

HOME APPLIANCES SWITCHING SYSTEM USING SMS

BY

MD Mahfuzul Haque Masum

ID: 142-15-3747

AND

MD Masiur Rahman

ID: 142-15-4102

This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

Shah MD Tanvir Siddiquee

Assistant Professor

Department of CSE

Daffodil International University



DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

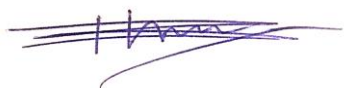
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APPROVAL

This Project titled “**Home appliances switching system using SMS**”, submitted by *MD Mahfuzul Haque Masum* and *MD Mashiur Rahman* to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents.

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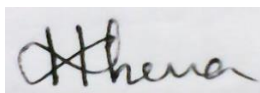
Dr. Touhid Bhuiyan

Professor and Head

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University



Internal Examiner

Most. Hasna Hena

Assistant Professor

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University



Internal Examiner

Sumit Kumar Banshal

Senior Lecturer

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University



External Examiner

Shah Md. Imran

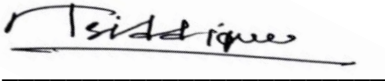
Industry Promotion Expert

LICT Project, ICT Division, Bangladesh

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Mr. Shah Md. Tanvir Siddiquee, Assistant Professor, and Department of Computer Science and Engineering, Daffodil International University**. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:



Mr. Shah Md. Tanvir Siddiquee

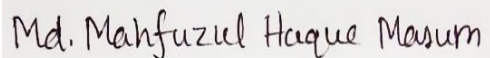
Assistant Professor

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University

Submitted by:



MD Mahfuzul Haque Masum

ID: -142-15-3747

Department of CSE

Daffodil International University

MD. Masiur Rahman

MD Masiur Rahman

ID: -142-15-4102

Department of CSE

Daffodil International University

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ABSTRACT

Today innovation has permitted us to do numerous things which we thought were incomprehensible in the early day. Out of all, remote innovation has been perhaps the main creations in mankind's set of experiences. Not exclusively would we be able to trade data yet we can likewise control gadgets remotely. This paper is about the remote control of home machines. The primary portion of the paper is about the investigation of required segments while the subsequent half is about the execution of the consolidated segments to accomplish controller.

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CHAPTER 1

Introduction

1.1 Introduction

The advancement of innovation has had a major effect on human way of life. Power, a wellspring of energy, is a significant component for individuals and crucial for current human progress. To diminish wastage of this energy, numerous examinations have been done, of which some were effective. All things considered, a few tasks and postulation are being finished for just this reason. On the off chance that there was an approach to decrease the wastage of power and furthermore work electrical gadgets distantly simultaneously, it would make human way of life eco-accommodating and more agreeable.

Like power, cell phones have been another significant component for people as a mode of correspondence since the development of the innovation. Individuals of each nation utilizes cell phones to communicate among them. Short Message Service (SMS) is an extremely quick and helpful element of a cell phone, which is currently limitlessly well known as a vehicle of correspondence. SMS is additionally a modest method to send data to numerous individuals simultaneously. Along these lines, a SMS can be utilized to send a guidance from any cell phone of the world to some other fit gadget at a little expense.

The point of this undertaking is to execute a gadget which will empower the client effectively control home apparatuses distantly and lessen wastage of power at an expense of two modest cell phones, one as the gadget to control the home machines at home and one in the hand of the client to send the SMS. Additionally, there will be an insignificant security to not allow any individuals to control the control home apparatuses without knowing the quantity of the Subscriber Identification Module (SIM) card and the SMS text design. The gadget would be connected to the manual exchanging arrangement of the home such that it would empower the client to likewise control the home machines independently for each room.

1.2 Motivation

Everyone needs an easy solution to everything nowadays. For this reason, our main focus is to solve people's problem to make their life easier. The motivation for developing smart home systems comes from many reasons, but most prominent are convenience, security, energy management, connectivity and luxury. Smart Home systems are one of the newer areas of research that have not been fully integrated into our society.

1.3 Objectives:

The target of the task ordinarily fall into a categories of classifications, including reserve funds, wellbeing, accommodation, and control. Additionally, some consumers purchase home automation for comfort and peace of mind.

1.4 Expected Outcomes:

Our main goal is to make our life easier and luxurious. This project will help to control our home appliances from anywhere in the world. Some expected outcomes of our project are below-

- Save people time.
- Save loss of electricity.
- Save cost of electricity.
- People can control home appliances from anywhere.
- The project will help the people to lead their life easier and tense less.

1.5 Report layout

Chapter 1: Introduction

- It presents the review of the project. The introduction of the project is described here.

