CHAPTER 1
INTRODUCTION

1. INTRODUCTION

Today, technology has become an integrated part of people's lives. The creation of many devices such as mobile phones and computers have caused many people to rely on technology to communicate with their friends, store information such as pictures, movies, documents, and music .

The internet has become a common interface that many devices use in order to simplify the daily life of many people. From the time of its introduction, the amount of people that use mobile phones and the internet to communicate with other people has increased dramatically to become one of the major means of communication.

Smart-phones have allowed people to connect to the internet without the need for a computer, while still offering the same functionality but through different means. With the introduction of better hardware and better software, smart-phones have become powerful devices and have become an important part of people's daily lives. A field that is recently gaining popularity is home automation which can also use smart-phones as information or functionality hubs.

Have you ever wondered about home automation which would give the facility of controlling tube lights, fans and other electrical appliances at home using a remote control? Off-course, Yes! But, are the available options cost-effective? If the answer is No, we have found a solution to it. We have come up with a new system called Arduino based home automation using Wi-Fi. This system is super-cost effective and can give the user, the ability to control any electronic device without even spending for a remote control. This project helps the user to control all the electronic devices using his/her smart-phone. Time is a very valuable thing. Everybody wants to save time as much as they can. New technologies are being introduced to save our time. To save people's time we are introducing Home Automation system using Wi-Fi . With the help of this system you can control your home appliances from your mobile phone. You can turn on/off your home appliances within the range of Wi-Fi.

Fig 1: IoT Applications

1.1. PROBLEM STATEMENT

In these present days home computerization is persuading the chance to be vital to improve our life conditions. Comfort and straightforwardness of utilizing home machines is the thing that home automation is progressing. Home automation offers a bleeding edge lifestyle in which an individual finds the opportunity to control his whole house utilizing a pushed wireless, from turning on a TV to locking/opening sections; it in like way offers a competent utilization of centrality.

By the by, to get or verify such framework exhibited will cost a great extent of cash and that is the authentic reason of why home computerization has not gotten much premium and thought, adding to that in like way the multifaceted thought of displaying it and engineering it. Therefore it is essential to bode well and simple to organize, in the event that this is allowed to individuals, they will gain it in their homes, workplaces and schools. In a way, a framework alteration for the home computerization is required with the genuine goal to chop down the cost of applying it to houses. In addition home computerization offers ease of cerebrum and body to injured or potentially progressively settled individuals in their homes by only a single tick to do what they require as imparted as of now.

1.2. PROBLEM MOTIVATION

The motivation for developing smart home systems comes from many reasons, but most prominent are convenience, security, energy management, connectivity and luxury.
The biggest motivation behind smart home systems is the convenience. Convenience is really another way of saying “time saver”, and into day’s world where everything is moving faster, every second has value.

Security is also a big factor in the emergence of smart home systems. With a sophisticated enough system, home security becomes a powerful tool that gives piece of mind and power to the user. Security systems are also a large deterrent for crime.

Energy management has become a huge factor in deciding anything, due to the trend of increasing cost of energy. As civilization grows, it constantly needs more energy to power itself. This leads to heavy pressure on efficient use of energy. Smart Home systems help the user do this and save them money at the same time. The smart home system is able to monitor certain process that use energy in the house and can control the amount of energy being used.

Physically disabled and challenged people have also been a great motivation for our project. We have seen their efforts done in controlling daily household appliances and we have come up with an idea to help them with our home automation project which will definitely create a big impact to their day to day problems.

1.3 FLOWCHART DIAGRAM

1.3.1

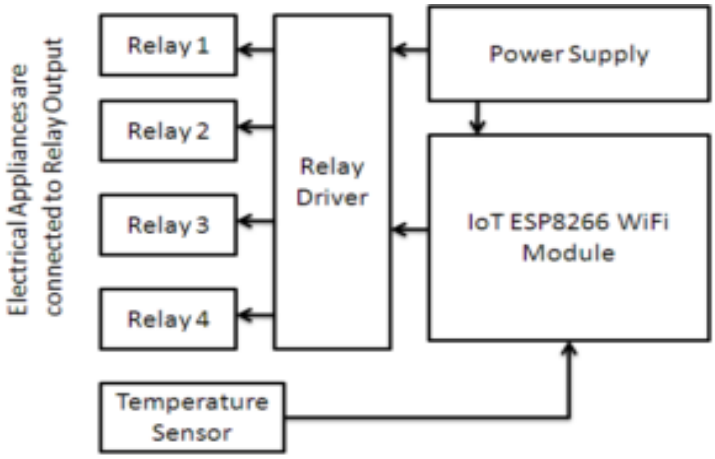

Fig 2: Flowchart of Home Automation System

1.4DATA FLOW DIAGRAM

1.4.1: Level 0 DFD:

