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WIRELESS AUTOMATION SYSTEM USING BLUETOOTH TECHNOLOGY

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ABSTRACT

Internet of Things (IOT) is an emerging technology using for industrial, domestic and wireless applications. This paper reviews about the self-control mechanism of the domestic devices using Arduino and Bluetooth module. Further, there is a framework which describes about the interconnecting mechanism of various devices for monitoring purpose.

Keywords : Arduino, Bluetooth Module

I. INTRODUCTION

As an emerging technology, the Internet of Things (IoT) is expected to offer promising solutions to transform the operation and role of many existing industrial systems such as transportation systems and manufacturing systems. It is an innovative and easy communicative platform for the variety of devices like sensors, microcontrollers, displays, vehicles and home automation devices etc. The IoT is considered as the future evaluation of the Internet that realizes machine-to-machine (M2M) learning. The basic idea of IoT is to allow autonomous and secure connection and exchange of data between real world devices and applications. The IoT links real life and physical activities with the virtual world.

Surprisingly the application of IOT continues in all domains such as Agriculture, Automation, Industries, Manufacturing, Home appliances, Health care, Security, Surveillance, Transportation etc. and it highly changes the normal world into a SMART world by using these technologies. This paper focuses on the communication establishment between Arduino board and Bluetooth module and its working on the home control system devices. Bluetooth is a wireless technology standard has the ability to share information or data over short distances using short wavelength UHF radio waves ranging from 2.4 to 2.485 GHz within a physical range of 10m to 100m from mobile device

and various building personal area networks. It can connect several devices and it overcomes the synchronization problem which is faced by the network. In this paper, we presented a part of smart technology which using the Bluetooth standard in a mobile device which is more easy, affordable and efficient to use.

According to the research, Smart phone can provide computer mobility, ubiquitous data access, and pervasive intelligence for each and every person day to day lives. It was used for almost every aspect of business processes, working places and nowadays for security purpose.

With this never ending technology, Smart phone usually support one or more short range wireless technologies such as Bluetooth making it possible to transfer data via these wireless connections. The use of Bluetooth technology in a smart phone today is not just limited for the transfer of data and files only also it uses can be elaborated to application of smart living makes us aware and helps us out in the emergency situations. In recent years, the Bluetooth standard prototype includes the integrating design of automation and sensor control of various real and virtual objects at a same time.

II. SYSTEM DESIGN

The design consists of two main parts hardware and software. The hardware design consists of various parts such as,

- Arduino Uno
- Bluetooth module
- Android mobile phone
- LED
- Power supply
- Relay circuit

Software part consist of

- Arduino Integrated Development Environment (IDE)
- Bluetooth terminal smart phone application

These devices can be used for wireless communication between smart phone and Arduino board. Fig. 1 illustrates block diagram of proposed Smart Switch automation system. The block diagram in Fig-1 explains about the overall system. The design establishes the communication between Arduino board and

android mobile phone using Bluetooth module (HC-05 or HC06). This system has input from android Smartphone, the overall system is controlled automatically and the output connected to the relay which can be easily communicates with the various peripheral devices or household appliances. In this paper, the automation system consists of two main hardware components: the smart phone and the Arduino BT board. The script which can be uploaded to the arduino board enables the BT HC-05 or HC-06 to access the home appliances and also the control commands for the appliances and it sets up communication protocol between the two or more devices which allows controlling the behaviour of the Arduino BT board.

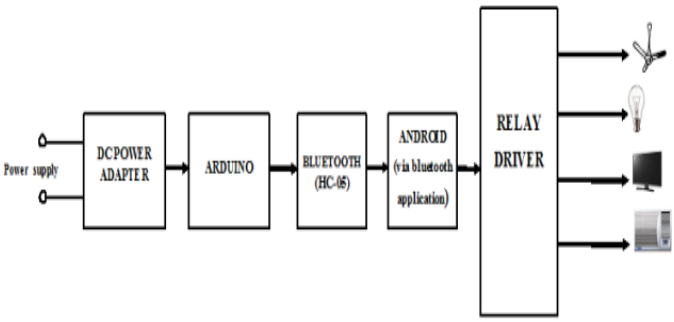

Fig 1: Block diagram of Smart Switch using Arduino

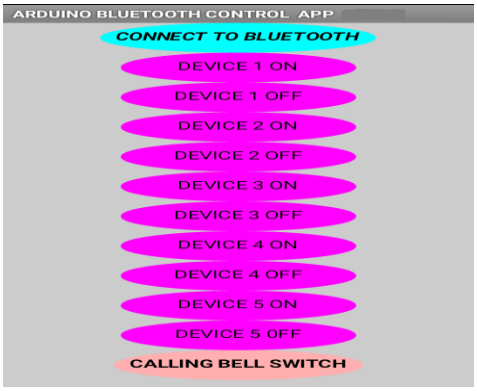

Fig 2 : Arduino Bluetooth Control Application

Arduino program is developed by free software integrated development environment (IDE) issued by Arduino web. There are three steps should be done. First is compiling, second is to upload the machine code(script written in Arduino Version 1.8.3), final step is to search Bluetooth device then connect it with the mobile application. For test purposes, the LED is connected for indication to know about the device actual status. The LED can be controlled to be on or off. Here we developed new mobile application which creates the interface between Arduino and the home appliances.

The communication between Arduino and HC-05 Bluetooth module can be established by the Serial port (UART or USTART) inbuilt in Arduino board which used to interact with computer or other devices. Now, the written arduino program sketch uploaded which sends the status messages to confirm the transfer of data through digital streams 0's or 1's. The relay driver circuit can be used to control two or more devices at a time along with the Arduino and Bluetooth module. The most important feature of this

proposed system is that Arduino Bluetooth Control Application developed by cloud based tool MIT APP Inventor which can be shown in the Fig 2. It enables us to change or edit the device name independently. An additional feature TIMER was included in the proposed system which functions ON/OFF at a particular time period should be given already.

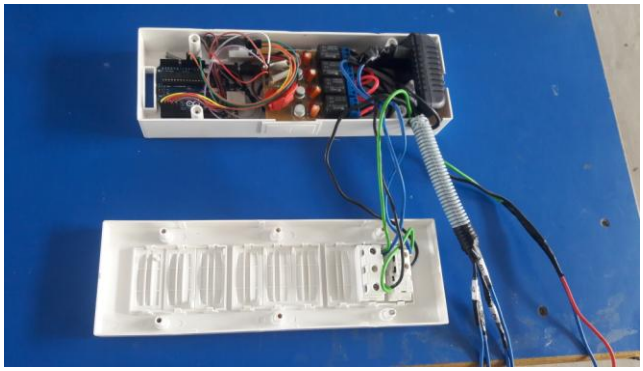

Fig 3 : Wireless Automation System using IOT

III. CONCLUSION & FUTURE WORK

In this paper we have introduced wireless automation system using Arduino based Bluetooth technology. By using this, a more flexible and reliable control to any number of devices was achieved. We have tested our system, with nearly 4 devices and obtained more satisfactory results. The timers used in this system provides flexibility to set time for the device to ON/OFF automatically without Manual control.

In future, we have planned to extend the system, using Wi-Fi and Cloud technology concepts for automation, agriculture and various fields. By doing so, we are able to control our devices from any part of the world irrespective of time and distance.

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