Chapter 2: Background

- The background of the project is described here,

Chapter 3: Requirement Specification

- The requirement part of the project is described here.

Chapter 4: Design Specification

- The design part of the project is described here.

Chapter 5: Implementation and Testing

- The implementation part and testing part of the project is described here.

Chapter 6: Impact on Society, Environment and Sustainability

- Impact on society, environment and sustainability is described here.

Chapter 7: Conclusion and Future Scope

- Summary and future scope of the project is described here.

CHAPTER 2

Background

2.1 Introduction

In this chapter we are going to discuss about the technologies and components we used in this project. This chapter will describe the related work, scope of the problem and challenges.

2.2 Relative Works

In this digital world, we use many appliances in our home. Sometimes we forgot to turn them off/on. Sometimes we become confused about our home appliances that did we turn it off/on. For this kind of problem and to lead a better life we develop our project. By this project, people can control their home appliances by sending a single SMS. They can also know the status about their appliances by sending SMS.

2.2.1 Home appliances switching system by Bluetooth

By this project, people can control their home appliances by using Bluetooth. For this, people need android phone. People can control easily their home appliances anywhere from their home. Physically disable people also can use this project. By utilizing this project, our home mechanization works intelligently by giving expanded personal satisfaction, and solaces to people.

2.2.2 Home appliances switching system by ZigBee

By this project, people can control their home appliances wirelessly by using ZigBee and voice. This project basically used to control home appliances by voice. This project present controlling home appliances by using ZigBee and microcontroller. Here to run this project, need a pc for controlling home appliances.

2.3 Comparative Analysis

For this undertaking, we needed to concentrate a great deal. Relative examination is an exploration philosophy in the sociologies. We have tried the distinctive application before we begin. We have noticed them from an alternate part of view. In what direction we can plan the task, what system we should utilize, how clients will take this, a great deal of things.

2.4 Scope of the Problem

For each sort of development project, we may deal for certain issues, we may confront restrictions. It's a sort of normal interaction. Meanwhile, we didn't have the foggiest idea how we might plan the application. We expected an enormous deliverable from the venture that could fulfil a wide range of needs by the consultant. We didn't know if we can construct it. Cause there no such research or repot or papers about our undertaking. We can't track down any such articles about it. We were get strained and stressed.

2.5 Challenges

In this project, we had face many challenges to run it properly. We were the idea maker but we had not enough experiences to deal with electric circuits and the code. For this, we had to study a lot and needed to prepare ourselves. At first, we become depressed. Then we very attentively connect the components and started the coding.

CHAPTER 3

Requirement Specification

Introduction

In this chapter we are going to know, how the project is represented, how it works, how to use it, what kind of products needed to build the project?

3.1 Business Process Modelling

Business process modelling is the technique for addressing cycles of an association, with the end goal that the current interaction can be noticed, created, and enhanced. It is a method which is utilized in quality control. In a basic and formalized manner, it portrays an association's current cycles. This is helpful in light of the fact that it clarifies ways you can utilize it to improve. The significant part of the procedure depends on the chart as 'data flow Diagram'. We are attempting to clarify that plan of action of the venture here utilizing the Data Flow Diagram. Regularly, Data Flow Diagram clarifies how information is addressed however a framework or task.

3.2 Requirement Collection and Analysis

- Arduino Uno
- SIM900 GSM/GPRS Shield
- GSM SIM card
- DC Relay

- Jumper wires to interconnect the gadget
- Force connectors to control the gadget

Thus, for the accompanying, we have studied a lot. We examined a lot of materials for building up this undertaking. We deal with the plan rules and possessed them.

3.3 Use Case Diagram

The easiest method of address the connection among client and framework is use case diagram. It shows the cooperation between various client and different use case to which client are associated. In this utilization case diagram, it addresses clients of our application

