

VOICE CONTROLLED HOME AUTOMATION SYSTEM USING ARDUINO

BY

MD. SHAHARIAR ALAM

ID: 162-15-8113

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

Supervised By

Mohammad Jahangir Alam

Lecturer

Department of CSE

Daffodil International University

Co-Supervised By

Mr. Saiful Islam

Senior Lecturer

Department of CSE

Daffodil International University

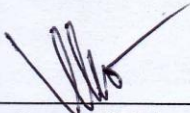


**DAFFODIL INTERNATIONAL UNIVERSITY
DHAKA, BANGLADESH
MAY, 2019**

APPROVAL

This Project titled “**Voice Controlled Home Automation System Using Arduino**”, submitted by Md. Shahariar Alam, ID No: 162-15-8113 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. The presentation has been held on 02-05-2019.

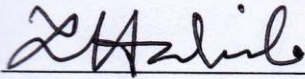
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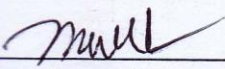
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Faculty of Science & Information Technology
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Internal Examiner



Dr. Swakkhar Shatabda
Associate Professor

Department of Computer Science and Engineering
United International University

External Examiner

DECLARATION

I thusly announce that, this task has been finished by me under the supervision of **Mohammad Jahangir Alam**, Lecturer, Department of CSE, Daffodil International University. I likewise proclaim that neither this venture nor any piece of this undertaking has been submitted somewhere else for honor of any degree or recognition.

Supervised By:

for
Saiful
05.05.2019

Mohammad Jahangir Alam
Lecturer
Department of CSE
Daffodil International University

Co-Supervised By:

Saiful
05.05.2019

Mr. Saiful Islam
Senior Lecturer
Department of CSE
Daffodil International University

Submitted By:

Shahariar
05.05.2019

Md. Shahariar Alam
Department of CSE
Daffodil International University

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ABSTRACT

Home automation system is getting to be famous step by step everywhere throughout the world on account of making life simpler by limiting the remaining task at hand. Home automation alludes to the programmed and electronic control of family machines, highlights furthermore, exercises. At present the most imperative gadget in our day by day life is cell phone. In this task an ease and easy to use remote controlled home automation system is displayed utilizing Arduino, Bluetooth module, Smartphone and distinctive sort of sensor. A cell phone application is utilized in the recommended system which enables the clients to control home apparatuses and sensors utilizing Bluetooth innovation. A large portion of the regular home automation systems are intended for unique purposes while the proposed system is a universally useful home automation system and we can without much of a stretch execute this system in any current home and office. This task portrays the equipment and programming design of the proposed system, future work and objective. The proposed model of **Voice Controlled Home Automation System Using Arduino** is actualized and tried on equipment and it gave the precise and anticipated outcomes.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This is 21st century and we are living in a period of brilliant innovation. When individuals said that cutting edge life is impossible without power and now individuals state, day by day life is unfathomable without web. Present day innovation has contacted another dimension of programmed and brilliant systems. In this days there is no compelling reason to present the upside of utilizing innovation. As we probably am aware, the progression has gone far and nearly has come to its pinnacle of modernization. The present a standout amongst the most essential gadgets of current occasions is Smartphone and another critical component of current age is the Internet. The way to venture into the universe of programmed control system is the mix of Smartphone and the Internet. Thusly, with the assistance of these two and microcontrollers home automation is conceivable.

Home automation is "The Internet of Things". The way during which that the bulk of our gadgets and machines are associated along to convey us the same management of our home. Home automation has been around from numerous decades as far as lighting and straightforward apparatus control, and as of late innovation has gotten up to speed for the possibility of the interconnected world, permitting full control of our home remotely. We have great and shabby offices to remote systems and as yet creating in Bangladesh. The legislature and a few associations are endeavoring to build up our nation in high innovation and high innovation isn't around few highlights. What takes the high innovation to next dimension is Automatic System. That is the reason the interest of programmed electronic gadget is expanding.

1.2 Motivation

In 2008 Marvel Studios discharged a Movie called Iron-Man. In that film there was a character known as "Jarvis" who was an Artificial Intelligence voice controlled Assistant. The CEO of Facebook, Mark Zuckerberg was motivated from that motion picture and character and in 2016, he has assembled an Artificial Intelligence (AI) voice controlled colleague for his home. He has depicted that it resembles an advanced head servant who can talk, play music, control lights and toasters. It can likewise say who is at the entryway. This undertaking has made a motion picture character nearly come to genuine. These days 'Alexa' and 'Google Assistant' likewise get greater notoriety as a voice control individual Assistant. The great work of Mark Zuckerberg has propelled me to do the venture of home automation. Home automation results in a more brilliant home and is utilized to give a higher and more beneficial way of life. We trust one day practically all houses will be a keen house. This task is a little advance to achieve this objective.

1.3 Objectives

The main objective of this project is to make a low cost, reliable and user friendly Voice Controlled Home Automation System using Arduino. An automation system includes controlling of home appliances like Light, Fan, Air Conditioner (on/off), Television (on/off), Room Temperature Update, Motion Sensing etc.

Another most important objective is to develop the entire system such a way that all the appliance can be control through the voice command as like as text command. Some important appliance can be controlled automatically by motion.

1.4 Expected Outcome

Controlling home appliances like Light, Fan, TV, Air Conditioner etc. with Android phone through Bluetooth communication using Bluetooth Module by Voice Command or Text Message. This will work only inside the house.