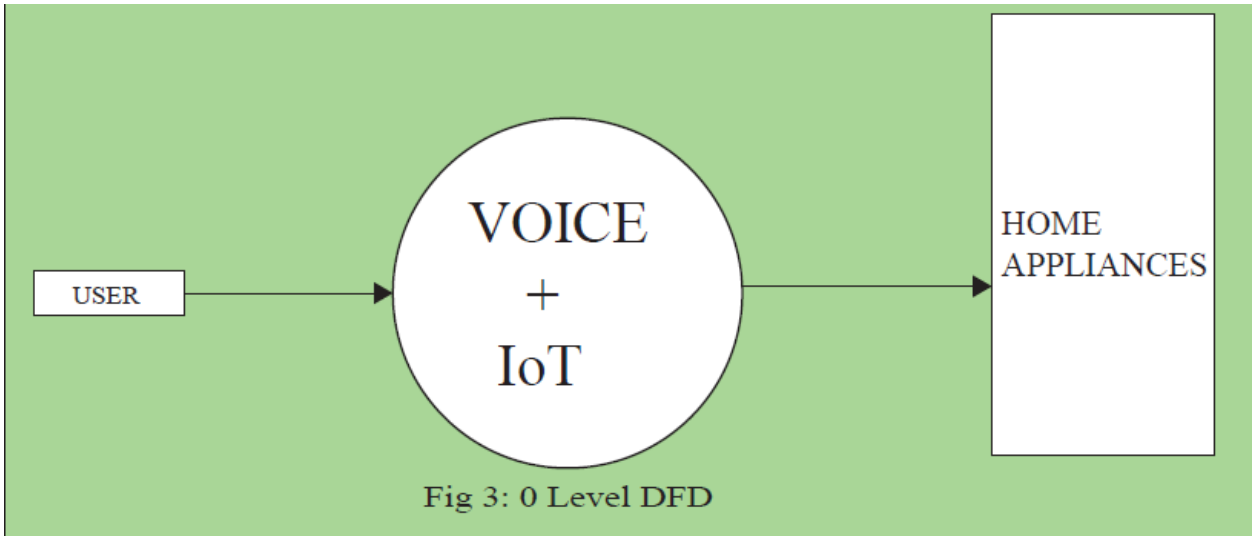

Fig 3: 0 Level DFD

1.4.2 : Level 1 DFD

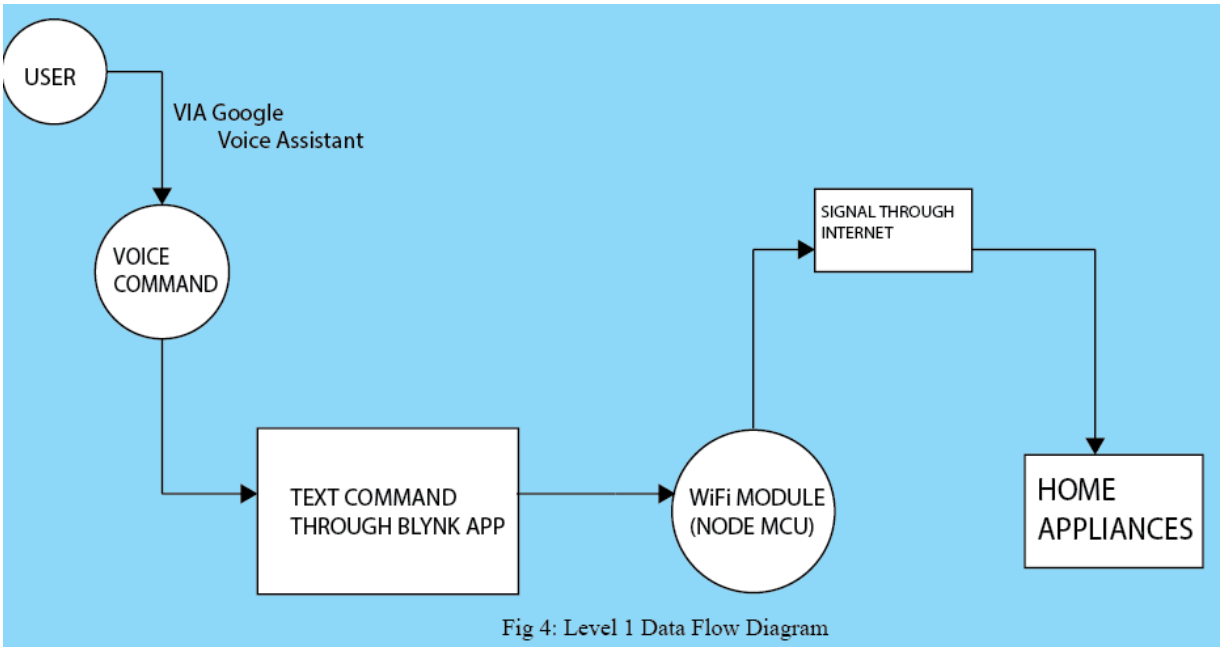

Fig 4: Level 1 Data Flow Diagram

1.4.3 : Level 2 DFD

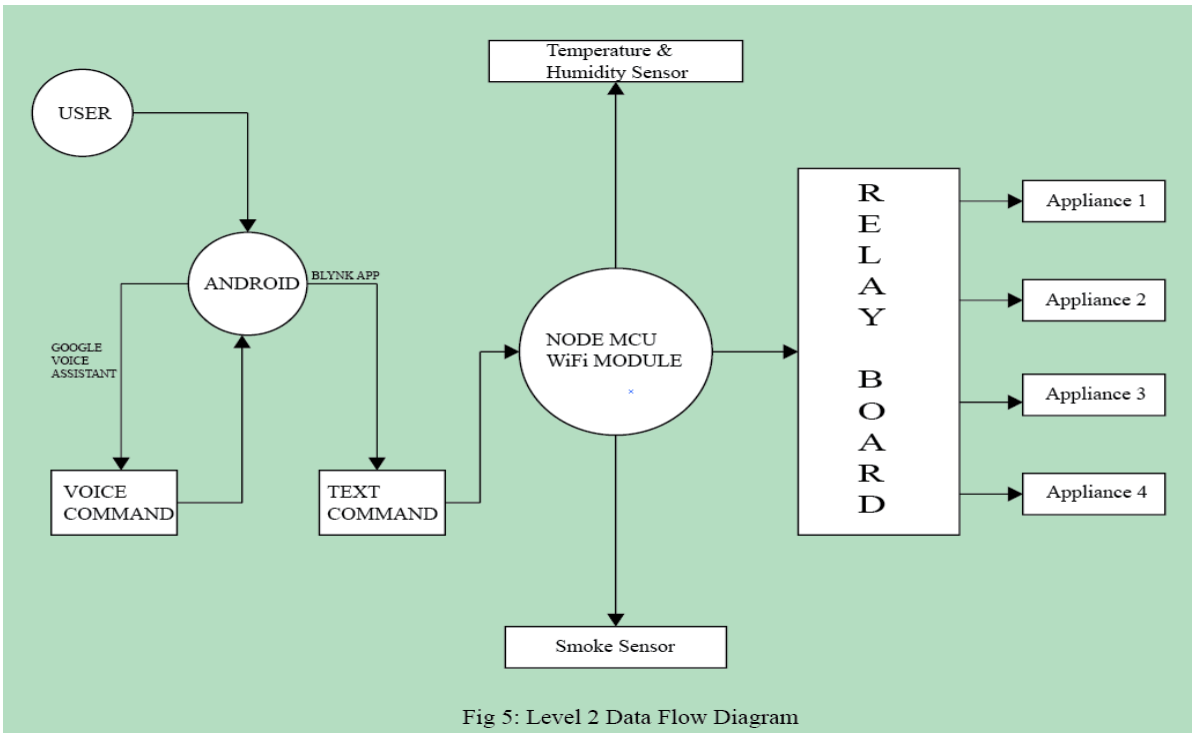

Fig 5: Level 2 Data Flow Diagram

CHAPTER 2

PRELIMINARY STUDIES

Home automation was first brought into the world market amid the 1970s, anyway it fail to meet the wants for people and was fruitless. There were various reasons related with the mistake of the home automation system. The system was neither straightforward nor cost capable. At present, the main point to be recalled when arranging a home computerization system is that it should be cost-capable and easy to present.

