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Smart Fix Home Automation Using Internet of Things

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Abstract: *We are in the age of rapid technology change, where working on new technology is booming to create new things to easier the living style of human beings. This idea re present to design and implement a minimum cost and a highly secure home automation system which are controlled by smart phones. The whole system is based on Arduino Uno board connected with relay to access and control the home automated appliances with the help of android Smart phone. The communication medium between hardware and software is done using the low cost Bluetooth module i.e. wireless system implementation is going to be done. This system is design to provide low cost and easy to implement home automation system to control different electrical appliances. Each system is secure with the unique security feature of Bluetooth pairing technique i.e. based on MAC address to provide security feature during the connectivity.*
Keywords: *Arduino Uno, Smart phone, Android IDE, Bluetooth, Arduino BT.*

I. Introduction

Internet of Things (IOTs) are the trending concepts in the field of technology, working on different module to connect hardware with software is the integral part of Internet of Things. Wireless is the next concept in this connecting world, communication medium without physical connectivity is considered as the best way to communicate faster than physical old communication mediums. While talking about home automation system, Bluetooth technology is considered as safe and easy to implementation in the connecting the devices to the Smartphone, Bluetooth feature is available in every devices.

Today, Bluetooth technology is widely used in home automation system. Operating at a globally available frequency of 2.4GHz, unlicensed, this Bluetooth device can link digital devices from 10 meters to 100 meters, the speed of communication is upto 3Mbps which depends on the network class. We can use Bluetooth technology for design this home automation system [1]. This system involves controlling the high voltage devices with using relay module so it must be feasible and safe in terms of using high voltage to control this module.

When we are designing a home automation system then there are some issues involved. The new devices can be easily integrated into this system because system is scalable. This system provides a user friendly environment on the host side, the process of device configuration, monitoring and controlling is very easy. If any problems are raised in the system which is find out by the some diagnostic services. The overall performance of the system is very fast and cost effective for the application of proposed home automation system [5].

An architecture for home automation system is proposed by Neng [2, a dedicated network is used for proposed system, that shows the how to we solve the problems at any stage of software in home automation. we represent a telephone network and PIC based remote control systemwith the help of pin check algorithm, which algorithm is designed by Yavuz and Hasan [3].

In this proposed work we design a Android phone based, very low cost, security enabled automation system which used in homes. Arduino BT board is used to connect the appliance at home. The communication between the mobile phones and the Arduino BT board is provides by the wireless technology. We can connect more devices in this system with some changes in architecture. Since Android IDE is used for the development of applications, it provides the portability environment and run on any Android OS platform. The Figure 1 represents the overall connection architecture of this proposed model. This paper is defined as below.

In the first part the hardware implementations and general design of the system is described. In the next part we describe the software development process of the system.