The following will be solved among the sub - objectives

- Ability to control all the appliance through voice command
- Ability to control all the appliance through text command
- Controlling some important appliance automatically by motion sensor and other sensors.
- A low cost smart home automation system

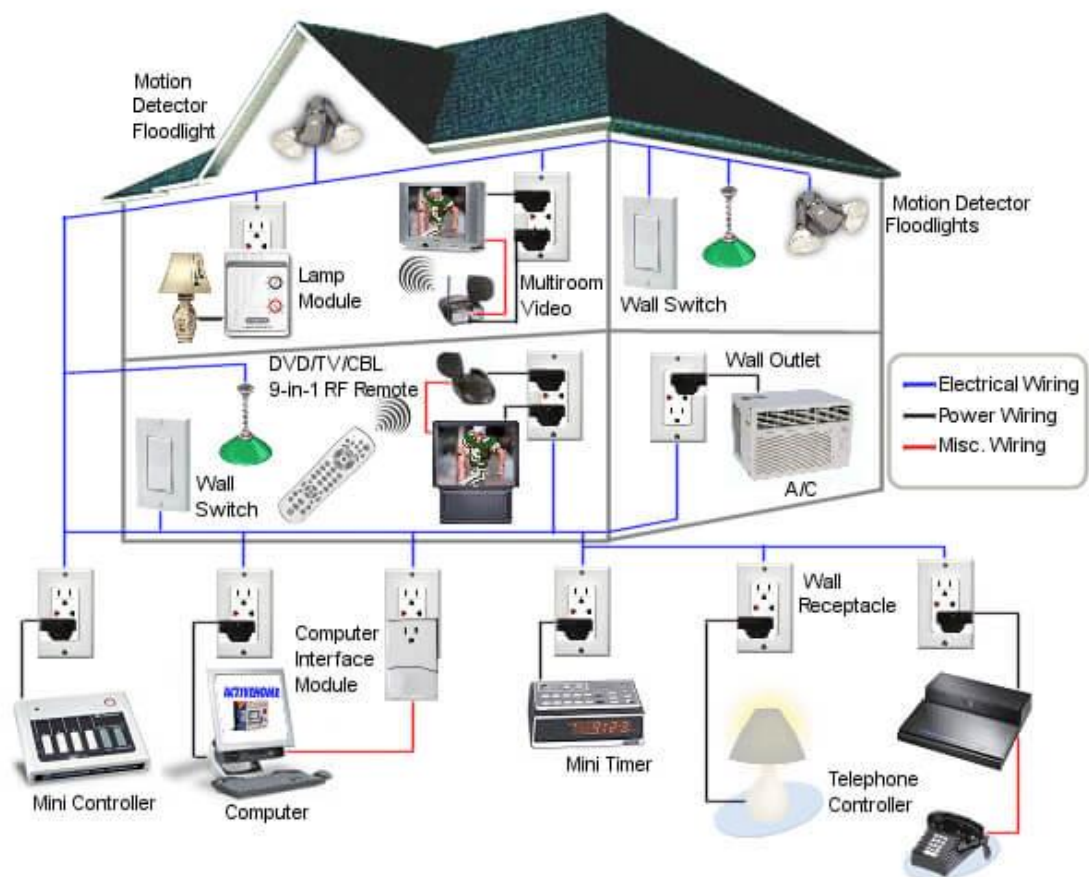


Figure 1.1: An Outlook of Smart Home Automation System.

1.5 Report Layout

This report is designed so as to give a comprehensive understanding of the system, how it operates, how it is reported and the results of the research, among the sub - goals it is expected to achieve. The report follows DIU's standard reporting template.

This chapter introduce the project and the report itself. In this chapter I describe the objectives of this project, the motivation, and the expected outcome of this project.

The following chapter is about the background, related works and issues. This chapter includes detailed citations and work descriptions of what the researcher has already been done to understand their work and the results of their work.

Chapter 3 is about Requirements specification. What kind of hardware and software we are using in this project and how the work and also the specification of every single hardware is discussed briefly in this chapter.

Chapter 4 is about Design specification. In this chapter I describe the block diagram, the flow chart of the proposed system. I also describe about every component how they are connected and the coding procedure of them. The software I used for this project is also describe in the last portion of this chapter.

Chapter 5 is about implementation. After all this analysis and research I implement this project and the result of testing the implementation of this project has given in this chapter. The analysis report is also describe in this chapter.

The final chapter contains the limitations, future work and discussion about the summary of this project.

CHAPTER 2

BACKGROUND

2.1 Introduction

Home automation is the internet of tasks, the scheme in which that the bulk of our appliances and apparatuses may be correlated together to assign us a sustained oversight of our home. [3] There are numerous projects done dependent on home automation. They are on the whole unique in relation to one another. The thing that matters is in plans, highlights, gadgets, components and calculation. They were structured by explicit requirements. Some of them are shabby and some of them are costly. Accessibility of both equipment and programming is important to work.

2.2 Related Work

I scanned for a long lastly I discovered a few articles dependent on Arduino, Bluetooth and home automation. Numerous projects are finished by Arduino just for security reason.

There are not many projects are done on Fingerprint Recognition Module for solid security issues at home. [6] One of the projects utilized biometric strategy for cutting edge E-visa. The e-international ID is known as, speaks to a strong activity in the organization of two new innovations: Radio-Frequency Identification (RFID) and biometrics. [5] [7]

Some home automation projects use Bluetooth or ZigBee for the remote association. And furthermore with the assistance of Wi-Fi and because of the presentation of IPv6 the association of practically boundless number of installed gadgets is conceivable. [8] In Bangladesh, we use IPv4.

An article which released in 2016 indicate that utilizing PIR sensor with Arduino Mega is a shabby and powerful security system that can advise around a gatecrasher through caution. Individuals cost a lot of cash on close to home security protect for home security. They made this simpler and less expensive than security protect and exorbitant observation camcorders. [9]

A minimal effort and remote controlled automation system was structured by specialists where Bluetooth innovation was utilized to give remote controlled remote access to client. [4]

2.3 Comparative Studies

I already mention that there are many project done base on Arduino and home automation system, but this project is different from them. It has different diagram, configuration, gadgets, components and code to control the system. It has lots of keyword to control the system smoothly and it is cheap than others, so anyone can afford it for their home and office to make them smart.

2.4 Scope of The Problem

These are not the only investigates done on comparative theme. As I state prior that they are not quite the same as each by configuration, highlights, gadgets, components and calculation. A portion of these projects are finished with Arduino and some of with Raspberry Pi. The segments, similar to sensors and shields models are likewise of various. Some of them are shabby and some of them are costly. My point is to consolidate those systems together for example controlling home apparatuses with Arduino and keeping it as shoddy as could be expected under the circumstances.

2.5 Challenges

The main challenges for this project is to complete the project in as cheap as possible. There are many projects already done on this, so I had to make this project different from them. Another most important challenge for this project is to control the appliance by voice command, so I had to set the appropriate keyword to the Arduino to make it smother.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Introduction

Before begin the project we have to present with the parts that expected to execute this project. It is critical to know all the data about both equipment and programming particulars. There are lots of components I used this project like microcontroller, sensors, modules and so on. We need to know some basic about these components.

