AUTOMATION SYSTEM USING ARDUINO AND BLUETOOTH.

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ABSTRACT

The project aims to provide an efficient, low-cost automated energy management system for houses. It also provides a facility for surveillance of the house. The consumption of energy is increasing day by day; there is a great need to prevent the overuse of energy in all possible ways. Home automation is one of the ways by the use of this motorized technology everyone can make their lives better at the homes, it reduces human efforts and stress, energy effectual, time-saving thus make a smart home.

The main objective of this project is to develop a home automation system using an Arduino board with Bluetooth being remotely controlled by any Android OS smart phone. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches.

Keywords —*Home automation, Smartphone, Bluetooth, App Controlled system, Bluetooth HC-05 controlled.*

I. INTRODUCTION

In this time, automation technology is one of the most important and attractive areas that play a great role in everyday life. Automation Technology has numerous uses, advantages, and applications in every field of life such as industrial automation, Lighting control, Aircraft automation, automatic vehicles, Appliance control and integration. In the current situation, the progress of the home automation system is tremendous.

The consumptions of energy at homes tend to increase in proportion with an increase of heavy home appliances like air conditioning, refrigerators, and heater, etc. the usage of energy consumption must be improved properly to minimize carbon dioxide emissions. An easy interface appliance is the main aim of this system.

The home appliances can be easily monitored, tracked, and controlled. A user-friendly interface provides everyone to interact with the system. Home automation can give more quality and ease of life for every person. Home automation technology becomes an energy consumption controller and an easily accessible smart home technique. The key features involve maintaining user comfort, friendly interface, and user satisfaction.

II.LITERATURE REVIEW:

Several remote controlled home automation systems have been studied. R.Piyare and M.Tazil research work provided full functionality to remotely control home appliances via wireless communication between the Arduino BT and cell phone using Bluetooth technology. Arduino BT board was connected with home appliance and it was controlled by a Symbian OS cell phone application. Symbian OS cell phone can only support the python language scripts and this system failed to support Java based application, nowadays mostly smartphone applications are developed in Java. Similarly, another study presented home automation system using Bluetooth and android application. However, this was designed only for 4 lights and it was not feasible to control more than 4 home appliances . In another research work, XBee based home automation system introduced for handicapped and elderly people. XBee transceivers were used for wireless communication between the master control panel board and the remote control device.

lII. SYSTEM DESCRIPTION

The system used in this home automation is as follow:

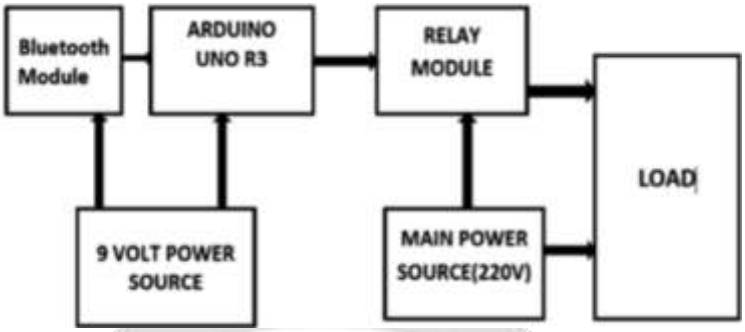

Figure1. Block diagram

As we see from the diagram the Arduino plays the main function of microcontroller in the system. Arduino controls the mobile app and Bluetooth module.

Overall this home automation system consists of the following major parts:

A. Arduino uno:

Figure1.1 Arduino UNO

Arduino UNO is based on an 8-bit AT Mega (328p) microcontroller. This controls the different components of the system like Relay Network and Bluetooth Device. All commands are processed by the Arduino and executed on the relay board.

B. Bluetooth (hc-05) module:

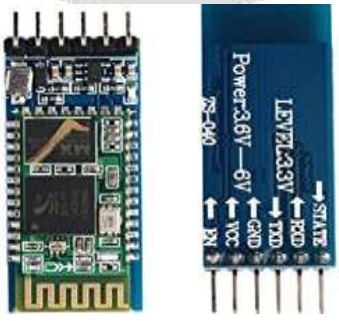

Figure1.2 Bluetooth (HC-05) Module

The medium between the system and the Android mobile app for communication is the Bluetooth. It plays the role of the wireless medium in the system.