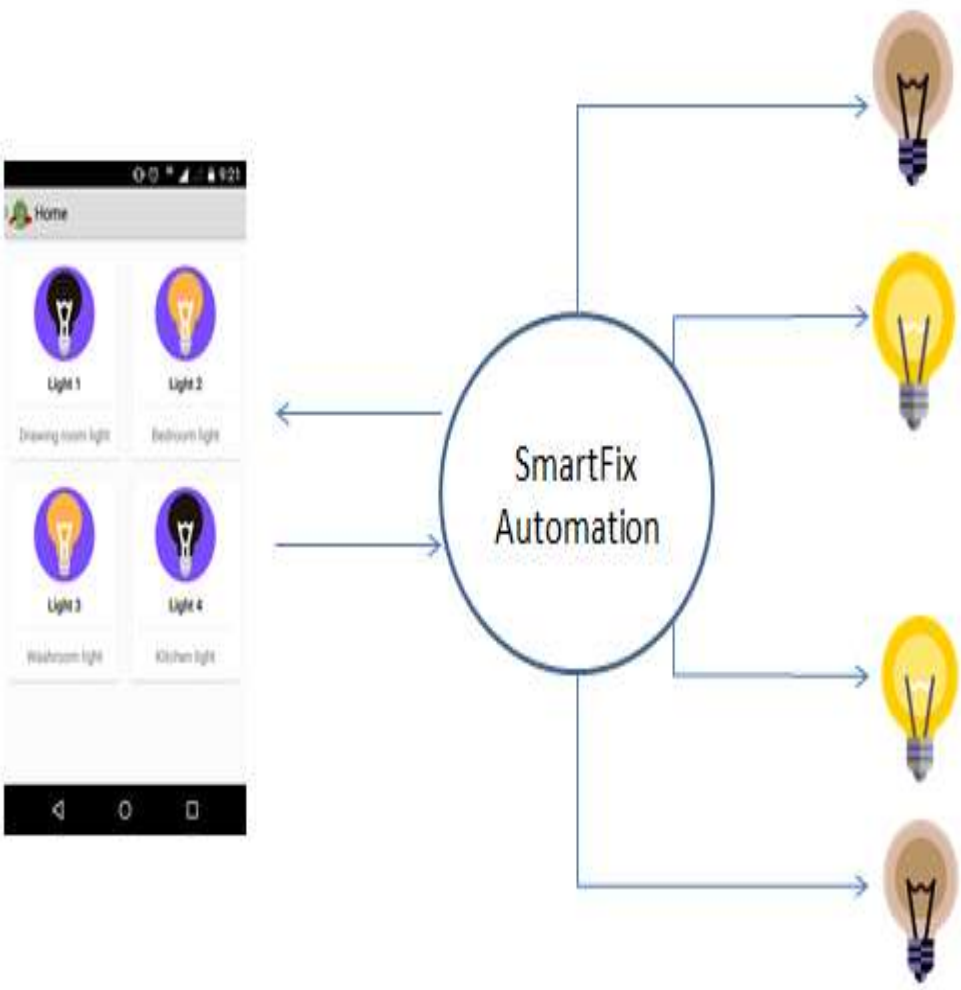

Figure 1: The Architecture of SmartFix Home Automation System

II. Methodology And Implementation

There are three main hardware components are used to design a SmartFix home automation system such as the Arduino Uno Board, HC-05 Bluetooth module and relay module. The Smartphone phone application is developed it is based on Android operating system which to access the home applications and control on the system by user. The communications of the application is performed by the hardware and setup an ad-hoc communication routing protocol between the two or more devices, which allows for controlling the nature of the Arduino UNO. An 8-bit microcontroller board based on the ATmega328P and the HC-05 Bluetooth module is used in SmartFix Home Automation system. This supports only serial communication over the Bluetooth, which is wirelessly. The architecture of the hardware board that consist 23 digital I/O ports, a flash memory of 32kb, 14 input and output pins, pulse width modulator are used for this task. The Arduino IDE and high-level interactive C language are used for the programming and then connect the SmartFix Home Automation module and USB. The Bluetooth antenna is used for picks up the packet string sent from the Smart phone. The digital output ports are used for the connection of the Arduino Uno board to provide the sufficient currents and voltage for smoothly run the designed system. In this research work we use the 25W, 240V lamps for testing which shown in Figure 2. The Figure 3 shows the 4- channel relay circuit configuration with applications of home. The applications send the commands ON or OFF a device, it may not provide guarantee for the successful operation as the device may be defective. These types of problems are solved by using the feedback massage. It has been designed to the status of the device after communication from the applications. If instruction has been sent to turn ON a device, the feedback circuit senses the current request and turned ON a respective led, which show the device is ON Otherwise it indicates the command was not executed correctly [5].