3.2 Requirement Collection and Analysis

The segments depiction is given beneath:

- i. Arduino Mega 2560
- ii. PIR Motion Detector (HC – SR501)
- iii. Light Dependent Resistor (LDR)
- iv. Bluetooth Module HC-05
- v. Relay Module 5V 4 Channel
- vi. Breadboard

3.2.1 Arduino Mega 2560

The Arduino mega is known as a microcontroller board contingent on the atmega1280. It has total 54 input/output pins. Out of 54 pins 14 pins known as PWM output, 16 pins known as simple sources of info, 4 pins known as UARTs which is used for connect with other modules, it has also a stone oscillator which is 16 MHz, it has a power jack and an USB port for supply the power on it, the USB port also used for insert the code on it, it has a header which is known as ICSP, it has also a reset button on it to reset device and bring it on default mode. It comprises everything forecast to help the microcontroller. [10]

In this project I have utilized a power keep money with the Arduino Mega 2560 to give the influence supply through the USB link and different parts.

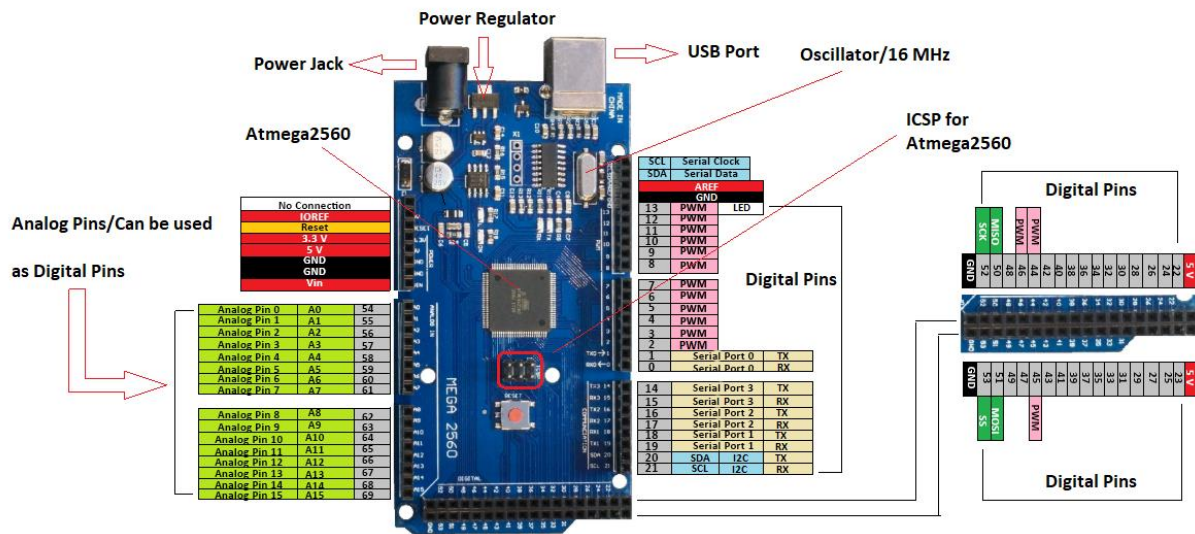


Figure 3.1: Arduino ATmega 2560

The specification and limitation of Arduino Mega 2560 [10] is given below:

Model of microcontroller	ATmega1280
Functionate Voltage	5V
Recommended Voltage	7-12V
I/O Pins (Digital)	Total pin 54 (15 provide PWM output)
Input Pins (Analog)	16
DC Current supply for I/O Pin	40mA
DC Current supply for 3.3V Pin	50mA
Flash Memory	Total size 128 KB of which 4 KB used by boot loader
SRAM	8 KB
EEPROM	4 KB
Clock Speed	16 MHz

Table 3.1: specification and limitation of Arduino Mega 2560

3.2.2 PIR Motion Detector (HC – SR501)

The PIR stand for Passive Infra-Red Sensor HC-SR501 depends on infrared innovation which recognizes movement by estimating changes in the infrared dimensions radiated by encompassing items. This movement can be identified by checking for a high flag on a solitary I/O stick. Module gives a streamlined circuit that will identify movement up to 6 meters.

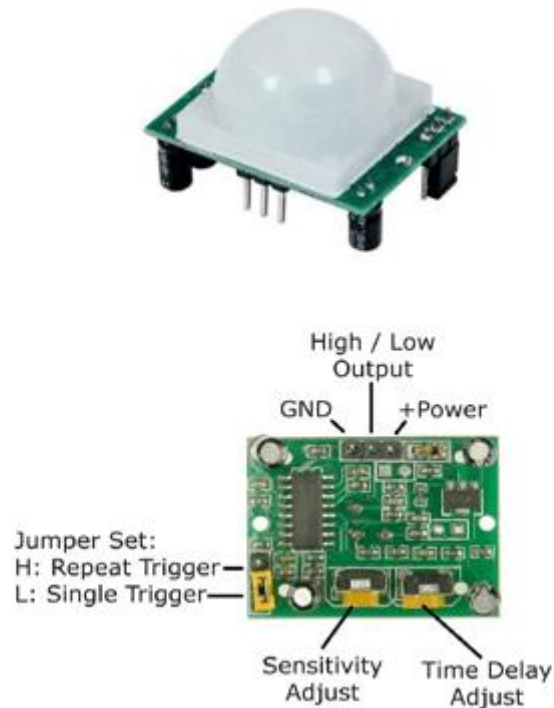


Figure 3.2: PIR Motion Sensor

Specification: 5-20V power supply is needed to activate the PIR sensor. When it get minimum 3.3V the sensor generate high signal and when it get 0V it generate low signal.

Application: It is for the most part utilized in security reason, body enlistment toys and modern automation toys. Pyro-electric infrared switch is a detached infrared switch which comprises of pyro-electric infrared sensors, BISS0001 and a couple of outer parts. It can consequently open a wide range of gear including radiant light, fluorescent light, radio, programmed, electric fan, dryer and programmed clothes washer, and so on. It is broadly utilized in undertakings, inns, stores, and passageway and other delicate region for naturally lamplight, lighting and caution system.

