Home Automation Using Bluetooth

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ABSTRACT

This paper reviews basically about Bluetooth based home automation system. It is controlled by PIC microcontroller. Home automation can be defined as the ability to perform tasks *automatically and monitor or change status remotely*. These include tasks such as turning off lights in the room, locking doors via smartphone, automate air condition systems and appliances which help in the kitchen. Now a days several wireless devices are available such as Bluetooth, Zigbee and GSM. Since Bluetooth is low in cost than the other two and hence is used more. In this paper we have described the methods of automating different home appliances using Bluetooth and pic microcontroller. Different sensors are involved in this system to advance and make it smarter. Sensors such as temperature sensor, liquid sensors, humidity sensor etc. can be used.

Keywords :- Bluetooth, Android Smartphone, Pic Microcontroller, Home Automation ,Wireless Communication.

I. INTRODUCTION

There is increasing demands in smart home in the rapidly growing cities. In these smart systems devices can be easily controlled through a Smartphone. These smart home systems can be used for simple or difficult tasks by integrating devices and gadgets inside and outside of home.

Home automation can be implemented by two ways i.e wired and wireless network. Wired network HAS(home automation system) is traditional way of home wiring system. In this there is electrical wiring are present between switch and electrical appliances. Where in wireless network the home appliances were physically connected to the controller via relays. The Android phone sends a signal to the controller. The signal received was processed for controlling the home appliance accordingly. At the same time, the controller sends the status (ON/OFF) of the home appliance to the Android phone. The Android application was developed in Java programming using Eclipse IDE with Android platform. This automation comes into the picture.

The wired HAS has its own disadvantages it is unsuccessful in large homes and areas as the long stretches wires weaken the signal so phase couplers are required to maintain strong transmission and increases the cost of system.

RF(radio frequency) signal are being used in wireless HAS. This type of system is very useful large buildings and businesses. This system is typically messed type of network. These are the various modules in market which facilitates communication between two devices.

a) Bluetooth Modules: The operating frequency for Bluetooth is between 2400 and 2483.5 MHz, or 2402

and 2480 MHz including guard bands 2 MHz wide at the bottom end and 3.5 MHz wide at the top. They usually range from 0-100 meters.

 b) XBee Modules: Xbee modules have different operating frequencies and range depending upon the series being chosen. It varies from 0 to 100 km.

c) GSM: GSM have operating frequency in the range of 380.2-1989 MHz.

II. RELATED WORK

[1]. Optimization of Home automation System: This paper aims at designing and implementing advance development of embedded system to get easy excess control of any device using phone Bluetooth only. Nowadays human life is so busy that they have no time to look into small things like switching off lights, fans, sprinkles of garden, Air conditioners, heaters etc. Which cause lots of problems like wastage of energy, water and many other resources. Also manual system of switching gets eliminated.

The automation system can be controlled by any smartphone.   The automation system connects through Bluetooth to the smartphone. Commands of Switching the device ON/OFF can be given from the phone. Hence wireless communication can be established in between the Phone and circuit. And one can operate it sitting anywhere within the Range. When a command is send through the device via Bluetooth the feedback circuit detects the current to give an output signal. It then turns on the LED on the switching circuitry which indicates that the device is Switched on. If this does not happen then we can say that there is failure.

[2]. Efficient Control algorithm and flexibility of new devices: HAS uses Bluetooth of a smartphone so one can operate the devices at anytime he wants without moving from the place. This ensures energy of the devices is beings saved. This allows high tech functionality and luxury. As technology moves forward more easier ways can be developed. HAS tend to be flexible for accommodation of new devices. There is always an upgradation in devices so it is easier to replace old ones with the latest devices in HAS.

[3]. Maximizing Home Security: Home automation system can connect to Motion sensors, Security Alarm sensor or Surveillance cameras, Door locks, and other security means which you can activate from your Smartphone. It also provide security alerts on the device.