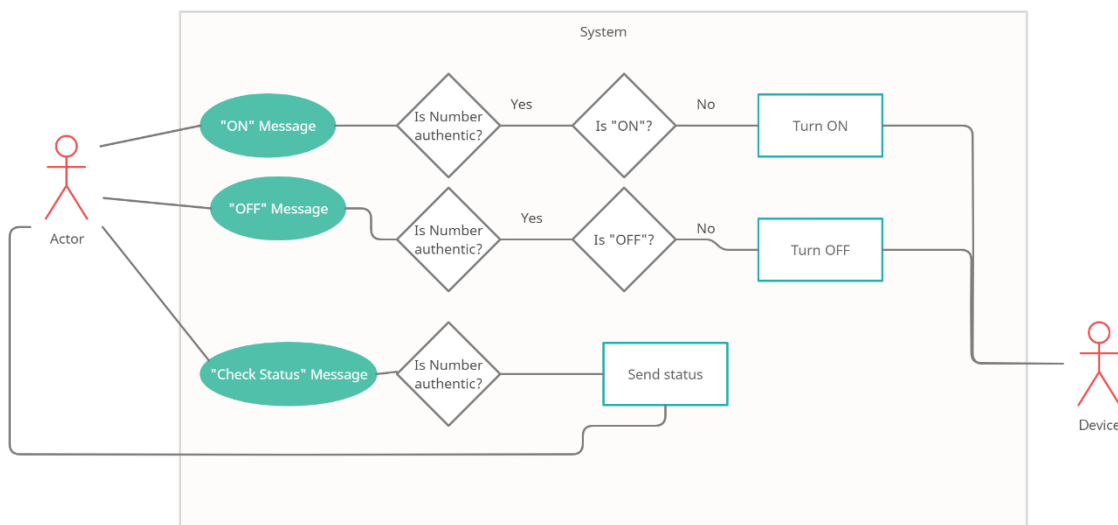


Figure 3.3 Use Case Modelling

3.4 Logical Data Model

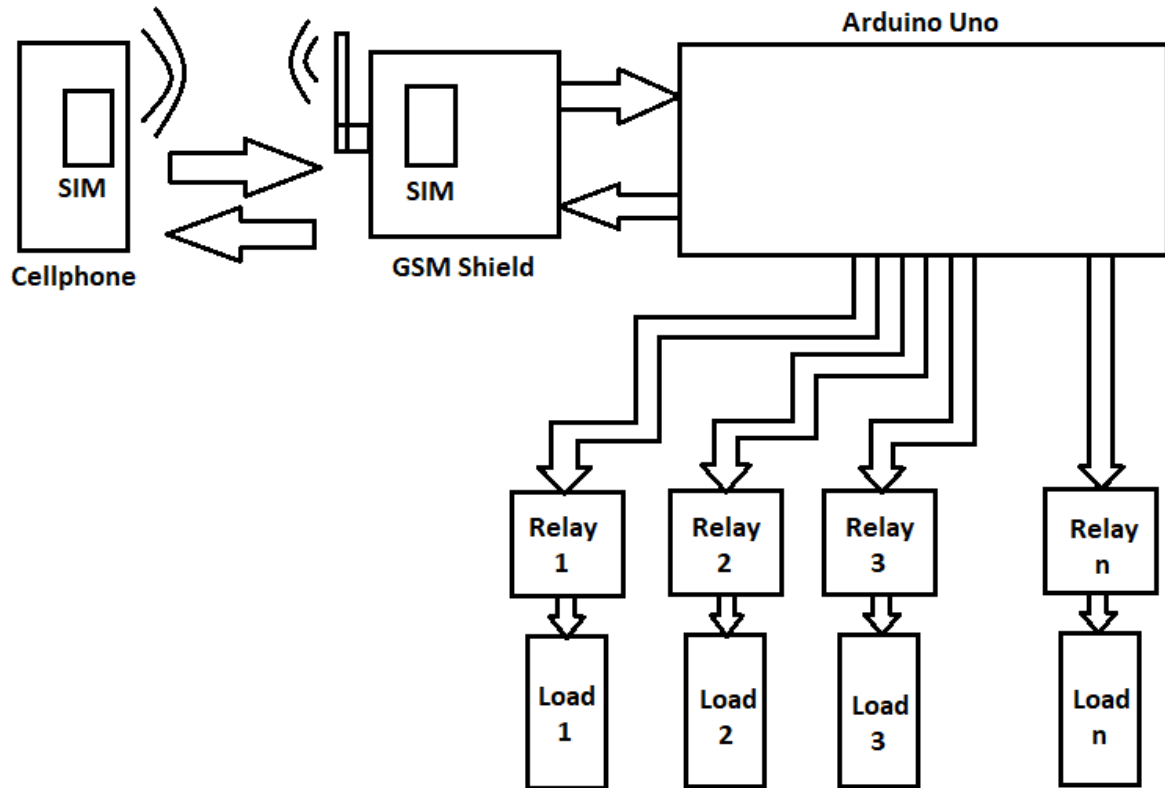


Figure 3.4- Data Flow Diagram

3.5 Design Requirements

- What we need the item to do, just as the centre destinations of the item.
- User stream of the application for each sort of client
- Product vision proclamation
- Project highlights
- Technical Specifications
- Choosing IoT stage
- Future maintenance
- Dependencies

CHAPTER 4

Design Specification

Introduction

This chapter is going to be described our design specification of or project. Design is going to be described in this chapter.

