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Home Automation using Bluetooth and IOT Modules

[1] Dr. Manoj Priyatham M, [2] Madhu.J,
[1][2] Department of Electronics and Communication, R R Institute of Technology , Chikkabanavara, Bangalore.

***Abstract* - The concept of home automation has been around since the late 1970s. As time changes the increase in consumption of energy and population, there is a grave need to conserve energy in every way possible. The inability to access and control the appliances from remote locations is one of the major reasons for energy loss. The advancement of technology and services, people's expectations of what a home should do or how the services should be provided and accessed at home has changed a lot. IOT is the latest and emerging internet technology. This paper presents the Home Automated system (HAS) using Bluetooth as well as Internet based HAS. The main idea presented here is to control the home functions through the Bluetooth. Bluetooth looks like an attractive communication technology for creating smart homes. It is cheap, easy, and quick to set up. People are already familiar with the technology. when the user is at home and there is no need of internet here, so the data charges will be reduced. And another part is to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home.**

Key words: Bluetooth , Home Automated System (HAS) , Internet Of Things (IOT)

I. INTRODUCTION

A. OVERVIEW

Nowadays, the use of smart-phones and tablets are rising very high. As people want more and more comfort in their life, they fall for new technology which mainly includes Home Automated System (HAS). There are many HAS are there in the market as the requirement of the user, but for all that there will be more improved version that satisfies the user. In one hand the control of the functions of the house via Internet is more popular and easy to use. On the other hand, the use of Bluetooth technology to directly control without any internet charges and avoid delay due to the speed of Internet or other interruptions. home devices are equipped with Bluetooth communication adapters, so they can communicate with the host controller phone via Bluetooth. Since there is a provision of advanced version of Bluetooth, Bluetooth Low Energy (BTLE) which will operate in low energy and is able to overcome the problem of high energy consumption.

II. EASE OF USE

A. **Multiple Operating systems:** This HAS can be controlled using either Bluetooth or Internet as we required.

B. **Easy To Operate:** When the user is at home, there will be no need of control the things over the internet and no need of connecting it to wifi.

C. **Reduces The Data Charges:** As the user will be in the range of Bluetooth(100m), he/she can control over the Bluetooth, which will reduce the Internet charges.

D. **Decrease In Delay Time:** The delay which is occurring due to low Internet speed will not be caused as there is use of Bluetooth rather than over Internet.

E. **Overcome Of Network Failures:** As there is any technical failures will occur in wireless signal communication via internet, it should not affect the user to operate Home functions.

F. **Integration of mobile devices:** With wireless networks, associating mobile devices such as PDAs and Smart-phones with the automation system becomes possible everywhere and at any time, as a device's exact physical location is no longer crucial for a connection.(as long as the device is in reach of the network).

III. SYSTEM ANALYSIS

A. Problem Definition

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The main objectives of this research are the implementation of a home automation system using Bluetooth and IOT capable of controlling and automating most home appliances through an easy to manage web interface and an Android application for Bluetooth. The proposed system is flexible operating on different user ends (Internet control and Bluetooth control). The automated domestic IOT-based systems available now are very popular because of the smart and easy controls but the drawback is that when the user is at home he must also use the Internet to control small things like the fan Or lights. One of the main goals of improved technologies is to save energy, but the power used in transmitting signals to control over the Internet (when the user is at home) will waste unnecessary power and Loads of data transmission.

B. Proposed System Features:

The system proposed in this article is a distributed home automation system, consisting of servers, sensors. The server monitors and controls the various sensors, and can be easily configured to handle more hardware interface module (sensors). The automation system can be accessed from the web browser of any local computer in the same local network using the server IP or remotely from any PC or mobile handset connected to Internet with a suitable web browser via server IP (Internet IP). And the Bluetooth system using a simple Android application, which you can use to control some devices with click or voice commands. Here, the commands are sent via Bluetooth to Arduino Uno. Thus, it allows users to operate easily at home. The power used in transmitting signals to control on the internet when the user is at home will also be reduced.