2.1 "The Framework of Home Remote Automation System Based on Smartphone :: Akbar Satria and Widodo Budiharto"

The fundamental thought behind this paper become to make a versatile application on a phone framework so the buyer can be in expense of computerized approach; see the amount of float that has been used in the amount of dollars, so the issue is the multifaceted nature in sparing power which might be resolved. advancement and format transformed into brought out through gathering measurements the utilization of poll to the respondents. format strategy utilizing explanations to convey polls and to dissect writing, and after that thereafter doing the structuring in equipment (that is the microcontroller) made United rendition Language (UML), database planning, code usage and presentation of UIs on an IOS and on the Android. The consequence of this view is the usage of a remote household robotization cause in cell that could help the clients in rate to controlling the home and making sense of the charges of solidarity that has been used in each advanced device all together that the enhancement is done.

2.2 "Automation of Home through IOT": Vinay Sagar, KN. Kusuma, SM. (2013)

In this generation, there are 4 most important demanding situations confronted by the home automation gadget these days; those demanding situations encompass: excessive price of ownership, inflexibility, terrible manageability, in addition to issue in reaching security. the principle objectives of this mission is to layout and implementation of a home automation system the usage of internet of things technology, that is able to automating and controlling maximum of the daily appliances within the residence thru an clean and manageable net interface. The machine recommend on this paper, has a notable adaptability of using wi-fi technology for interconnecting of the allotted sensors to home automation machine server, on the way to in the long run is to reduce the cost of deployment at the side of growing the upgrading capacity and device reconfiguration.

2.3 K. Y. Lee and J. W. Choi", in their studies and examination on the House Learning and Improvement of Networking in 2003, portrayed a Smart and Automated Home as a "unit where all of the machines of the house are related together and controlled and checked remotely." The going with sections will give a structure of the past research and practical works in the field of Smart Homes.

2.4 IEEE discharged many research papers on home-computerization. A portion of these exploration had intriguing application with regards to home computerization.

2.4.1 " Wise Smart Home Automation and Security System Using Arduino and Wi-fi". This paper gives an insignificant exertion fruitful and versatile home control and checking structure with the guide of an organized littler scale web server with web show (IP) accessibility for access and to control of equipment and contraptions remotely using Android-based.

2.5 Ramani, R. Olatunbosun , A. (2010) "Internet of Things (IoT)"

Certainties period is web of things (IOT) which has won immense notoriety and notoriety during these current years. What's to come is web of things, that will also have the transformation ability of genuine latent gadgets into virtual worldwide hubs. The IoT endeavours to achieve unification of the entire thing in our worldwide underneath a typical framework, this may never again help us to profit control anyway likewise actualize records symmetry. The high objective of this paper is to give a recognition into web of 23 things, designs, and basic innovation and their product in our day by day life. With the entry of IT and ITeS innovation has caused an unrest in presence at character arrange notwithstanding authoritative running stage. IOT has in shop something for everyone extending from numerous longitudinal and vertical markets incorporating a not uncommon man's regular ways of life in the general public. necessities of tremendous organizations have driven the exponential blast in IoT foundation as those organizations tend to advantage massively by the advanced consistency and control provided over its value chain gadget. This expanded ability to follow things has showed itself in gatherings transforming into more prominent proficient, dashing up of procedures, minimize mistakes, anticipate pilferage, through IoT. The IoT is a mechanical upset that will unfurl out to every one of the fields individuals have ever made and reform the fate of registering and correspondences.

CHAPTER 3
MODULES

Our home automation was divided into following modules:

3.1. BASIC HOME APPLIANCES:

In this very first module we have connected to some of the basic home appliances which we use in our day to day life. Few of them are lights, fan, etc. These are the most basic appliances which we generally use in our day to day life. With the proper connections we have connected them to the 4x4 Relay module which have 4 load outputs. With the help of our voice commands and app we give control and via Wi-Fi the Node MCU receives the command and performs the commands as given by the user.

3.2. Temperature and Humidity detection Module:

In this module we have used DHT11 sensor which is a low cost temperature sensor which detects the temperature with ±1°C and ±1%.The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). Its fairly simple to use, but requires careful timing to grab data.

The DHT11 calculates relative humidity by measuring the electrical resistance between two electrodes. The humidity sensing component of the DHT11 is a moisture holding substrate with the electrodes applied to the surface. ... The change in resistance between the two electrodes is proportional to the relative humidity.

3.3: Smoke Sensing Module:

In this module we'll we detecting any smoke or leakage of any harmful gases in the house. For this we'll be using MQ2 Smoke sensor which will trigger an alarm after it crosses a particular threshold value. MQ2 gas sensor is an electronic sensor used for sensing the gases in the air such as LPG, propane, methane, hydrogen, alcohol, smoke and carbon dioxide.

