International Journal of Research in Computer & Information Technology (IJRCIT),
Vol.8, Issue 3, June 2023
E-ISSN: 2455-3743
Available online at www.ijrcit.co.in

DTMF Controlled Electric Appliances with Feedback Notifications

[1]Prof. Pradip Balbudhe, [2]Palash Dhawale, [3]Sameer Dhanorkar, [4]Ritesh Chikhlonde, [5]Srushti Selwate

Abstract: This project presents a design and prototype implementation of new home automation system that uses DTMF and Web Application as a network infrastructure connecting its parts. The proposed system consists of two main components. The first part is the server (webserver), which presents system core that manages, controls, and monitors users' home. Also, by using DTMF technology (Dual Tone multiple frequency) which receives the command from the phone to develop digital output. This digital signal is further processed to actuate switching mechanism through relay driver to turn on/off the loads/appliances. Unlike most home automation systems on the market, the proposed system is scalable, thanks to which one server can manage many hardware interface modules. The proposed system is better than the home automation systems available on the market in terms of scalability and flexibility.

Keywords— Home automation; Global System for Mobile Communication (GSM); Electrical and Electronic Devices; GSM module; security system

I. INTRODUCTION

In this context, the electronic and electrical environment is any environment made up of devices such as fans, televisions, air conditioners, motors, heaters, lighting systems, etc. A remotely accessible environment is an environment in which each device can be accessed and controlled remotely through a software interface that includes an Android app and a web app. Such remotely accessible systems already exist on the market, but they also have inconveniences. This article aims to review all existing systems of this type and compare the features available.

Because of their ease of use, they were more important than any other technology. You can use them as a replacement for existing circuit breakers in your home that create sparks and start fires in various situations. The project automation controller is the ESP8266. A home automation system using DTMF (Dual Tone Multi Frequency) technology, and a web-based application connected to a wireless module to seamlessly control multiple devices in your home. Helps reduce power wastage.

Objectives

The basic idea behind this project is to control the functioning of electric appliances using wireless technology. In this project we will have using cell phone and GSM module; Cell phone will be handed to the person who can send the digital signal to GSM Module which is normally held in automatic answering mode at the load ends. At the receiving ends GSM Module codes are inputs to the microcontroller, which pre-programmed to identify the command signal coming from the user's ends, which is interfaced through relays & relay drivers according to the desired commands from user's end. The GSM Module at load site are usually DTMF decoded. DTMF will decode the keywords coming from user's site into digital codes of corresponding frequency which finally fed as input to the microcontroller. This gives us the ability to press the keypad of the cell phone and can switch on or off the electric appliances installed at different locations as per the user desired and motor on/off status feedback notification message is sent over user cell phone. A DTMF decoder & controlling circuit receives the input commands and control the on–off mode of the connected electrical appliances. This circuit designed is easily available using the various electrical and electronics circuit components.

II. LITERATURE REVIEW

Numerous research articles have been published on home automation and automatic security systems. Basic information on home automation and security systems uses in Arduino and GSM technology is explain and presented by Kaur. For example, some researchers have used Bluetooth technology in a network environment as well as in automation systems; Sriskanthan has developed a home automation application using Bluetooth technology. In the past, home automation systems were ambiguous and complicated due to the hardware of the system, but today, thanks to modern technologies, these systems are used by many people around the world. A touch screen-based home automation system

Manuscript Received April 5, 2023; Revised 25 April, 2023 and Published on June 02, 2023

Prof. Pradip O. Balbudhe, Palash D. Dhawale, Sameer S. Dhanorkar, Ritesh T. Chikhlonde, Srushti R. Selwate, Department of Computer Engineering Suryodaya College of Engineering and Technology, Nagpur, Maharashtra, India.
Mail Id: *pb6143@gmail.com, palashdhawale03@gmail.com, sameerdhanorkar95@gmail.com, riteshchikhlonde965@gmail.com, srushtiselwate01@gmail.com*