3.2.3 Light Dependent Resistor (LDR)

A Light Dependent Resistor (LDR) is a light-controlled variable resistor. It is otherwise called Photoresistor. The opposition of a LDR diminishes when the light force increment, as such, it displays photoconductivity. A photoresistor can be connected in light-touchy finder circuits, and light-actuated and dim enacted exchanging circuits. A high opposite semiconductor is known as a photoresistor. [11]



Figure 3.3: Light Dependent Resistor (LDR)

3.2.4 Bluetooth Module HC-05

Hc-05 scheduler is a straightforward to employ Bluetooth serial port protocol. It is configured for uncomplicated unimpeded synchronous extension installation. The many interesting and courteous piece of hc-05 usb subsystem is it continues to be exploited as a servant or servant. This strand render it an unforgettable reply for unimpeded communications. The usb version of this module is v2.0. The data rate of this module is 3mbps.

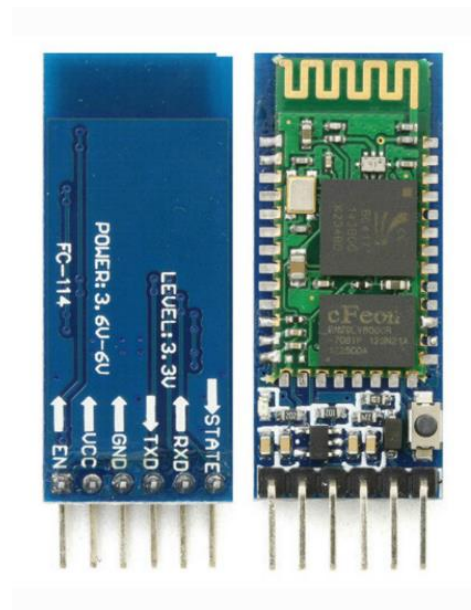


Figure 3.4: Bluetooth Module HC-05

Hardware Features: This Bluetooth Module takes 1.8V for task, with constraint of 3.3V to 5V I/O. Affectability is commonly - 80dBm and UART interfacing with baud rate is programmable. Edge connector is likewise present.

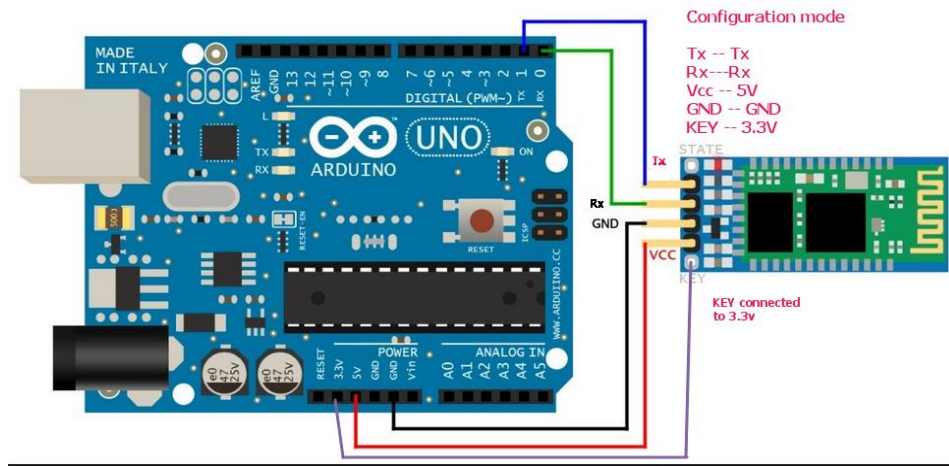


Figure 3.5: Connection of Bluetooth Module with Arduino

Software Features:

- Default baud rate for the slave is: 9600
- Data bit is: 8 bit
- Require stop bit is: 1
- Parity bit: No
- Pin code: 1234 or 0000 as default

3.2.5 Relay Module 5V 4 Channel

It is a 5V 4-channel hand-off board used to control different apparatuses. It very well may be utilized with or without microcontrollers. Each 5V hand-off requirements 20mA driving current. It has LEDs for sign of yield status.



Figure 3.6: Relay Module 5V 4 Channel

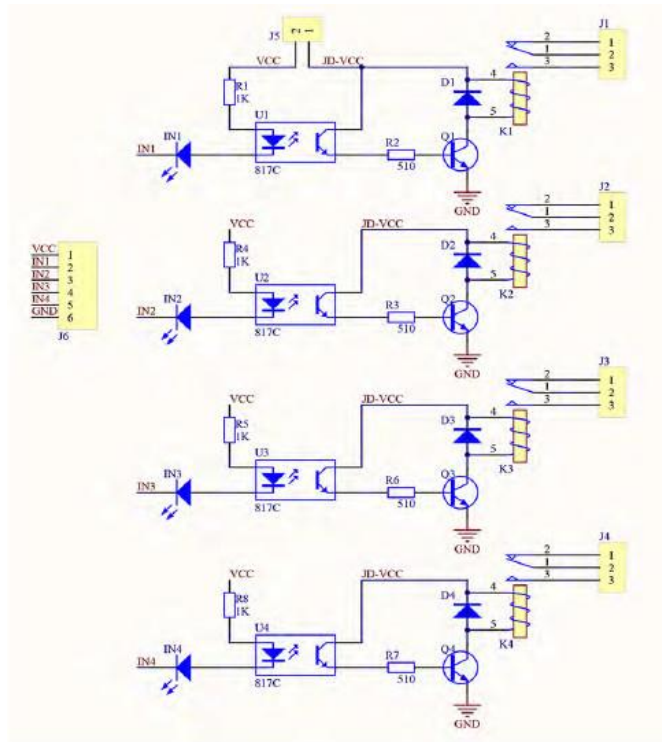


Figure 3.7: Schematic of 4-Channel Relay module.