CHAPTER 4

HARDWARE DESCRIPTION

Hardware which are used in our project are as follows:

- Node MCU(ESP8266) Wi-Fi Module
- DHT-11 Temperature and Humidity sensor
- MQ-2 Gas/Smoke sensor
- Relay Module
- Light Bulbs
- Bread Board

4.1 Node MCU Wi-Fi Module: The Node MCU (**N**ode **M**icro**c**ontroller **U**nit) is an open-source software and hardware development environment built around an inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains the crucial elements of a computer: CPU, RAM, networking (WiFi), and even a modern operating system and SDK. That makes it an excellent choice for the Internet of Things (IoT) projects of all kinds.

Node MCU, the Arduino hardware is a microcontroller board with a USB connector, LED lights, and standard data pins. It also defines standard interfaces to interact with sensors or other boards.

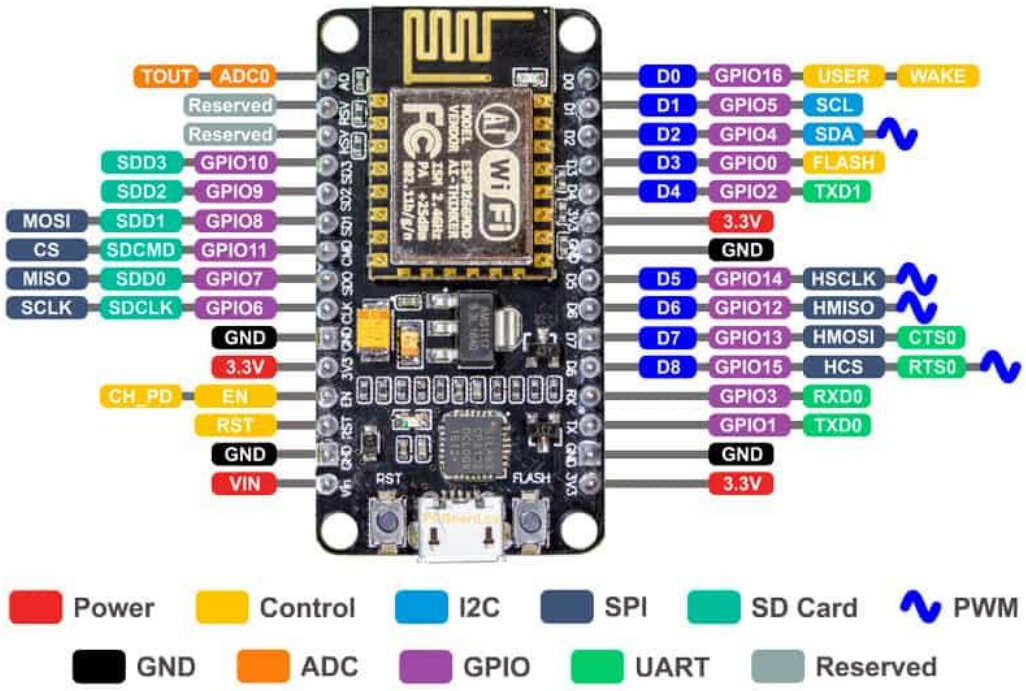

Fig 6: Node MCU

4.1.1. Node MCU ESP8266 Specifications & Features

- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small Sized module to fit smartly inside your IoT projects

4.2 DHT-11 Temperature and Humidity Sensor : The **DHT11** is a commonly used **Temperature and humidity sensor.** The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers.

The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%.

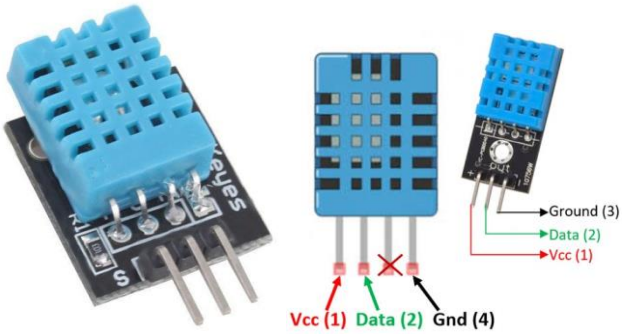

Fig 7: DHT-11 sensor

4.2.1: How to use DHT11 Sensor:

The DHT11 Sensor is factory calibrated and outputs serial data and hence it is highly easy to set it up. The connection diagram for this sensor is shown below.