International Journal of Research in Computer & Information Technology (IJRCIT),
Vol.8, Issue 3, June 2023
E-ISSN: 2455-3743
Available online at www.ijrcit.co.in

was developed by Wagh using GSM and Zig-Bee. The GSM technology is also used by Singh in the developed device system. A low-cost Android application that provides mediation services has been presented by Pawar. The proposed system uses the Internet of Things to control and monitor various devices. GSM is commonly used in this type of applications that control devices. In Pakistan, most of the offices, corporate platforms and educational institutions do not have a device security system to control devices in smartphone apps. The security control system did not find any positions in Pakistan. On paper the used the technology by controlling by the application like ZiggBee they control the home appliances by using the app they control light holder fan and other appliances also they tried automation by using NodeMcu this needed high quality of internet connection for execute properly. In the paper "Smart light Automation" they use the technology for the automation of the light by using the Esp8266 and by using the PIR sensor by controlling the relay they required a PIR sensor for input as an output they control the relay also major problem is the PIR sensor. There are most of the time where relay is giving fault input as they located the human signals. PIR sensor uses the human presence for giving the input signal to the microcontroller the major advantage is it precision in the input and execute proper automation. One of the paper authors use the technology for controlling the relay by sending the message to the sensor and then it gives the command to the relay for the automation it also one of the reliable technologies for this scenario.

Table 1: "DTMF controlled electric appliances with feedback notifications"

Authors	Dataset Used	Feature Extraction Technique	Classification Technique	Accuracy
Richu Sam Alex, R NarcissStarbell (2021)	Sensor Network for Energy Saving	Sensor used for the automation and Senor	ESP8266	90.37 %
Subhanshini, Vigash Dharshan, Christo Immanuel, Deepak(March 18)	PIR sensor. Audriuno	Audriuno IDE	Ardiuno, PIR sensor	80.8 %
Deblino Ruhidas, Ria Ghosh, Agnismitta Ghosh, Anish Sengupta (April 18)	DTMF coding system	DTMF	DTMF	90%
Armando Roy Delgado, Rich Picking, Vic Grout,	Remote-Controlled Home Automation Systems with Different Network Technologies	Remote Controller	Controller	80%
Remote-Controlled Home Automation Systems with Different Network Technologies	ZiggBee,Application,Audriuno	ZiggBee	Audriuno	70%

III. PROPOSE SYSTEM

MODULES-I: The first step of our project is done under the Module 1 here we connect the DTMF and GSM module with ESP8266 and relay. Here the we connect the our mobile with esp8266 and relay by using GSM. The working is like this, we first call the registered user number then GSM module will receive the call and then it connects to DTMF.

MODULES-II: After connecting with DTMF, then user will give input to DTMF and then by using Esp8266 it controls the relay. The relay is responsible for the automation of the loads in the circuit. This is how our first module is complete.

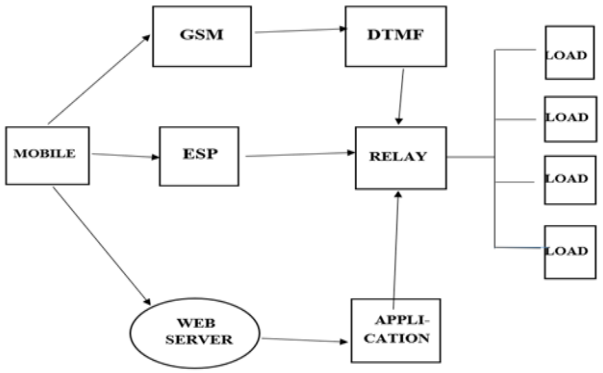

Figure 1: Block Diagram of DTMF controlled electric appliances with feedback notifications.

