INTELLIGENT CONTROL OF ELECTRONIC APPLIANCES USING REMOTE GSM

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Abstract – *The aim of this proposal is about digital notice board and electrical appliances control by using GSM and Bluetooth. The idea behind this project is to provide its users with a simple, fast and reliable way to put up important notices in the LCD where the user can send a message to be displayed in the LCD. The message can be sent through an android application. Similarly, a home automation system has been developed where home appliances like light, fan etc. can be switched on or off using the same android application. So, using the android application, the home appliances can be controlled and notices can be put up in an LCD display from any location in the world and it also minimizes time consumption. It uses Arduino-2560 board to control the appliances and notice by the GSM technology, Real Time Clock (RTC), temperature sensor, Bluetooth system, Relay and an android application for user interface with the hardware. The temperature sensor used in the project can be used to measure the room temperature. The Real Time Clock is used to update the current date and time. Bluetooth system can be used to access the control of appliances within the building. Relay is used to supply the limited amount of current to the particular devices. The device can be used anywhere irrespective of the place of deployment provided mobile network connectivity is available.*

Keywords— GSM, LCD, Arduino.

Introduction

In this project, a hardware capable of controlling electronic appliances and displaying notices electronically using an android application has been built. So, the hardware can perform broadly two functions. For controlling home appliances, the system can be used in much different kind of situations where as user can switch on/off any home appliance connected to it from anywhere using an android application installed in a smartphone. In order to display notices, a user can use the same application to type a notice and click on the send button to get it displayed. Both the functionality can be used only if sufficient balance amount is left in the user's SIM card since each access transacts a fixed amount for SMS. The motivation behind such a project is mainly to reduce physical effort for operating appliances especially for aged people. Also, it might help a person to save energy by switching off appliances on being out of home or to switch on appliances to get services like washing clothes, cooling room, heating water done by the time he reaches home. Another reason for this project is over usage of paper in educational institutions for printing notices. If notices are displayed everywhere electronically, it would reduce paper usage and make communication easier and faster.

II.LITERATURE SURVEY:

The automation systems developed earlier includes "GSM BASED SMART HOME AND DIGITAL NOTICE BOARD" [1], however, it uses an ARM microcontroller for system control and GSM technology for communication, so it can control only less appliances load. The home automation systems developed earlier includes a PIC16F887 IC integrated with GSM module enabling SMS based automation [2], unlike this project, did not use any android application in it and involved extra task of writing message.In [3], Elkamouchi also gave a prototype of Smart home and used sensors and actuators for the home appliances to get them connected to microcontroller. Another smart home was built in [4], where Xbee was used for communication instead of GSM. In 2011, a Wireless remote power controller was built in [5], which could control power consumption in a home through TC35 module. Han in [6], built a smart home energy management system using IEEE 802.15.4 and Zigbee module for communication. A computerized system was developed in [7], where a GSM was interfaced with a desktop computer. Home appliances had wired connection with desktop and users were connected through Wi-Fi. Doors and Windows were monitored in [8] using PIC18F452 with security that required ID for entering through the door.

III.COMPONENTS

The components used in this system are:

A. ARDUINOMEGA DEVELOPMENT BOARD

The Arduino mega is a micro controller board which has 54 digital inputs/output pins, 16 analog inputs, 4 UARTs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything that needed to support the microcontroller; simply connected to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

B. GSM SIM900 MODULE

GSM 900 module supports communication in 900MHz band. In India most of the mobile network providers operate in 900MHz band.

In home automation systems, there are two ways of connecting GSM module to Arduino board. If the communication between Arduino and GSM module is serial, then we are supposed to use serial pin Rx pin of Arduino to the Tx pin of GSM.

In case of parallel communication then the Tx pin of Arduino is connected to the Rx pin of GSM module.

C. 20*4 ALPHANUMERIC LCD DISPLAY

This LCD has been used to display the notice sent by the user. It is a 20*4 screen which means it can display 20 alphanumeric characters in each line and there are four lines for display in total which sums up to a maximum of 80 characters being displayed at a time. It has 8 data pins since each character is of 8 bits and three other pins namely, enable, read/write and register select. Whenever the enable pin is low, LCD is OFF condition and whenever the enable pin is high LCD is in ON condition. In case of Read or Write pin, if it is high reads data form the LCD and if it is low write form the LCD.The register select pin decides the type of data to be transferred through the data pins. If it is high, a character is written in LCD and if low, command is sent to LCD.

D. RELAY

A relay is an electromagnetic switch operated by a relatively small electrical current that turn on or off a much larger electrical current.