IV. SYSTEM DESIGN AND IMPLEMENTATION

A. Proposed System:

The idea of this project was developed after studying the technique involved in controlling the home automation system using the IOT aid is already an existing document. In the sense that the user should use the Internet to turn on the fan or light, even the user is at home too. So this should be overcome by using Bluetooth when the user is at home.

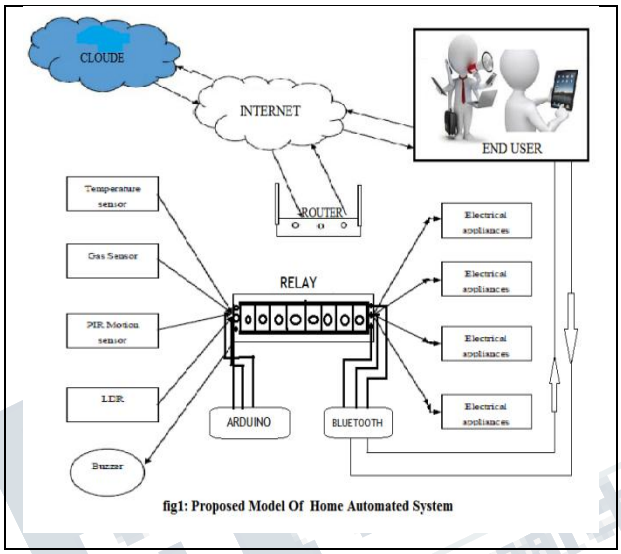

fig1: Proposed Model Of Home Automated System

The proposed Home automated model is shown in Figure-1 given above. The user interface is connected to the database through a web server. The database contains details of all household devices and their current status. A user accessing your home remotely can view device status information from the database through the web server. The PC manages all operations and communications in the home network. The number of channels depends on the number of apparatuses in which the user wants to control. This model consists of different sensors such as temperature, gas, and LDR movement. When the system is connected via the Internet, the parameter reading starts. The sensor data are sent to the web server and stored in the cloud. Data can be analyzed anywhere at any time. In the proposed model temperature, gas leaks, the movement in the house is monitored. The user can also control appliances via the Internet through the web server. If the lights or appliances are left in hurry you can see and off remotely by simply typing the IP address of the web server.

A **relay** is an electromagnetic switch operated by a relatively small electric current that can enable or disable a much larger electrical current. The heart of a relay is an electromagnet (a coil of wire that becomes a temporary

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magnet when electricity flows through it). You can think of a relay as a kind of electric lever: Start with a small stream and ("levers") lights up another device with a much larger stream. Why is that useful? As the name suggests, many sensors are very sensitive pieces of electronic equipment and produce only small electrical currents. But often they need them to drive larger pieces of devices using larger currents. Relays close the gap, making it possible for small currents that trigger the largest. That means the relays can work either as switches (switch things on and off) or amplifiers (conversion of small currents in the larger).

The relay module and Bluetooth module can be, in turn, feeds a power source Arduino-Uno board used in Bluetooth. Bluetooth antenna in our module collects packets sent from the cell phone. These packets containing commands state apparatus. Different household appliances are connected to the digital output ports of Arduino BT through relays to provide sufficiently high current and voltage compatibility.

B. System Functions:

The proposed Home Automated system is able to monitor and control the following sensors/ devices/ appliances

- Fire and smoke alarm.
- Motion detector.
- Temperature and humidity sensor.
- Lights and fans.
- Switching on / off different devices.

C. Software design

Front End Design: HTML is a format that tells a computer how to view a Web page. The documents themselves are simple text files with special tags or codes that a Web browser uses to interpret and display information on your computer screen. HTML means Hyper Text Markup Language; An HTML file is a text file containing small markup tags. Markup tags tell the Web browser how to display the page. An HTML file must have an htm or html file extension.

The flowchart of the software is given in figure-2. When running the program, it first checks if Bluetooth is already activated on the phone. If Bluetooth is enabled, the discovery process for the device and the service will be performed. The software will check if there are already predefined devices stored in the phone memory.