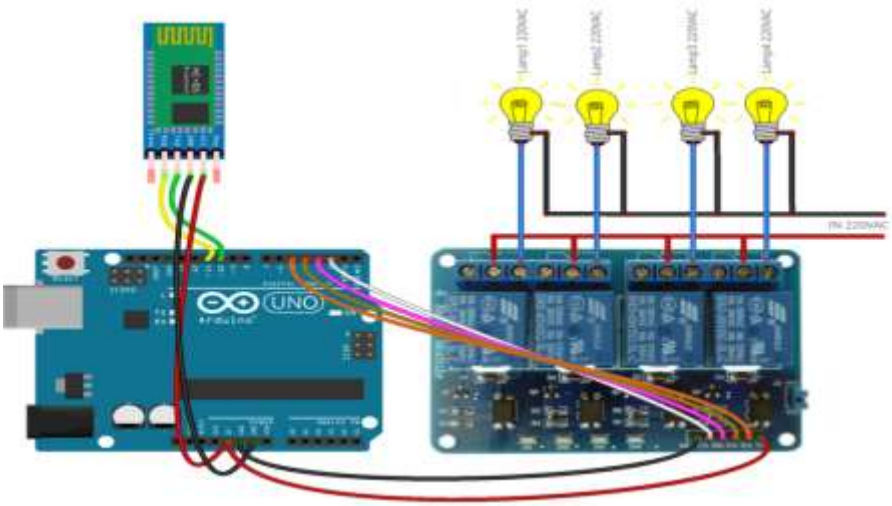

Figure 2: The pin connections of the proposed system

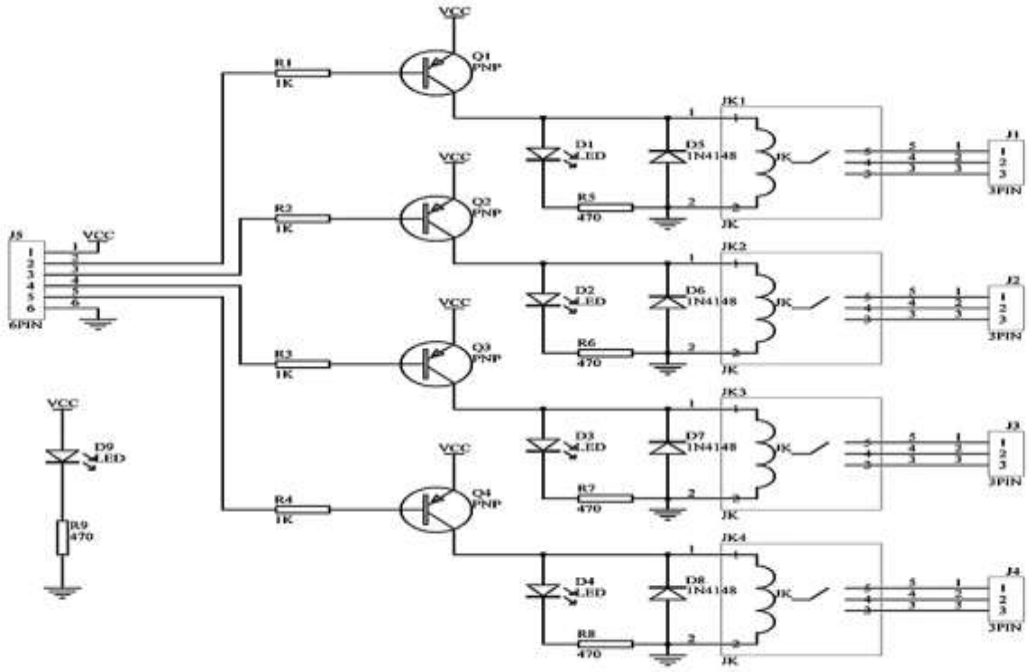

Figure 3: Channel Relay Circuit Switching

III. Conclusion

SmartFix Automation system is design and implemented at a minimum cost, flexible and wirelessly used for the home automation system. The proposed model is secure and only accessible to the paired Application design for particular Bluetooth system. The user only needs to turn ON its Smartphone Bluetooth for pairing with the system module i.e. for connecting the HC-05 module with application. The system provide basic security feature only connection is establish if that BT module address (MAC address) is assigned in application for pairing. This system is built without introducing the Internet Feature so it can be used without Internet Connectivity.

The all functionality of this proposed system was tested which works properly. The communication between the Smartphone and Arduino BT was very low which is less than 50m in buildings and the maximum range is 100m in an open range.

In future we can develop Internet Connectivity enable applications for all smartphones or smart devices with the help of Android so that it can works on any smartphone or smart devices.

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