In home automation applications relay can work either as switches-turning things ON and OFF or as an amplifier-Converting small currents into a larger ones.

E. DC MOTOR

A 500 rpm 12V DC motor has been used for home automation purposes.

F. ANDROID APPLICATION

An application named automation system has been developed. With this application the user can shift between auto and manual mode. Where the Automatic mode corresponds to Bluetooth and GSM control and Manual mode corresponds to human control of appliances.

G. SMARTPHONE WITH ANDROID OPERATING SYSTEM

A smartphone with android version 4.2 Jelly Bean have to be used for running the android application.These are the main components used in home automation control using GSM and Bluetooth.

IV.SYSTEM WORKING
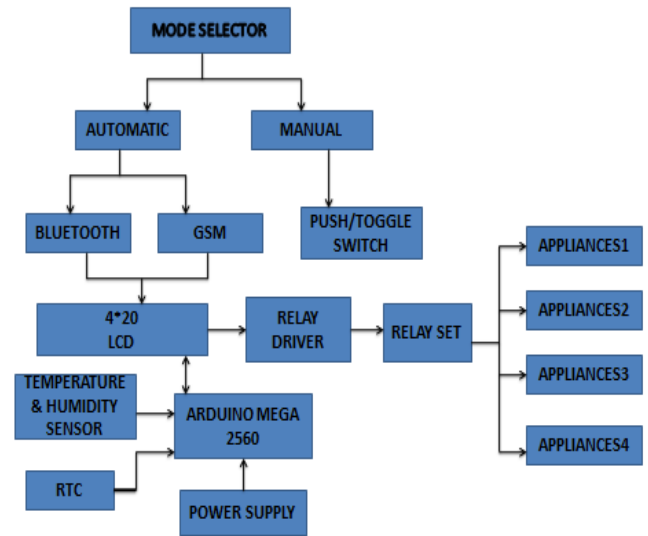
Figno:4.1 Block Diagram for controlling Electrical appliances

In Automation system is been developed to control the electrical appliances and the notice board digitally, so an android application is been developed to control the hardware system by which the android application which has different modules. The first module is the mode selector which the user selects the manual mode or automatic mode, if the user enables the automatic mode it redirects to either GSM control or Bluetooth control and if the user clicks the GSM mode in which the outdoor control of appliances can be done and also the control of digital notice board can be done by using the GSM mode and if the user enables the Bluetooth mode the indoor control of home appliances can be done respectively. The devices can also be controlled through any mode even it is turned on or off using another mode. The digital notice which has the typing screen for the display of messages this can be done by using GSM mode by which communication can be done easily and quickly. The automatic control of electronic devices can reduce the human work and time consumption. It also minimizes the unwanted power consumption. Typical functions are:

- Mode selector
- Automatic modes
- GSM control for home appliances and Notice board
- Bluetooth control for home appliances
- Typing screen for notice board

Digital notice board which can able to display the load status of the appliances and also with the help of the LM 35 sensor the temperature of the room can be identified. The digital notice board of 4*20 size can be used to display 80

alphanumeric characters in 4 rows correspondingly and it has the multipurpose use that it has the ability to display the messages for communication easily and quickly thus it makes the human lifestyle more sophisticated.
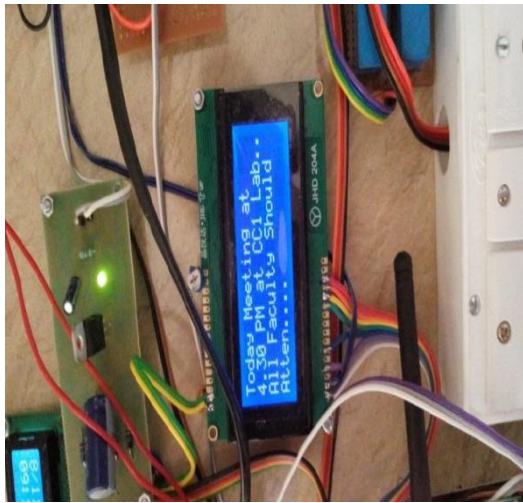

Fig.no.4.3.Notice Board control

GSM and Bluetooth

Fig.no.4.4. Snapshot of hardware system

V.MODULE DESCRIPTION

• MODE SELECTOR

It enables the user to select the mode as manual or automatic to the user

By selecting the Manual mode the user can control the appliances manually. In Automatic mode the user can control the appliances and digital notice board by using the application