C. Relay module:

Figure1.3 Relay Module

As the block diagram shows the AC supply of all appliances is across the relay module with acts as an electrically operated switch.

D. Android mobile app:

A mobile app is used to operate all appliances. In the app, just simple touch can turn to switch off/on your all appliance from anywhere in the home.

IV. HARDWARE DESIGN:

In a hardware implementation, Arduino Uno is placed as a microcontroller to control the hardware. Arduino has 6 analog pins, 14 digital pins, and power pins. Arduino does not carry any wireless connection within it that is why we use Bluetooth module Hc-05 for wireless communication.

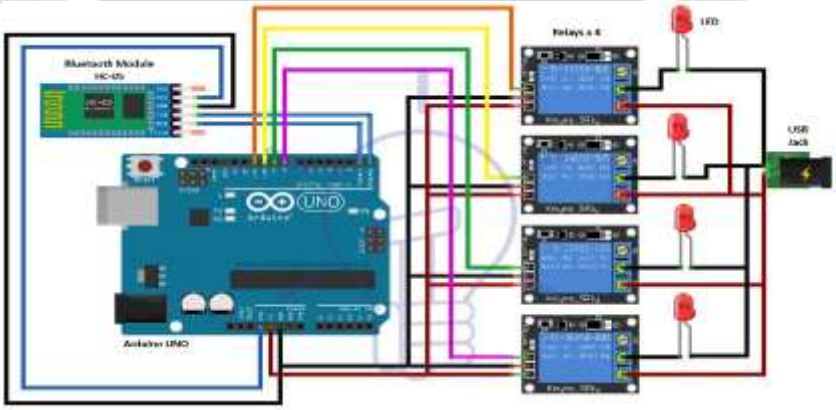

Figure2. Hardware design

Hardware implementation consists of the following:

• Arduino Uno

• Bluetooth Module HC-05

• 4 Channel Relay Module (9V)

• Power supply, Loads (watt savers) and connection wires, etc

• 9v Battery or 9v adapter

• Jumper wires

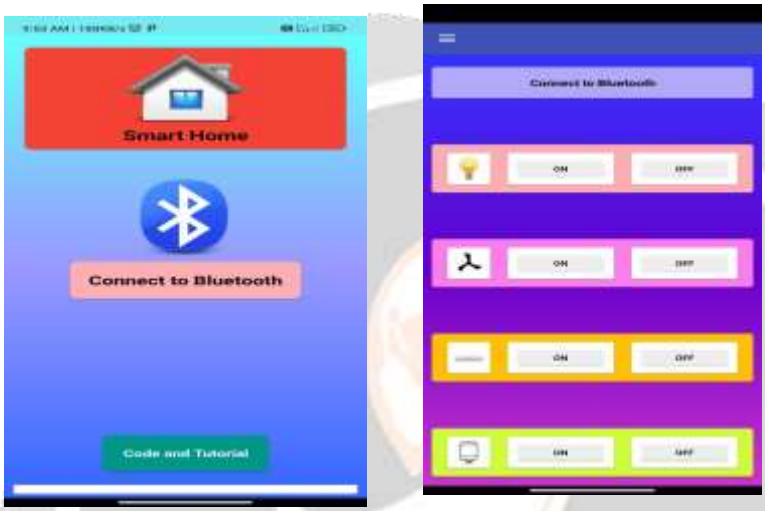

Fig4. Android mobile app

VI. SOFTWARE DESIGN

The software part of the system is programming on Arduino UNO and second is the designing of the Android mobile app for the system. The software which was used in this system for creating the app was MIT App inventor.

VII. EXPERIMENT TEST:

Based on the research and work conducted, try to examine the result of the system.

Figure5. Design of sample home automation

In figure.5 whole system of home automation in a lower scale made on a wooden sheet figure.5 is showing that it has been succeeded in the formation of home automation technology using Arduino Uno

CONCLUSION

Home Automation is undeniably a resource which can make a home environment automated. People can control their electrical devices via these Home Automation devices and set up controlling actions through Mobile. In future this product may have high potential for marketing.

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