4.1 Front-end Design

In this area, we connect our devices.

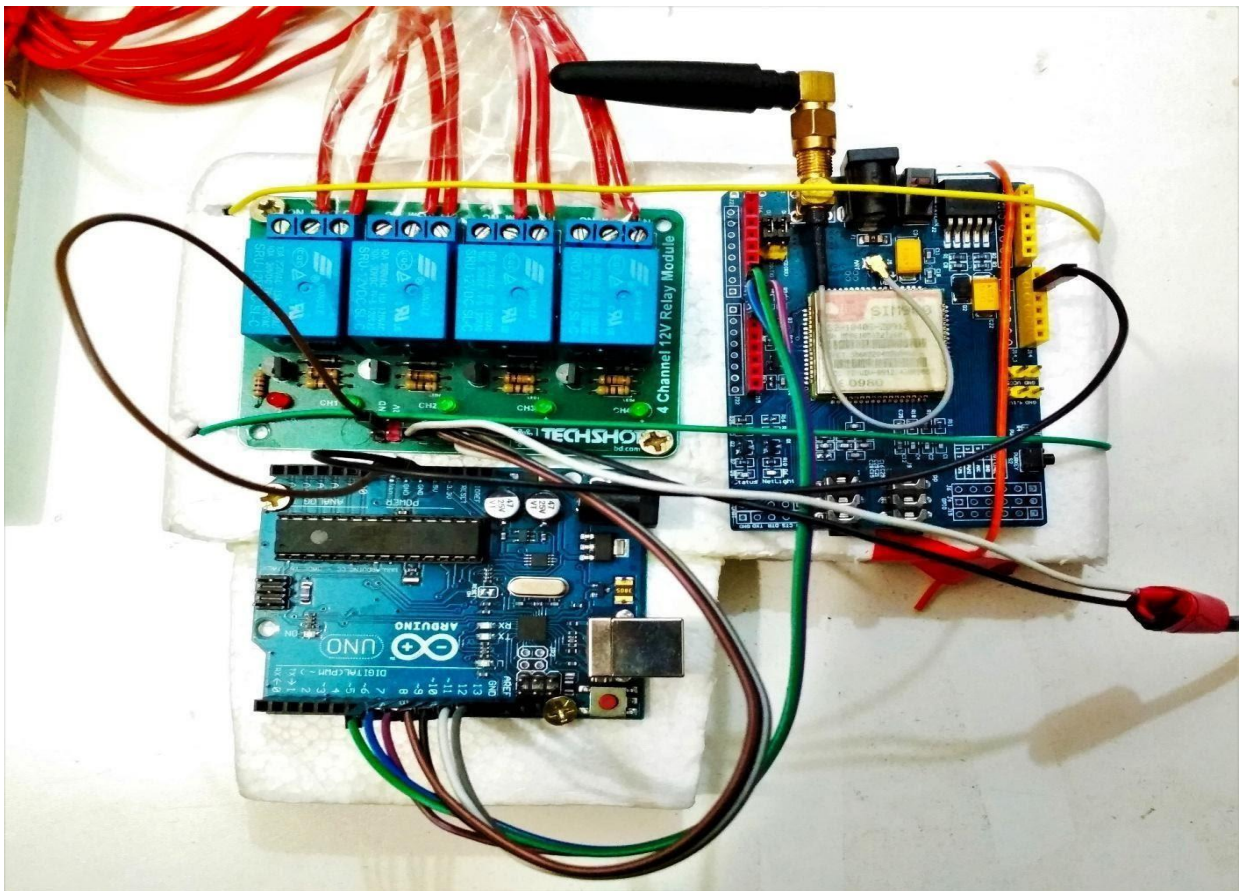


Figure 4.1: The connected devices

4.2 Back-end Design

We design our back-end design we used this code.

```
#include <SoftwareSerial.h>
SoftwareSerial command(7, 8);

String text;
String message;
String stateA;
String stateB;
String stateC;
String stateD;
const int module = 9;
const int relayA = 10;
const int relayB = 11;
const int relayC = 12;
const int relayD = 13;

void setup()
{
  powerUp();
  pinMode(relayA, OUTPUT);
  digitalWrite(relayA, LOW);
  stateA = "af";
  pinMode(relayB, OUTPUT);
  digitalWrite(relayB, LOW);
  stateB = "bf";
  pinMode(relayC, OUTPUT);
  digitalWrite(relayC, LOW);
  stateC = "cf";
  pinMode(relayD, OUTPUT);
  digitalWrite(relayD, LOW);
  stateD = "df";

  Serial.begin(19200);
  command.begin(19200);
  delay(20000);
  Serial.println("Module Ready.....");
  command.print("AT+CMGF=1\r");
  delay(100);
  Serial.println("Message Mode Started.....");
  command.print("AT+CNMI=2,2,0,0,0\r");
```

```

    delay(100);
    Serial.println("Waiting for Messages.....");
}

void powerUp()
{
    pinMode(9, OUTPUT);
    digitalWrite(9, LOW);
    delay(1000);
    digitalWrite(9, HIGH);
    delay(2000);
    digitalWrite(9, LOW);
    delay(3000);
}

void loop(){
    delay(100);
    if(command.available()>0){
        text = command.readString();
    }

    delay(10);
    if(text.indexOf("aobocodo")>=0){
        digitalWrite(relayA, HIGH);
        digitalWrite(relayB, HIGH);
        digitalWrite(relayC, HIGH);
        digitalWrite(relayD, HIGH);
        state = "ao";
        stateN = "bo";
        stateC = "co";
        stateD = "do";
        Serial.println("Reading New Message.....");
        Serial.println("Relay A,B,C,D ON.....");
        Serial.println("");
        command.println("");
        text = "";
    }

    delay(10);
    if(text.indexOf("afbfcfdf")>=0){
        digitalWrite(relayA, LOW);
        digitalWrite(relayB, LOW);
        digitalWrite(relayC, LOW);
        digitalWrite(relayD, LOW);
    }

```

```

state = "af";
stateB = "bf";
stateC = "cf";
stateD = "df";
Serial.println("Reading New Message.....");
Serial.println("Relay A,B,C,D OFF.....");
Serial.println("");
command.println("");
text = "";
}

delay(10);
if(text.indexOf("aobocodf")>=0){
    digitalWrite(relayA, HIGH);
    digitalWrite(relayB, HIGH);
    digitalWrite(relayC, HIGH);
    digitalWrite(relayD, LOW);
    state = "ao";
    stateN = "bo";
    stateC = "co";