• AUTOMATIC MODES

This automatic mode which is compromises of both Controller mode and Terminal mode by which the user can select the mode of automatic control as GSM control and Bluetooth control

• TERMINAL MODE

Terminal mode is a GSM module which has control for appliances or the notice board. The user can control the electrical appliances by giving the input as numbers and the digital notice board by using alphabets
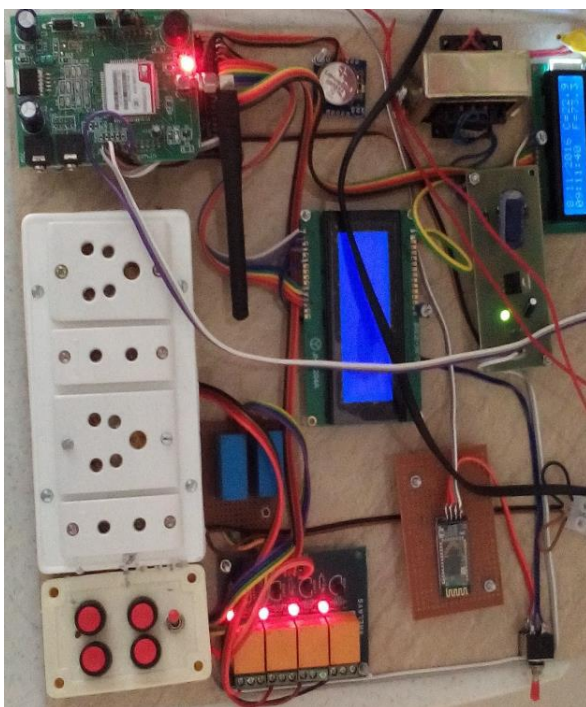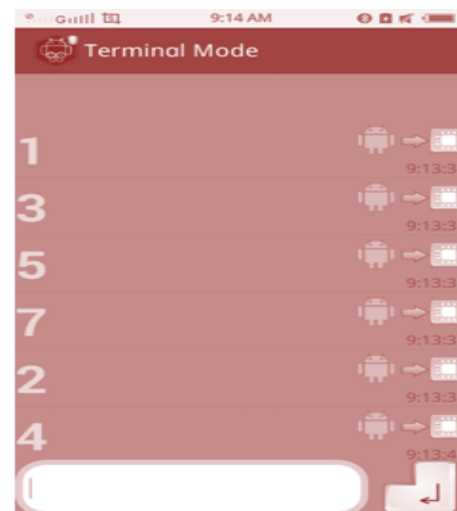

TEXT BOX FOR NOTICE BOARD

If the user selects the notice board button it automatically redirects to the text box area where the user can type the message and send it which can be displayed in the notice board
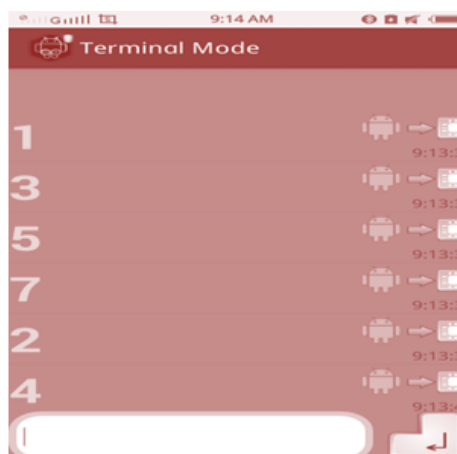
CONTROLLER MODE

The Bluetooth application which helps the user to control the home appliances as indoor control.In this the appliances can be controlled by setting the commands for switching ON and OFF the devices

6. CONCLUSION

This automation system with GSM and Bluetooth system is designed and developed for the welfare of the human beings. The control system can be the betterment in time consumption; the system can easily control the hardware by use of android systems which are commonly used by all the people. This project provides the advantage for users in home automation system and control of notice board digitally.

7. FUTURE WORK

Future scope for the home automation systems involves making homes even smarter. Homes can be interfaced with sensors including motion sensors, light sensors and temperature sensors and provide automated toggling of devices based on conditions. More energy can be conserved by ensuring occupation of the house before turning on devices and checking brightness and turning off lights if not necessary. The system can be integrated closely with home security solutions to allow greater control and safety for home owners. The next step would be to extend this system to automate a large scale environment, such as offices and factories. GSM costs for sending a message to the control system and Bluetooth which can be provided for only certain ranges. So to overcome these disadvantages the internet based automation system can be done, this also helps the user to control the system from remote places and it can be cost effective. In future a website can be developed by which the appliances can be controlled by using the internet.

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