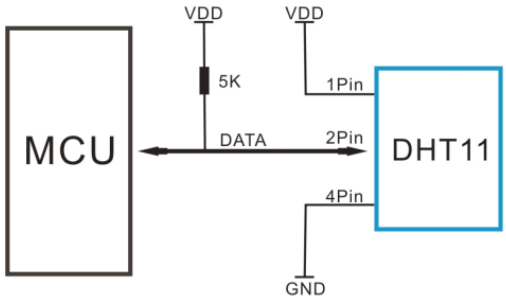

Fig 8: Connection between DHT11 & MCU

4.3: MQ-2 Gas Sensor: MQ2 gas sensor is an electronic sensor used for sensing the gases in the air such as LPG, propane, methane, hydrogen, alcohol, smoke and carbon dioxide. MQ2 gas sensor is also known as chemiresistor. It contains a sensing material whose resistamce changes when it comes in contact with the gas. This change in the value of resistance is used for the detection of gas. MQ2 is a metal oxide semiconductor type gas sensor. Concentrations of gas are measured using a voltage driver network present in the sensor. This sensor works on 5V DC voltage. It can detect gases in the concentration range of 200 to 10000ppm.

Fig 9: MQ2 Gas sensor

4.3.1. Working Principle: This sensor contains a sensing element, mainly aluminum-oxide based ceramic, coated with Tin dioxide, enclosed in a stainless steel mesh. Sensing element has six connecting legs attached to it. Two leads are responsible for heating the sensing element, the other four are used for output signals.

Oxygen gets adsorbed on the surface of sensing material when it is heated in air at high temperature. Then donor electrons present in tin oxide are attracted towards this oxygen, thus preventing the current flow.

4.4. Relay Module: A power relay module is an electrical switch that is operated by an electromagnet. The electromagnet is activated by a separate low-power signal from a micro controller. When activated, the electromagnet pulls to either open or close an electrical circuit.A simple relay consists of wire coil wrapped around a soft iron core, or solenoid, an iron yoke that delivers a low reluctance path for magnetic flux, a movable iron armature and one or more sets of contacts. The movable armature is hinged to the yoke and linked to one or more set of the moving contacts. Held in place by a spring, the armature leaves a gap in the magnetic circuit when the relay is de-energized. While in this position, one of the two sets of contacts is closed while the other set remains open.

When electrical current is passed through a coil, it generates a magnetic field that in turn activates the armature. This movement of the movable contacts makes or breaks a connection with the fixed contact. When the relay is de-energized, the sets of contacts that were closed, open and breaks the connection and vice versa if the contacts were open. When switching off the current to the coil, the armature is returned, by force, to its relaxed position. This force is usually provided by a spring, but gravity can also be used in certain applications. Most power relays are manufactured to operate in a quick manner.

Fig 10: 4x4 Relay Module

4.5: Light Bulbs: Two light bulbs to demonstrate home automation.

Fig 11: Light bulbs

4.6: Bread Board: Breadboards are one of the most fundamental pieces when learning how to build circuits. In this tutorial, you will learn a little bit about what breadboards are, why they are called breadboards, and how to use one. Once you are done you should have a basic understanding of how breadboards work and be able to build a basic circuit on a breadboard.

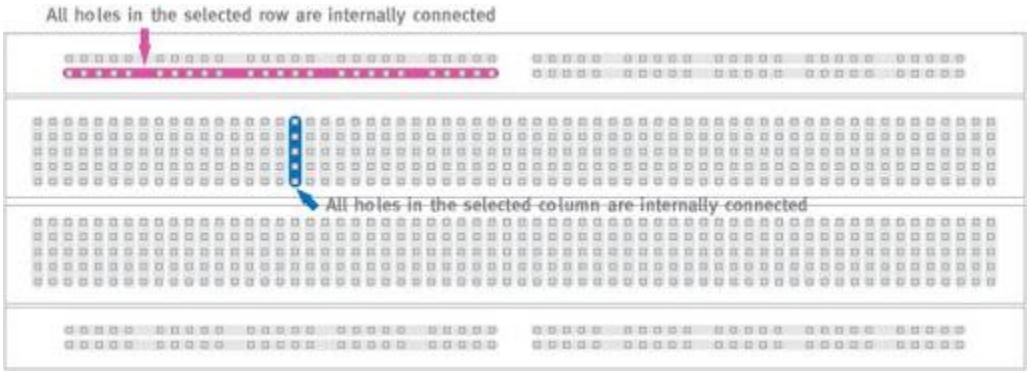

Fig 12: Bread Board

CHAPTER 5

SOFTWARE DESCRIPTION

5.1. Internet Of Things:

The Internet of Things, or IoT, refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. Thanks to the arrival of super-cheap computer chips and the ubiquity of wireless networks, it's possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT. Connecting up all these different objects and adding sensors to them adds a level of digital intelligence to devices that would be otherwise dumb, enabling them to communicate real-time data without involving a human being. The Internet of Things is making the fabric of the world around us more smarter and more responsive, merging the digital and physical universes.