    stateD = "df";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,B,C ON, D OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

delay(10);
if(text.indexOf("avocado")>=0){
    digitalWrite(relayA, HIGH);
    digitalWrite(relayB, HIGH);
    digitalWrite(relayC, LOW);
    digitalWrite(relayD, HIGH);
    state = "ao";
    stateN = "bo";
    stateC = "cf";
    stateD = "do";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,B,D ON, C OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("aob code")>=0){
    digitalWrite(relayA, HIGH);
    digitalWrite(relayB, LOW);
    digitalWrite(relayC, HIGH);
    digitalWrite(relayD, HIGH);
    state = "ao";
    stateB = "bf";
    stateC = "co";
    stateD = "do";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,C,D ON, B OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("avocado")>=0){
    digitalWrite(relayA, LOW);
    digitalWrite(relayB, HIGH);
    digitalWrite(relayC, HIGH);
    digitalWrite(relayD, HIGH);
    state = "af";
    stateN = "bo";
    stateC = "co";
    stateD = "do";
    Serial.println("Reading New Message.....");
    Serial.println("Relay B,C,D ON, A OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("afbfcdof")>=0){
    digitalWrite(relayA, LOW);
    digitalWrite(relayB, LOW);
    digitalWrite(relayC, LOW);
    digitalWrite(relayD, HIGH);
    state = "af";
    stateB = "bf";
    stateC = "cf";
}

```

```

stateD = "do";
Serial.println("Reading New Message.....");
Serial.println("Relay A,B,C OFF, D ON.....");
Serial.println("");
command.println("");
text = "";
}

```

```

delay(10);
if(text.indexOf("afbf code")>=0){
    digitalWrite(relayA, LOW);
    digitalWrite(relayB, LOW);
    digitalWrite(relayC, HIGH);
    digitalWrite(relayD, LOW);
    state = "af";
    stateB = "bf";
    stateC = "co";
    stateD = "df";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,B,D OFF, C ON.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("afb cdf")>=0){
    digitalWrite(relayA, LOW);
    digitalWrite(relayB, HIGH);
    digitalWrite(relayC, LOW);
    digitalWrite(relayD, LOW);
    state = "af";
    stateN = "bo";
    stateC = "cf";
    stateD = "df";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,C,D OFF, B ON.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("aobf cdf")>=0){

```



```

digitalWrite(relayA, HIGH);
digitalWrite(relayB, LOW);
digitalWrite(relayC, LOW);
digitalWrite(relayD, LOW);
state = "ao";
stateB = "bf";
stateC = "cf";
stateD = "df";
Serial.println("Reading New Message.....");
Serial.println("Relay B,C,D OFF, A ON.....");
Serial.println("");
command.println("");
text = "";
}