3.3 Use case Modeling and Description

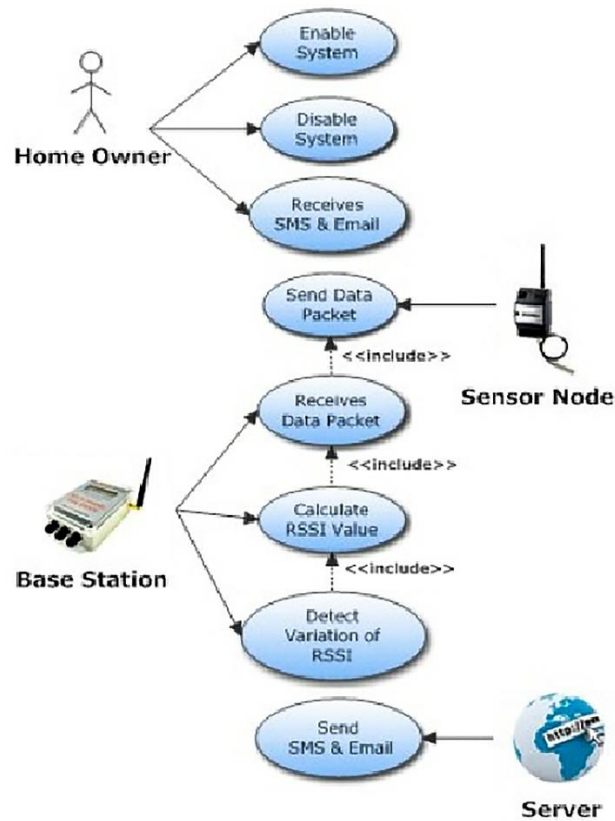


Figure 3.8: Use case diagram of Home Automation

The home owner can enable and disable the system. To enable the system the owner have to open the application on his phone and connect the Bluetooth module by inserting the password. When the connection is established the owner just have send command by voice or text to the Arduino (Base Station). The sensors can send the data pack to the Arduino. The Arduino can receive the command, calculating RSSI value, detect variation of the value and take the action based on the command.

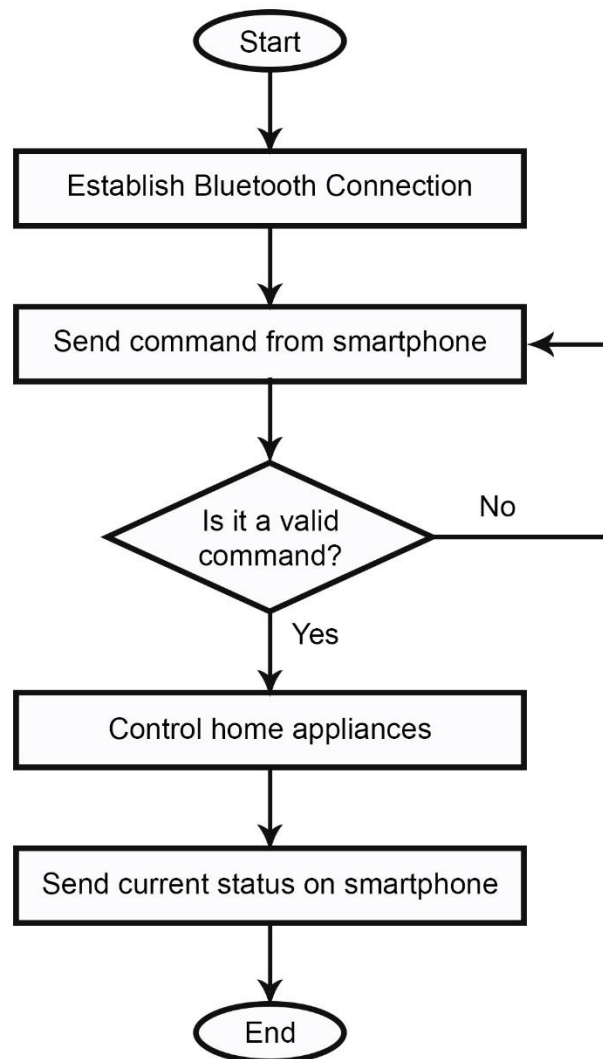


Figure 3.9: Flow chart of Home Automation

CHAPTER-4

DESIGN SPECIFICATION

4.1 Introduction

As indicated by the proposed system, we have planned the system structure appeared in the square graph (Figure 4.1). All programming and segments establishment are done and tried inside the home and Lab. There are a lots of parts and wires I have utilized for the system. This is done in the most straightforward and least cost conceivable. Be that as it may, the system is adaptable and can be redone by the client. Transforming one of the parts setup must be perfect with the correct programming accessible. Every segment was modified independently with Arduino Mega utilizing Arduino IDE. This project is separated into two sections: equipment usage and programming execution.

4.2 Implementation Requirements

Block diagram of the home automation system is given below:

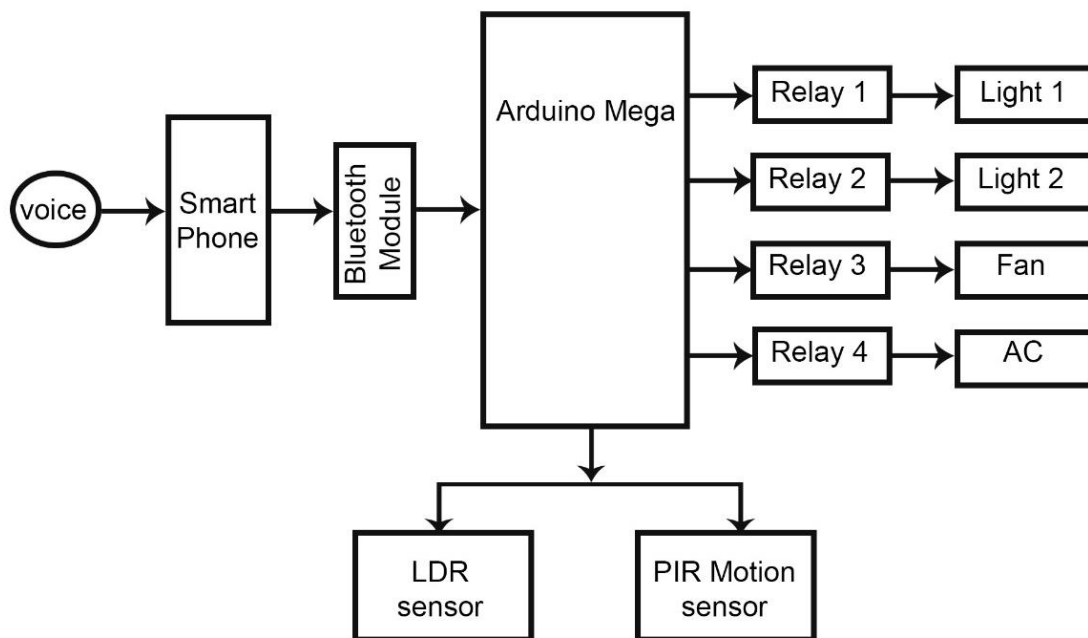


Figure 4.1: Block diagram of the home automation system

4.2.1 PIR Motion Sensor (HC – SR501)

In this project I am utilizing one PIR Motion Sensor HC – SR501 for an indoor light to transform on and off consequently when somebody go into the house from outside. At the point when the sensor distinguish any item it sends a high flag to the Arduino the Arduino perform activities as indicated by the order. PIR security sensor is associated with computerized stick 9.