International Journal of Research in Computer & Information Technology (IJRCIT),
Vol. 8, Issue 3, June 2023
E-ISSN: 2455-3743
Available online at www.ijrcit.co.in

IV. METHODOLOGY

Hardware and software requirements

NODEMCU: Node MCU (Node Microcontroller Unit) is a low-cost open source IoT platform. It basically includes ESP-12 module-based hardware alongside firmware running on Espressif Systems' ESP8266 Wi-Fi SoC. ESP32 32-bit MCU support was added later. Node MCU is open-source firmware with an open-source design. The name "Node MCU" is a combination of the words "Node" and "MCU" (microcontroller unit). The term "NodeMCU" refers strictly to the firmware, not the corresponding development kit. Both the firmware and the design board are open source. The firmware uses the Lua scripting language.

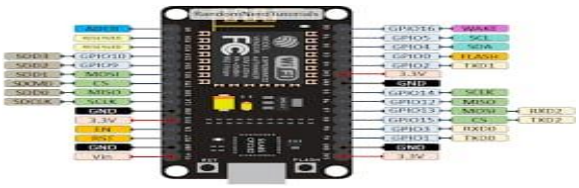

Figure 2: Node MCU

LCD: A usable LCD screen has 16 pins used to control various functions on the screen. The Arduino microcontroller can output 5V or 3.3V, so the LCD can be powered by connecting VSS and VDD to ground and 5V pins of the microcontroller. The contrast of the display can be adjusted by connecting a variable voltage to V0 located on pin 3 of the display. The RS, R/W and E pins are connected to the Arduino's pins 12, ground and 11 respectively. LCD 5 display can work in 8 bit mode and 4 bit mode. For this application, only the 4-bit format will be considered, as it requires fewer pins and is generally easier to use.

Figure 3: LCD Display

RELAY: A relay is a device that allows us to turn a circuit on or off with a higher voltage than the Arduino can handle. The relay provides complete separation of the low voltage on the Arduino side and the high voltage connected to the load. We are using a 4 channel 5V relay for this project. This is a 5V 4-channel relay interface board and requires 15-20mA drive current for each channel. It can be used to control various household appliances and high-voltage equipment. It has a standard interface and can be directly controlled by a microcontroller.

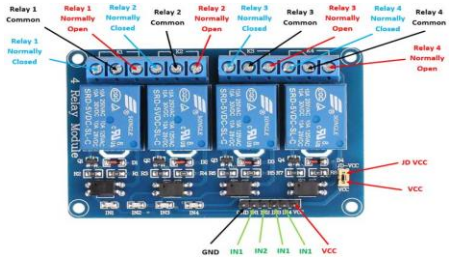

Figure 4: Relay

GSM: A GSM module or a GPRS module is a chip or circuit that will be used to establish communication between a mobile device or a computing machine and a GSM or GPRS system. The modem (modulator-demodulator) is a critical part here. These modules consist of a GSM module or GPRS modem powered by a power supply circuit and communication interfaces (like RS-232, USB 2.0, and others) for computer. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities.

Figure 5: GSM

PUSH BUTTON: The button is also called pushbutton, tactile button or momentary switch. It is a basic component and widely used in many Ardiuno projects. It is simple to use. However, it may make the beginners confuse, due to mechanical, physical issues and ways to use it as well.

Figure 6: Push Button

International Journal of Research in Computer & Information Technology (IJRCIT),
Vol. 8, Issue 3, June 2023
E-ISSN: 2455-3743
Available online at www.ijrcit.co.in

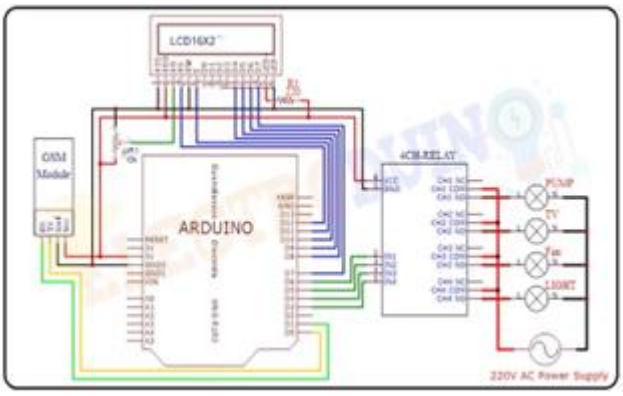

Figure 7: Reference Circuit Diagram of DTMF controlled electric appliances with feedback notifications.