```

```

delay(10);
if(text.indexOf("abcpdf")>=0){
    digitalWrite(relayA, HIGH);
    digitalWrite(relayB, HIGH);
    digitalWrite(relayC, LOW);
    digitalWrite(relayD, LOW);
    state = "ao";
    stateN = "bo";
    stateC = "cf";
    stateD = "df";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,B ON, C,D OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("afbfcode")>=0){
    digitalWrite(relayA, LOW);
    digitalWrite(relayB, LOW);
    digitalWrite(relayC, HIGH);
    digitalWrite(relayD, HIGH);
    state = "af";
    stateB = "bf";
    stateC = "co";
    stateD = "do";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,B OFF, C,D ON.....");
}

```

```

Serial.println("");
command.println("");
text = "";
}

delay(10);
if(text.indexOf("aob code")>=0){
    digitalWrite(relayA, HIGH);
    digitalWrite(relayB, LOW);
    digitalWrite(relayC, HIGH);
    digitalWrite(relayD, LOW);
    state = "ao";
    stateB = "bf";
    stateC = "co";
    stateD = "df";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,C ON, B,D OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

delay(10);
if(text.indexOf("afb ocado")>=0){
    digitalWrite(relayA, LOW);
    digitalWrite(relayB, HIGH);
    digitalWrite(relayC, LOW);
    digitalWrite(relayD, HIGH);
    state = "af";
    stateN = "bo";
    stateC = "cf";
    stateD = "do";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,C OFF, B,D ON.....");
    Serial.println("");
    command.println("");
    text = "";
}

delay(10);
if(text.indexOf("aobf cfdo")>=0){
    digitalWrite(relayA, HIGH);
    digitalWrite(relayB, LOW);
    digitalWrite(relayC, LOW);

```

```

digitalWrite(relayD, HIGH);
state = "ao";
stateB = "bf";
stateC = "cf";
stateD = "do";
Serial.println("Reading New Message.....");
Serial.println("Relay A,D ON, B,C OFF.....");
Serial.println("");
command.println("");
text = "";
}

delay(10);
if(text.indexOf("afbocodf")>=0){
    digitalWrite(relayA, LOW);
    digitalWrite(relayB, HIGH);
    digitalWrite(relayC, HIGH);
    digitalWrite(relayD, LOW);
    state = "af";
    stateN = "bo";
    stateC = "co";
    stateD = "df";
    Serial.println("Reading New Message.....");
    Serial.println("Relay A,D OFF, B,C ON.....");
    Serial.println("");
    command.println("");
    text = "";
}

delay(10);
if(text.indexOf("ao")>=0){
    digitalWrite(relayA, HIGH);
    state = "ao";
    Serial.print("Reading New Message.....");
    Serial.print("Relay A ON.....");
    Serial.print("");
    command.print("");
    text = "";
}

delay(10);
if(text.indexOf("af")>=0){
    digitalWrite(relayA, LOW);
    state = "af";

```

```

Serial.println("Reading New Message.....");
Serial.println("Relay A OFF.....");
Serial.println("");
command.println("");
text = "";
}

```

```

delay(10);
if(text.indexOf("bo")>=0){
    digitalWrite(relayB, HIGH);
    stateN = "bo";
    Serial.println("Reading New Message.....");
    Serial.println("Relay B ON.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("bf")>=0){
    digitalWrite(relayB, LOW);
    stateB = "bf";
    Serial.println("Reading New Message.....");
    Serial.println("Relay B OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("co")>=0){
    digitalWrite(relayC, HIGH);
    stateC = "co";
    Serial.println("Reading New Message.....");
    Serial.println("Relay C ON.....");
    Serial.println("");
    command.println("");
    text = "";
}

```

```

delay(10);
if(text.indexOf("cf")>=0){
    digitalWrite(relayC, LOW);
    stateC = "cf";
}

```

```

    Serial.println("Reading New Message.....");
    Serial.println("Relay C OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

delay(10);
if(text.indexOf("do")>=0){
    digitalWrite(relayD, HIGH);
    stateD = "do";
    Serial.println("Reading New Message.....");
    Serial.println("Relay D ON.....");
    Serial.println("");
    command.println("");
    text = "";
}

delay(10);
if(text.indexOf("df")>=0){
    digitalWrite(relayD, LOW);
    stateD = "df";
    Serial.println("Reading New Message.....");
    Serial.println("Relay D OFF.....");
    Serial.println("");
    command.println("");
    text = "";
}

delay(10);
if(text.indexOf("status")>=0){
    String message = stateA + stateB + stateC + stateD;
    delay(3000);
    sendSMS(message);
    Serial.println("Reading New Message.....");
    Serial.println("Request For Status Sent.....");
    text = "";
}
}

void sendSMS(String message){
    command.println("AT+CMGF=1\r");
    delay(100);
    command.println("AT+CMGS=\"+8801796123000\"\r");
}