4.2.2 Light Dependent Resistor (LDR)

In this project I am utilizing a Light Dependent Resistor (LDR) circuit for an open air light to consequently on/off amid day and night. A light will be on when it sense dim and a light will be off when it sense light. When a photoresistor sense dark it faced obstruction as high as Mega ohms ($M\Omega$), when a photoresistor sense light it faced obstruction as low as hundred ohms.

4.2.3 Bluetooth Module HC-05

Bluetooth module assumes the most imperative job in interfacing the home machines with the Android telephone yet it has just four pins for association. Stick associations are given beneath:

Bluetooth Pins	Arduino Pins
TX	RX
RX	TX
VCC	5V
GND	GND

Table 4.1: Bluetooth pins interface

4.2.4 Relay Module 4 Channel

In this project I am utilizing a 5V 4-Channel Relay Module. This transfers are associated with all the apparatus as a switch. The transfer will be on after every one of the sensors and modules are high. Each hand-off requirements 20mA driving current. The association is finished by the schematic outline.

4.2.5 Pin Configuration with Arduino Mega

SL	Arduino	Components
1	Pin 0 RX	TX (Bluetooth)
2	Pin 1 TX	RX (Bluetooth)
3	2	Light 1
4	3	Light 2
5	4	Light 3
6	5	Light 4
7	6	Light 5
8	7	Light 6
9	8	Light 7
10	9	PIR Sensor
11	10	Light 8
12	22	Light 9
13	23	Light 10
14	5V	Relay, Bluetooth VCC, PIR VCC, LDR VCC
15	GND	Relay, Bluetooth GND, PIR GND, LDR GND

Table 4.2: Pin interfacing with Arduino

4.3 Software Implementation

The product I utilized is Arduino IDE 1.8.5. All code is written in a solitary IDE called sketch. Every one of the parts are Arduino perfect so we have included individual Arduino Ada fruit Library. I separated the programming part in 3 sections, for example, Sensor, Module, and Android Application.

4.3.1 Sensor

A sensor is an electronic gadget that reacts to any change in physical marvel or ecological factors like warmth, weight, mugginess, development and so on. The sensors are simple to-computerized flag supplier. These sensors produce ceaseless yield flag. PC can't peruse or

dissect ceaseless qualities so every one of the sensors should be aligned concerning some reference esteem or standard for precise estimation. After that the flag created by the sensor is analyzable. A standout amongst the most vital qualities of sensors is that the yield should change straightly with the info. The product setup of the sensors I utilized is given beneath:

PIR Motion Sensor: The principle part of the calculation is to concentrate on estimating voltage from PIR sensor. It additionally incorporates input estimation filtration PIR_DeInit() and PIR_Init() utilized for deinitialization and initialization, at that point discover the yield voltage by filtration of flag from PIR sensor.

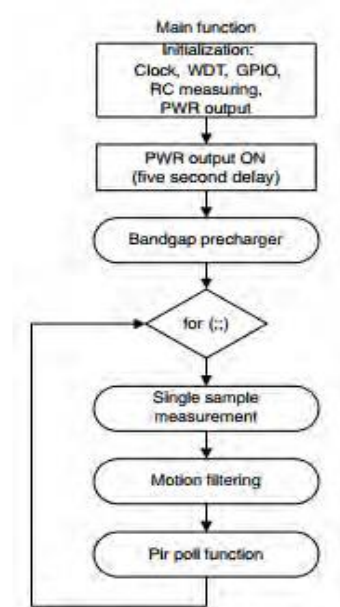


Figure 4.2: flowchart of PIR

4.3.2 Modules

In this project I used two modules such as Bluetooth Module and Relay Module.

Bluetooth Module: The default baud rate for AT mode is 38400. First we need to physically enter the AT mode. It continues perusing information in the wake of entering. The Bluetooth module transfers the order and shows it when the direction is given in the sequential screen. Deciding correspondence speed we utilized the capacity setup() instead of start() and findBaud(). To send a direction to the module the capacity cmd() is utilized. The key (cmdPin) stick is enacted to put the module in direction mode where 'AT' directions are perceived. The default elements of mode begin and end are utilized for the speed 38400. We can change the speed by AT order. I transformed it to 9600. In this system, I can control the home apparatuses through Android Application by means of Bluetooth. The Android App interfaces with microcontroller by means of Bluetooth. Exchanging of home machines is its principle work. In this system we just give order from the Android to the system by both the Voice direction and Text order. No order is returned through the Bluetooth.

Relay module: It is completely a hardware part, so we do not need any programming for this.

4.3.3 Android Application

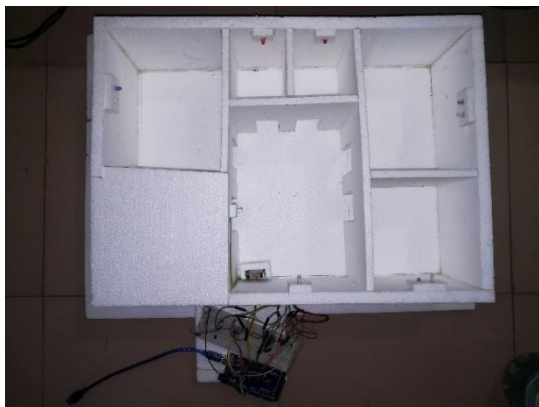
This project is developed such a way that you can control the Arduino by any Voice Control Arduino App. You can find the apps on Android play store.

I used few apps on this project like IoTBoys, Arduino Voice controller, Arduino Bluetooth Controller.