A light bulb that can be switched on using a Smartphone app is an IoT device, as is a motion sensor or a smart thermostat in your office or a connected streetlight. An IoT device could be as fluffy as a child's toy or as serious as a driverless truck. Some larger objects may themselves be filled with many smaller IoT components, such as a jet engine that's now filled with thousands of sensors collecting and transmitting data back to make sure it is operating efficiently. At an even bigger scale, smart cities projects are filling entire regions with sensors to help us understand and control the environment.

Fig 13: IoT

IoT Examples

- Elderly Care Monitoring
- Bike Helmet Crash Sensors
- RFID Smart Guns
- Smart Tennis Rackets
- Wi-Fi Type Writers
- Smart Smoke Detectors
- Air Quality Sensors
- Smart Fire Extinguishers
- Flood Alert Sensors
- Home Energy Monitoring and Control
- Smart Door Locks
- Concrete Infrastructure Monitoring
- Soil monitoring
- Retail Analytics

5.1.1. How big is the Internet of Things?

Big and getting bigger -- there are already more connected things than people in the world.Tech analyst company IDC predicts that in total there will be 41.6 billion connected IoT devices by 2025, or "things." It also suggests industrial and automotive equipment represent the largest opportunity of connected "things,", but it also sees strong adoption of smart home and wearable devices in the near term.

Another tech analyst, Gartner, predicts that the enterprise and automotive sectors will account for 5.8 billion devices this year, up almost a quarter on 2019. Utilities will be the highest user of IoT, thanks to the continuing rollout of smart meters. Security devices, in the form of intruder detection and web cameras will be the second biggest use of IoT devices. Building automation – like connected lighting – will be the fastest growing sector, followed by automotive (connected cars) and healthcare (monitoring of chronic conditions).

5.1.2.The Internet of Things and smart homes:

For consumers, the smart home is probably where they are likely to come into contact with internet-enabled things, and it's one area where the big tech companies (in particular Amazon, Google, and Apple) are competing hard.

The most obvious of these are smart speakers like Amazon's Echo, but there are also smart plugs, light bulbs, cameras, thermostats, and the much-mocked smart fridge. But as well as showing off your enthusiasm for shiny new gadgets, there's a more serious side to smart home applications. They may be able to help keep older people independent and in their own homes longer by making it easier for family and careers to communicate with them and monitor how they are

getting on. A better understanding of how our homes operate, and the ability to tweak those settings, could help save energy.

5.1.3What about privacy and the Internet of Things?

With all those sensors collecting data on everything you do, the IoT is a potentially vast privacy and security headache. Take the smart home: it can tell when you wake up (when the smart coffee machine is activated) and how well you brush your teeth (thanks to your smart toothbrush), what radio station you listen to (thanks to your smart speaker), what type of food you eat (thanks to your smart oven or fridge), what your children think (thanks to their smart toys), and who visits you and passes by your house (thanks to your smart doorbell). While companies will make money from selling you the smart object in the first place, their IoT business model probably involves selling at least some of that data, too.

5.2. IFTTT Services (If This, Then That):

IFTTT derives its name from the programming conditional statement "if this, then that." What the company provides is a software platform that connects apps, devices and services from different developers in order to trigger one or more automations involving those apps, devices and services.

Here are just three *if this, then that* automation you can run with IFTTT:

* *If* you make a call on your Android phone, *then* a log of that call is added to a Google spreadsheet.

* *If* you add a new task to your Amazon Alexa to-dos, *then* it will be added to your iOS Reminders app.

* *If* the International Space Station passes over your house, *then* you'll get a smart phone notification about it. (Yes, this is an actual IFTTT applet.)

IFTTT employs the following concepts:

- Services (formerly known as channels) are the basic building blocks of IFTTT. They mainly describe a series of data from a certain web service such as YouTube or eBay. Services can also describe actions controlled with certain APIs, like SMS. Sometimes, they can represent information in terms of weather or stocks. Each service has a particular set of triggers and actions.
- Triggers are the "this" part of an applet. They are the items that trigger the action. For example, from an RSS feed, you can receive a notification based on a keyword or phrase.
- Actions are the "that" part of an applet. They are the output that results from the input of the trigger.