```

```
delay(100);  
command.println(message);  
delay(100);  
command.println((char)26);  
delay(100);  
command.println();  
delay(3000);  
}
```

4.3 Interaction Design and UX

The interaction configuration has been done likewise by us. We have shared our thoughts and in the wake of finishing our initial feeling we have sent the application to a portion of my local area. What's more, founded on their survey we have adjusted it. We focused on client experience with our application. Ideally, presently everybody going to adore its client experience. They can associate with it without any problem.

4.4 Implementation Requirement

We collect our necessary requirements and implemented it, we have followed some technique to implement the project very easily. At first, we collect our components.

Secondly, we connect the components very carefully.

Next, we write our necessary code and install it in the Arduino Uno.

Then, we run our project. We run our project many times to avoid error.

CHAPTER 5

Implementation and Testing

Introduction

In this chapter, we are going to describe our implementation and testing, result of our project.

5.1 Implementation of Database

In this area, we initialize our code of the project and install it in the Arduino Uno. If we send a sms to the coding number it connect with this code that is install in the Arduino Uno.

5.2 Implementation of Front-end Design

For front-end design, we have used-

- Arduino Uno
- SIM900 GSM/GPRS Shield
- GSM SIM card
- DC Relay
- Jumper wires to interconnect the gadget
- Force connectors to control the gadget

We connect with the components for our front-end design.

5.3 Testing Implementation

After completing front-end and back-end design we started for testing. For testing we use, the testing chart.

5.3.1 Chart of SMS texts with the effects

Chart of SMS table

#	SMS Text	Effect
1	aobocodo	Switch 1 ON, Switch 2 ON, Switch 3 ON, Switch 4 ON
2	afbfcdff	Switch 1 OFF, Switch 2 OFF, Switch 3 OFF, Switch 4 OFF
3	aobf cdfd	Switch 1 ON, Switch 2 OFF, Switch 3 OFF, Switch 4 OFF
4	afb cdfd	Switch 1 OFF, Switch 2 ON, Switch 3 OFF, Switch 4 OFF
5	afbf code	Switch 1 OFF, Switch 2 OFF, Switch 3 ON, Switch 4 OFF
6	afbfcdfo	Switch 1 OFF, Switch 2 OFF, Switch 3 OFF, Switch 4 ON
7	avocado	Switch 1 OFF, Switch 2 ON, Switch 3 ON, Switch 4 ON
8	aob code	Switch 1 ON, Switch 2 OFF, Switch 3 ON, Switch 4 ON
9	avocado	Switch 1 ON, Switch 2 ON, Switch 3 OFF, Switch 4 ON
10	aobocodf	Switch 1 ON, Switch 2 ON, Switch 3 ON, Switch 4 OFF
11	abcpdf	Switch 1 ON, Switch 2 ON, Switch 3 OFF, Switch 4 OFF
12	aobf cfdo	Switch 1 ON, Switch 2 OFF, Switch 3 OFF, Switch 4 ON
13	afbfcode	Switch 1 OFF, Switch 2 OFF, Switch 3 ON, Switch 4 ON
14	afbocodf	Switch 1 OFF, Switch 2 ON, Switch 3 ON, Switch 4 OFF
15	aob code	Switch 1 ON, Switch 2 OFF, Switch 3 ON, Switch 4 OFF
16	afb ocado	Switch 1 OFF, Switch 2 ON, Switch 3 OFF, Switch 4 ON

17	ao	Switch 1 ON
18	af	Switch 1 OFF
19	bo	Switch 2 ON
20	bf	Switch 2 OFF
21	co	Switch 3 ON
22	cf	Switch 3 OFF
23	do	Switch 4 ON
24	df	Switch 4 OFF
25	status	Get a SMS with conditions of all switches

5.4 Test Results and Reports

We tested the project many times and it perfectly works.