If they exist, they will be listed down so that the user chooses one. The program then checks if the selected device is in range. It will then check if the device is a Bluetooth transceiver (Arduino BT card).

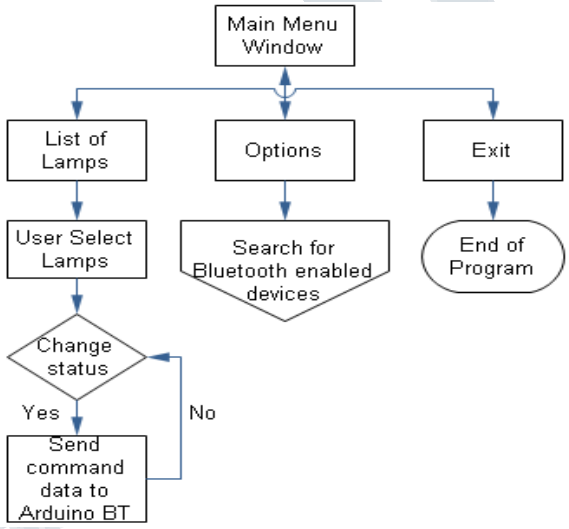

Fig2: Flowchart

Now if there are no devices stored in memory, the program will search for Bluetooth-enabled devices within the area. Once discovered, these devices will be displayed on the screen and also stored in memory.

D. CLOUDE STORAGE:

Cloud computing is a type of Internet-based computing that provides shared resources computer processing and data to computers and other devices on demand. It is a model that allows ubiquitous, on-demand access to a shared pool of configurable computing resources (e.g., computer networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal effort to quickly

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run together. Cloud computing and storage solutions provide users and companies with different capacities to store and process their data, either privately owned or centers of third-party data that may be located far from the ease of use that are in the distance from across a city for everyone. Cloud computing is based on the distribution of resources to achieve consistency and economies of scale, similar to a utility (like the electricity grid) through a grid.

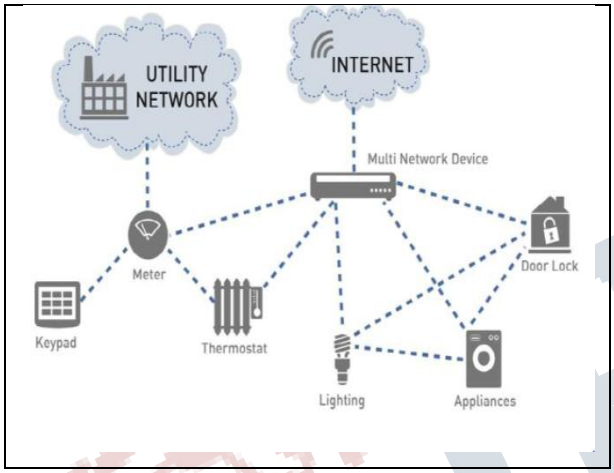

fig3: Home Appliances Connected To Internet

CONCLUSION:

The above work enable users to control devices using their pre-existing devices like Smartphone or home computer. The interfaces are intuitive and easy to use and provide a more accessible user interface, then those are found at home. It helps the user to analyze Status of different parameters at any time anywhere. And when the user without an internet connection is at home, devices can be controlled by Bluetooth. The system is designed in a user-friendly interface Provides simple controls for easy access to the interface on the window and Android. Finally, the proposed system is better than scalability and the flexibility perspective of viewing commercially available Home automation systems.

FUTURE WORK:

As this is a new field of investigation, the results of the project may be analyzed further. The system can be extended to include various other options that might include a home security feature. Since there is a serious security problem in the Bluetooth module and the communication range is also not much for some households, some of the other modules can also be used there. The document encourages researchers to continue to apply reference. The next level that works for HAS as security, flexible and economical.

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BIOGRAPHY:

Madhu.J pursuing B.Tech in Electronics and Communication Engineering from RR Institute of Technology, Bengaluru-560090