CONCLUSION

As the home automation is taking off, the prices are falling for the system and also the general people are coming to know about the system .With home automation we are moving to the smart cities which is taking Internet Of Things to a whole new level. This system is not only convenient to use but it is also making our lives easier. Even if home automation is only a part of our life it will transform a lot in the coming years.

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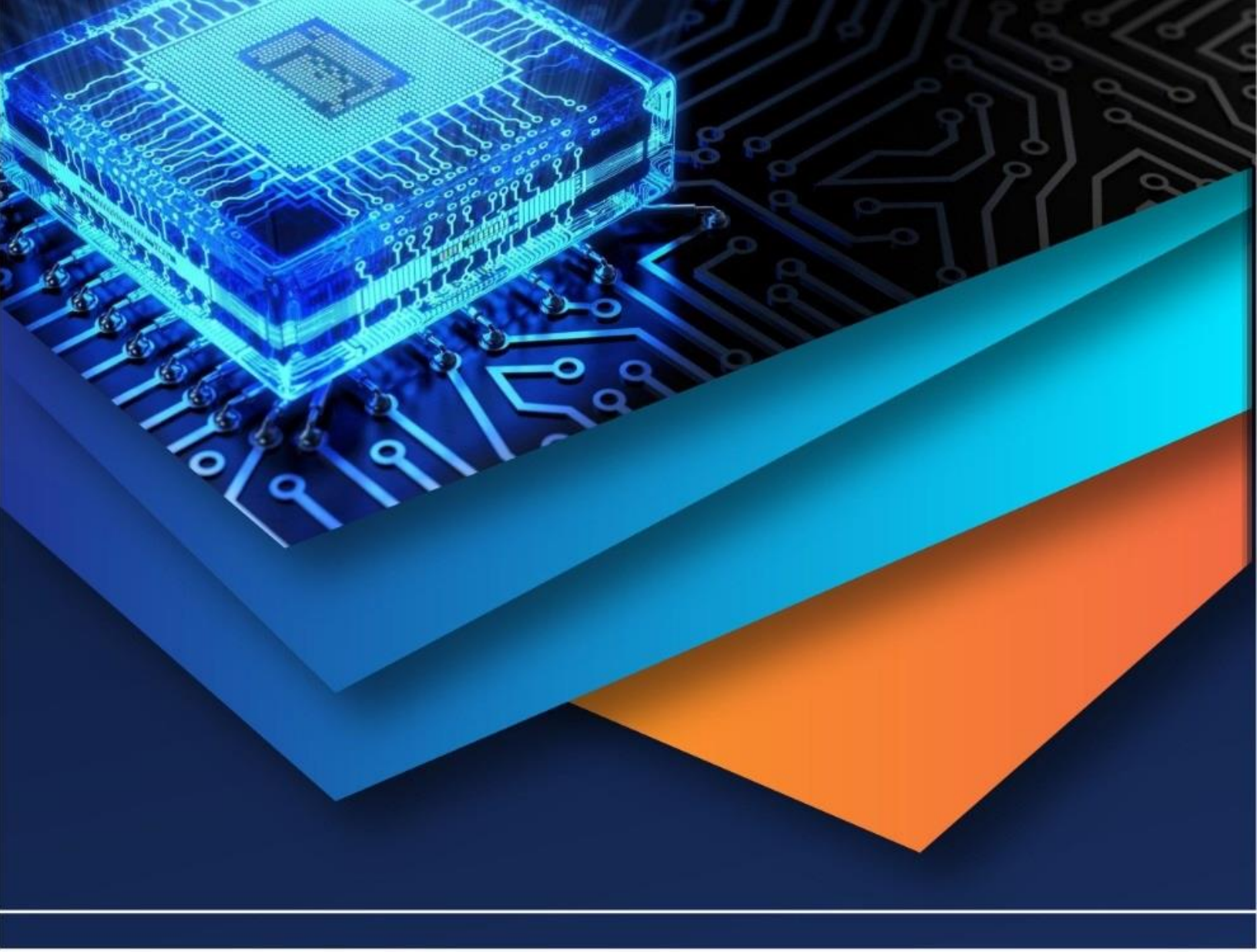

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