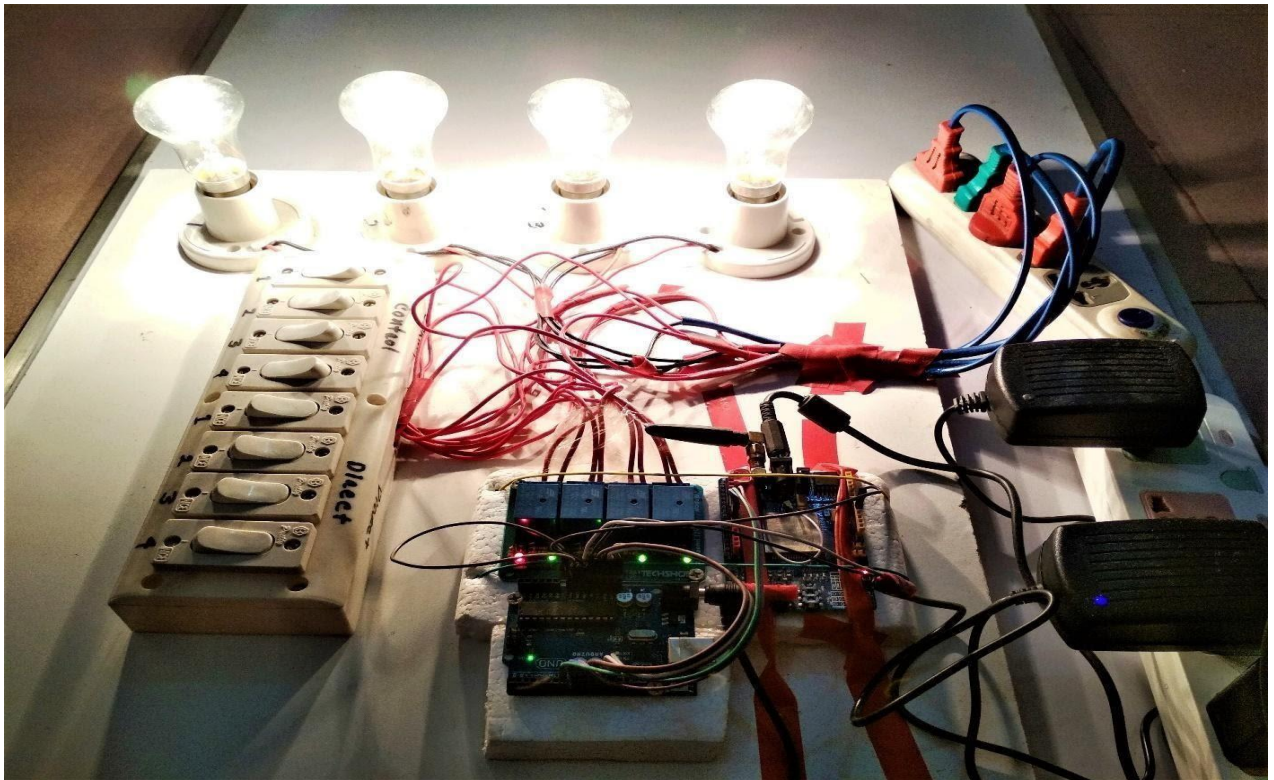


Figure 5.4: The result of the project.

CHAPTER 6

Impact on Society, Environment, Sustainability

6.1 Impact on Society

This project plays impact on society.

- It will reduce cost.
- It will reduce loss of electricity.
- Keep mind in peace.

6.2 Impact on Environment

Environment become well by this project. This project will not do anything with the environment.

6.3 Sustainability Plan

By making a lifecycle-based norm for home apparatus supportability, the Association of Home Appliance Manufacturers plans to give an accommodating device to the general population.

CHAPTER 7

Conclusion and Future Scope

Introduction

Each advancement and development have future degree and plan. This section describe about the future viewpoints and plan with respect to this web project.

7.1 Conclusion

The design for the device that we have developed and tested is quite functional and the model device is performing as up to the expectations. However, the model device and the program that is running with the model device is not ready to be sold as a product for consumers. The proper controlling of the home appliances of a user is highly dependent on the number of home appliances, switching conditions and SMS format chosen by the user. The number of channels for the DC relay and the program for the device need to be added and changed to match the user preference. It is to be considered that, more the number of home appliances, more the number of channels for the DC relay and more the number of switch condition combinations have to be added in the program for the device.

The aim of our project is reasonably fulfilled as the performing model device is still can be improved or, redesigned until the cost decreases or, the reliability and the functionality increase. Although, the model device is meant to be experimentally performing for the project, it is powerful and functional enough to perform for a small room with a few home appliances.

7.2 Future of the Project

1. The device can be redesigned by uniting the circuits of the elements into a single PCB to decrease the cost and increase the stability.
2. A smartphone application can be made to send SMS without typing using touch activated buttons as switches for the home appliances.
3. Many protective and security features can be added to the device to satisfy the user.
4. The Arduino Uno can be replaced by Arduino Mega (a more powerful development board with a faster system with 63 more general purpose I/O lines) to increase the functionality.

The program for the device can be rewritten to improve the ability of handling many switching combinations at the same time

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