III. METHODOLOGY

The home automation circuit consists of PIC 16F876A Microcontroller, Bluetooth receiver HC-05 and a 6-channel relay board. Bluetooth has a range of 0-100 meters, so that you can switch ON and OFF any electronic appliance within the range. The system using a Smartphone which sends input signal to the circuit. PIC microcontroller is used   because it provides an effective GUI(Graphical User Interface)
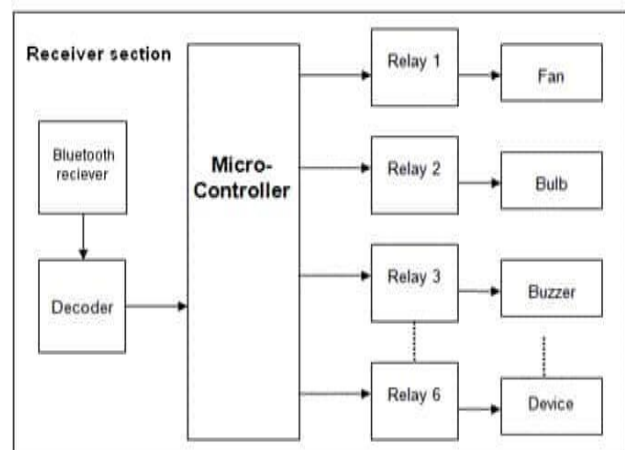
This system is beneficial in case of domestic application as well as industrial applications too. Smartphones or Tabs having an ANDROID Operating System can be used. This Sends the signal to the circuit via Bluetooth.

a) Power Supply: Power supply of the system has a step down transformer of 230/12V which steps down the voltage. A bridge rectifier is used to convert the AC power supply to DC. The

capacitive filter removes the ripples and IC7805 regulates the voltage to +5V.

b) Bluetooth Receiver: Bluetooth module HC-05 has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. It is IEEE 802.15.1 standardized protocol, through which one can build wireless network. It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air. To communicate with the other devices Serial communication is used by this module.

c) PIC Microcontroller: The PIC 16F72 microcontroller contains UART driver which is used to connect the hardware with the laptop. To offload the I/O tasks from CPU, PIC 16F72 is used. PIC microcontrollers are very popular due to their ease of programming, wide availability, easy to interfacing with other peripherals, low cost, large user base and serial programming capability (reprogramming with flash memory), etc. The main features of PIC microcontrollers are RAM, flash memory, Timers/Counters, EEPROM, I/O Ports, USART, CCP (Capture/Compare/PWM module), SSP, Comparator, ADC (analog to digital converter), PSP(parallel slave port), LCD and ICSP (in circuit serial programming).

d) Devices: One can use devices like Fan, Bulb, Buzzers, TV, sprinklers in the garden, Motors and any other type of electronic devices to be controlled by this Automation System.

e) Relays: Relays are a kind of switch that aims at closing and opening the circuits. It controls the Power(ON/OFF) of the circuit. This device can make or break contact with help of a signal without any human command. It is mainly used to control a high powered circuit using a low power signal. Mostly a DC signal is used to control circuit which is driven by high voltage like underlined controlling AC home appliances with DC signals from microcontrollers.

f) Android device: Any android Smartphone or Tab can be used for Home automation system.

IV. CONCLUSION

The design and working of Home automation System is discussed in this paper. This system can be easily implemented because of its wireless technology. With this System one can use the Bluetooth of his smartphone which is connected to the circuit. PIC microcontroller is programmed to support this system. The home automation System using Bluetooth has experimentally proven to run efficiently by connecting simple appliances to it and the appliances were successfully controlled by the device. The Bluetooth client was successfully tested on phones thus providing its portability and a wide compatibility. The Range of Smart products is continuously growing and this automation system can easily implement the newly arrived devices. Also this HAS has capabilities of being further evolved by the technology. Evolution in this system can be made by using Wi-Fi This system can make life easier for Physically challenged and Aged Generation who face challenges for moving from once place to other. Also this system is low in cost and secured. Automation has made life simpler and smarter. With this system one can Save energy, time as well as money and great convenience is provided to the user. Since this system is flexible and can be customized as per user needs it will have a great demand in upcoming years.

V. FUTURE SCOPE

This project can be further developed by integrating it with the internet to monitor home while sitting in a remote area. By doing this, one can keep an eye on his home through the internet connected to user's mobile or Laptop. The Bluetooth client was successfully tested on phones thus providing its portability and a wide compatibility. Apart from Wi-Fi, Bluetooth protocols there are zig-bee and z-wave are available in the market. Both are wireless protocols which use

mesh network to communicate. Each of these protocols should have a set of products that work with its technology. Also it can be further enhanced by using GSM models. That is a SMS can be sent or received as an alert. Also notifications Via Gmail can be given. As an topic of security we can also use temperature Sensors, Gas sensors with the circuit which can alert the user through IoT. Over use of electronics which is a main problem in this generation can be solved by giving an alert to the user. A website or an Application can be developed to give the command to the receiver. Also one can further try to get security of the house in his hands. One can also connect those devices to Alexa and google assistants further.

VI. REFERENCES

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