CHAPTER 5 IMPLEMENTATION AND TESTING

5.1 Implementation of Interactions

In the wake of programming and associating every one of the segments with the Arduino, I directed the trial. I have plan and run every one of the parts as indicated by the proposed system. I have structured a precise model of a house and set the segments. All modules and microcontroller are kept together interface with a great deal of wires. The sensors are set inside the room (Figure 5.1). All directions are given from Smartphone through voice order Android App.



(a)



(b)

Figure 5.1: Top view of prototype of proposed System (a) & (b)

5.2 Testing Implementation

The automatic outdoor light on and off during the day and night time shown on the Figure 5.2



(a) Outdoor light on



(b) Outdoor light off

Figure 5.2: LDR light on and off (a) Outdoor light on (b) Outdoor light off

An indoor light connected with PIR Motion Sensor automatically on and off when someone enter into the house. Figure 5.3



(a) Indoor light on



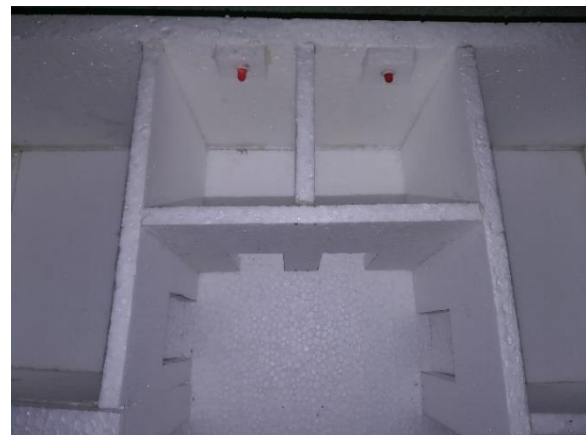
(b) Indoor light off

Figure 5.3: Indoor light on and off with PIR Motion Sensor

I have more than one room in my prototype, so I have to give them different names for controlling with voice command. I have Room A, Room B, Room C, Bathroom, Kitchen and Hall Room. When we want to control any appliance of these rooms we have to mention their name first, like Room A light on, Bathroom light on etc.



(a) On

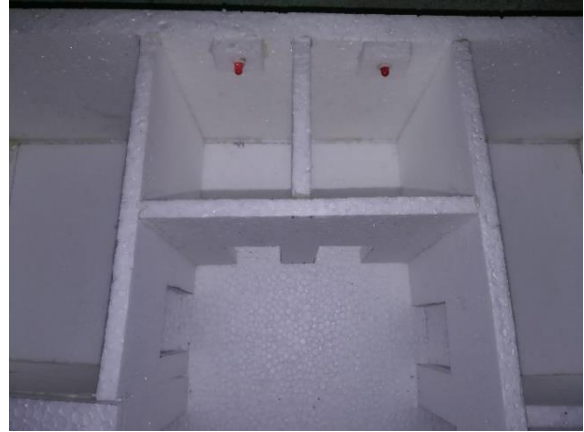


(b) Off

Figure 5.4: Kitchen light on and off with voice command (a) Light on (b) Light off



(a) On

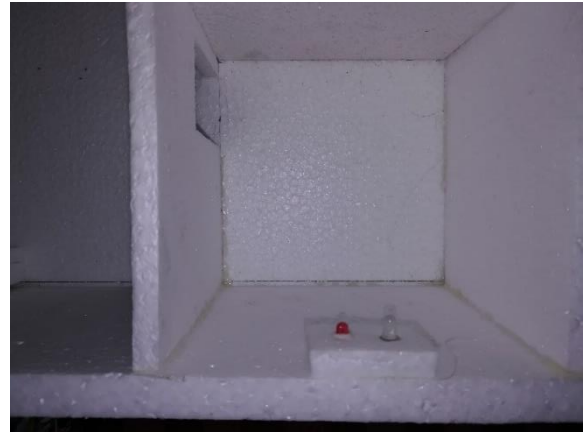


(b) Off

Figure 5.5: Bathroom light on and off with voice command (a) Light on (b) Light off

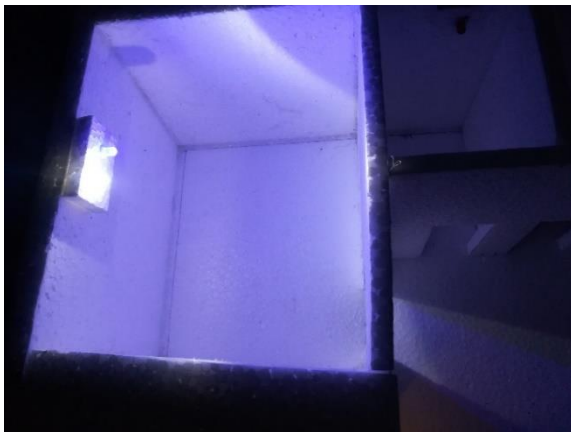


(a) On



(b) Off

Figure 5.6: Room A light on and off with voice command (a) Light on (b) Light off



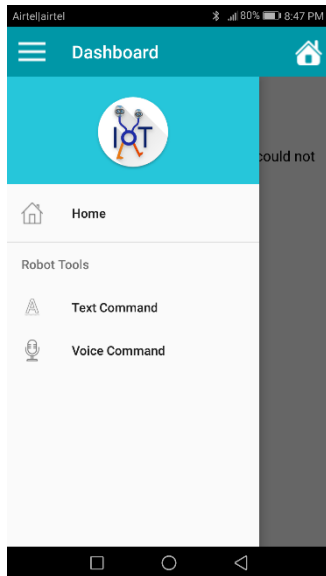
(a) On



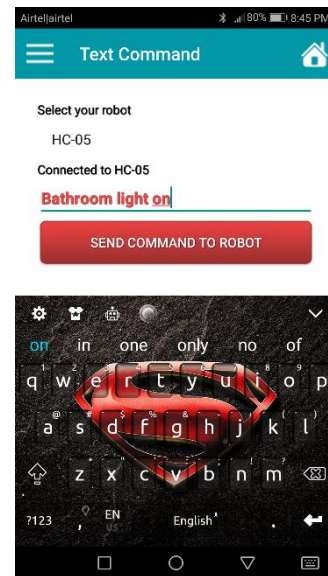
(b) Off

Figure 5.7: Room C light on and off with voice command (a) Light on (b) Light off