CONCLUSION

Based on all the research methods and their strengths and weaknesses, this article describes the best entry-level home automation system to own. The best system should be available to users around the world in real time. The GSM network is defined as this candidate network. However, to provide internet access, the data channel of GSM must be used. Only Internet access can facilitate it. This will provide a way to access home devices using Internet Protocol. The UI must be a web app with an associated mobile app. Make the system accessible to all types of people. Such a system should provide ease of installation. Only then will it be effective to automate the housework. A lot of thought should be put into the user interface design of these apps. Plug and play will be an advantage of the system. The ease of adding new equipment to an automated building will play an important role in sustaining the economy of the system. One of the papers use the PIR senor for the automation where one the cons of the it gives fault input as they sense the change in temperature in the input but if a person is continuously present there then there no difference in the temperature then it give input signal as there is no person is present in the room so turn off the relay as it conclude the fault in the project. As another project consist of the automation by using the app but it required good internet connectivity as to perform the execution of the relay. Also, there is the lots of trouble in the connecting to web server even it required good connectivity for connect to the app.

REFERENCES

[1] RajaR , Dr.K.Udhayakumar " Development in Smart Sensor Network for EnergySaving" International Journal of advance Research in Electrical, electronics and instrumentation Engineering (An ISO 3297: 2007 Certified Organization) Vol. 3, Special Issue 2.

[2] Richu Sam Alex, R NarcissStarbell "Energy efficient Intelligent Street Light System using Zigbee and Sensor", International Journal of Engineering and advanced Technology (IJEAT), Vol-3, Issue 4, April 2014.

[3] Subhanshini, Vigash Dharshan, Christo Immanuel, Deepak(March 18) "Smart Light Using PIR SENSOR"

[4] Michale Mango, Tommaso Poloneli , Luca Benini " A Low Cost and Highly Scalable Wireless Sensor Network Solution to Achieve Smart LED Light Control for Green Buildings" IEEE Senosrs Journal, VOL. 15, NO. 5, MAY20.

[5] Edvard. "Working Principle of Thermal Motor Protection Relay"

[6] DEBLINO RUHIDAS, RIA GHOSH, AGNISMITTA GHOSH, ANISH SENGUPTA (April 17) "DTMF Based Home Automation"

[7] C. K. Das, M. Sanaullah, H. M. G. Sarower, and M. M. Hassan,. Development of a Cell Phone based Remote Control System: an Effective Switching System for Controlling Home and Office Appliances. International Journal of Electrical & Computer Sciences, 9(10), pp.23-29.

[8] Armando Roy Delgado, Rich Picking, Vic Grout, "Remote-Controlled Home Automation Systems with Different Network Technologies", Centre for Applied Internet Research, University of Wales, UK

[9] A. W. Ahmad, N. Jan, S. Iqbal, and C. Lee, "Implementation of ZigBee-GSM based Home Security Monitoring and Remote Control system," in Proc. 2011 IEEE 54th International Midwest Symposium on Circuits and Systems (MWSCAS), Seoul, pp.1-4.

[10] S. I. Azid and S. Kumar. Analysis and Performance of a Low Cost SMS Based Home Security System. International Journal of Smart Home, 5(3), pp.15-24.

[11] T. Perumal, M. N. Sulaiman, Khaironi Yatim Sharif, A. R. Ramli, and C. Y. Leong. (2013). Development of an Embedded Smart Home Management Scheme. International Journal of Smart Home, 7(2), pp.15 – 26.