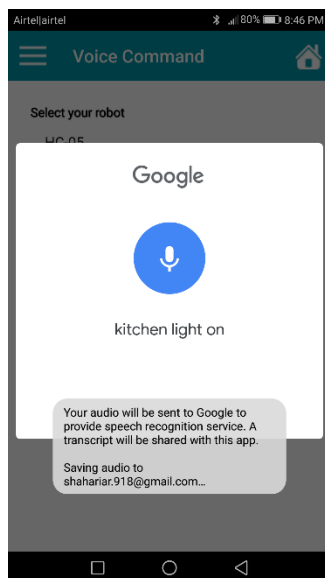
I have use an Android App called IoTBoys which is developed by IoT Boys to control the appliance using voice command and text message. This app is very user friendly. You just have to download it from Google play store and install on your smartphone. After open the app you need to turn on your Bluetooth and connect to your Bluetooth module. When the connection is confirmed you can send command by voice or text.



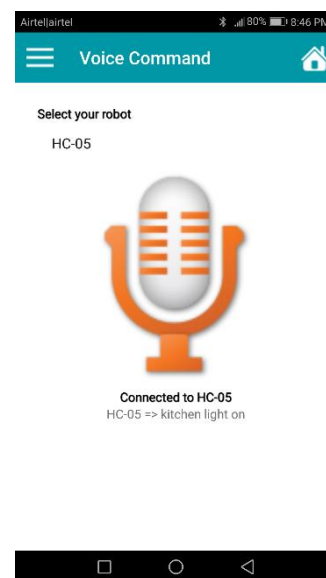
(a) App interface



(b) Sending command using text



(c) Sending command using voice



(d) Command send and waiting for new command

Figure 5.8: Use of Android Application (a), (b), (c) & (d)

5.3 Analysis

The usage of this project is definitely not a total project. This is a model of a bigger system for an ale house or office. There are some essential issues to see in this project. In the wake of playing out every one of the errands I saw that the voltage and current are not the equivalent of the data of the segment. I have utilized a few gadgets that need high and consistent supply. Generally there is delay in the assignment. There is likewise a danger of crushing the gadgets if the voltage achieved exceptionally high. To keep up a steady power supply, we can utilize DC-DC buck converter and a connector. In any case, there is an issue with that, it won't work without power. All sensors need time to give a steady perusing like, in handling of voice order, it takes most extreme 4 seconds postponement. The affectability of the sensors can be differed by the need of the client. The entire program is written in a solitary Arduino IDE so it is extremely simple for the client to change any sort of capacity. By and large the utilization of this automation system is simple, adaptable and dependable. We can undoubtedly include additional highlights in this system.

CHAPTER 6

CONCLUSION

6.1 Discussion

From this project, I discover the system adequately minimal effort and easy to understand. The entire house appliances stays under the client's control. In future we may discover a few gadgets that will increasingly dependable, quicker and less expensive. I have attempted to make a decent controlling of home apparatus. Every one of the assignments of this project are done effectively. I am ready to satisfy my objectives as proposed in this system.

Practically all logical and most recent advances have both great and terrible sides. That doesn't mean we ought to keep away from innovation. This sort of work rouses us to improve the situation for our nation. Brilliant Technology is a gift for everybody. We should endeavor to stay away from the terrible outcomes and use it for our advancement.

6.2 Limitations

There are a few confinements watched all through in this project. Since this project depends on voice control, we have to set the catchphrases to the Arduino. The more watchword we set for voice direction more it will work easily. In any case, the memory size of Arduino mega isn't substantially more that we have to set loads of catchphrases. For this issue we need to utilize more than one Arduino to control entire house appliance easily. It may does not work properly if there is too much noise around it. So for seamless control you have be in a quiet place when you want to command the Arduino.

In spite of the fact that it needs less hardware yet its expense isn't in insignificant range. To get office, clients need to cost for this. The expense of introducing a home automation system can be partly costly. However, it relies upon the device. The more refined the system is the more costly it will be. Home automation has various downsides. For having home computerized system, individuals will be lazier. That eventually may finish up with making incredible mischief in human social and expert life. Home automation has various disadvantages. For having home computerized framework, individuals will be lazier. That at last may finish up with making incredible damage in human social and expert life.

6.3 Future Scope

I previously referenced before this is only an essential structure of an extensive complete system. I have done the fundamental necessities of a run of the mill house. The assignments that I have done isn't the main undertakings the segments can do. There are a ton of different degrees for this project. More apparatuses can be included this system with an incredible transfer module. We can include security system in this project to make an ideal secure home automation system. Room air purifier can be added to this system to make it increasingly proficient. We can likewise include a reconnaissance camera outside the house for additional security. To spare the power sun oriented power system can be utilized to this system which make this system additional shabby and sturdy. At that point the system can keep running with the sun oriented power.

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APPENDIX

Appendix A: Bluetooth Module HC-05

HC-05 Bluetooth module can work as a Master, Slave and Loopback at the programmed association work mode. As a Master it can connect with another Bluetooth module to control the components which is connected with them. As a Slave it cannot connect with another Bluetooth, it can connect with only with a Master. The working mood of HC-05 can be changed by AT Command.

Detailed description of Command

(AT command is case- sensitive, should end up with terminator (“enter” or “\r\n”).)

1. Test

Command	Response	Parameter
AT	Ok	None

2. Reset

Command	Response	Parameter
AT+RESET	Ok	None

3. Soft version

Command	Response	Parameter
AT+VERSION?	+VERSION: <Para> OK	Para: Version number

4. Restore Default

Command	Response	Parameter
AT+ORGL	Ok	None

5. Get Bluetooth Address

Command	Response	Parameter
AT+ADDR?	+ADDR: <HC> OK	Para: Bluetooth address

6. Set Name/Inquire Name

Command	Response	Parameter
AT+NAME=<Para>	1. +NAME:<Para> OK----success 2. FAIL----failure	Para: Bluetooth device name Default: "HC-05"
AT+NAME?	ok	Default: "HC-05"

7. Set Password/Inquire Password

Command	Response	Parameter
AT+PSWD=<Para>	ok	Para: passkey
AT+PSWD?	+PSWD : <Para> OK	Default: "1234"

Appendix B: PIR Motion Sensor