- Applets (formerly known as recipes) are the predicates made from Triggers and Actions. For example, if you like a picture on Instagram (trigger), an IFTTT app can send the photo to your Drop-box account (action).
- Ingredients are basic data available from a trigger—from the email trigger, for example; subject, body, attachment, received date, and sender's address.

5.2.1. How IFTTT works:

The automations are accomplished via applets — which are sort of like macros that connect multiple apps to run automated tasks. You can turn on or off an applet using IFTTT's website or mobile apps (and/or the mobile apps' IFTTT widgets). You can also create your own applets or make variations of existing ones via IFTTT's user-friendly, straightforward interface.

Fig 14: IFTTT

CHAPTER 6
CODING

6.1. Temperature and humidity sensor coding:

```
#include <DHT_U.h>

#define Type DHT11
int sensePin = 2;
DHT HT(sensePin, Type);
float humidity;
float tempC;
float tempF;

void setup() {
        // put your setup code here, to run once:
        Serial.begin(9600);
       HT.begin();
       delay(10);  //wait before accessing sensor
}

void loop() {
        // put your main code here, to run repeatedly:
       humidity = HT.readHumidity();
       tempC = HT.readTemperature();
       tempF = HT.readTemperature(true);
       Serial.print("\n Humidity: ");    //prints the humdity in surrounding
       Serial.print(humidity);
        Serial.print("% ");

       Serial.print("\nTemperature in Celcius : ");
       Serial.print(tempC);
       Serial.print("C ");

        Serial.print("\n Temperature in Farhenite : ");   //prints the temp in farhenite
       Serial.print(tempF);
        Serial.print("F \n\n\n");

       delay(3000);  //delay to next sensing

}
```

CHAPTER 7
TESTING

7.1. SYSTEM TESTING :

The framework going for delicate products is the looking at achieved on an outright, included machine to assess the machine's congruity with its exact necessities. gadget testing would also fall inside the range of the dark compartment looking at, and in this way, it must need no data around the interior structuring of the presence of mind or the code. It's miles a totally comparable deliberate check case lettering. inside the check case lettering we ought to be equipped for compose the check case circumstances and moreover the utilization cases.

7.2. UNIT TESTING:

Throughout pc programming and coding, we have this unit testing assisting which of the product tests approaches with the methods for which specific units of the supply code, or a fixed of 1 and now and then additional PC programming component together with related control records, managing procedures, and working methodologies, are experienced and analyzed to see whether they are strong for use. Instinctively, we likewise can locate a unit to be the littlest checkable component of an apparatuses. For this situation of the procedural programming, our unit could have been a whole module, but it's miles more usually an man or woman manner or characteristic.
The objective of unit checking out is in order to separate every detail of this system and to illustrate that the person factors are accurate.

7.3.BLACK BOX TESTING:

The Black-box looking at is an approach to “test programming that uncovers out the ability and running of a product without the peering into the inward structures or into the operations, explicit data of the product's inside shape, code and programming understanding is commonly not required”. Furthermore the analyzer is enjoyably careful about unequivocally what our item is thought to do anyway it isn't responsive of ways it would do it. as a case, our analyzer is responsive that one careful enter may restore a definite, never-ending yield yet it isn't sure generally how the item would convey the yield inside the essential spot.

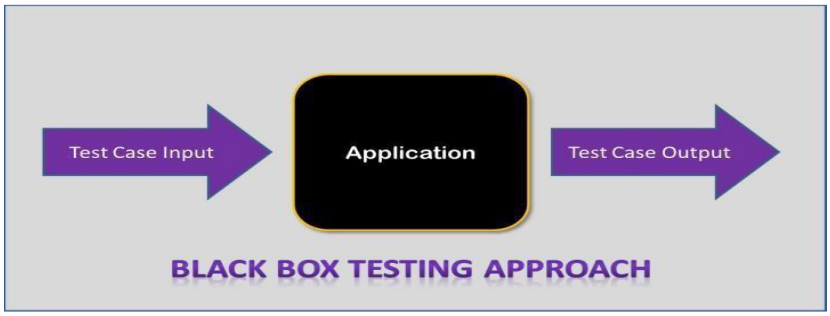

Fig 15: Black Box Testing Approach

CHAPTER 8
SNAPSHOTS

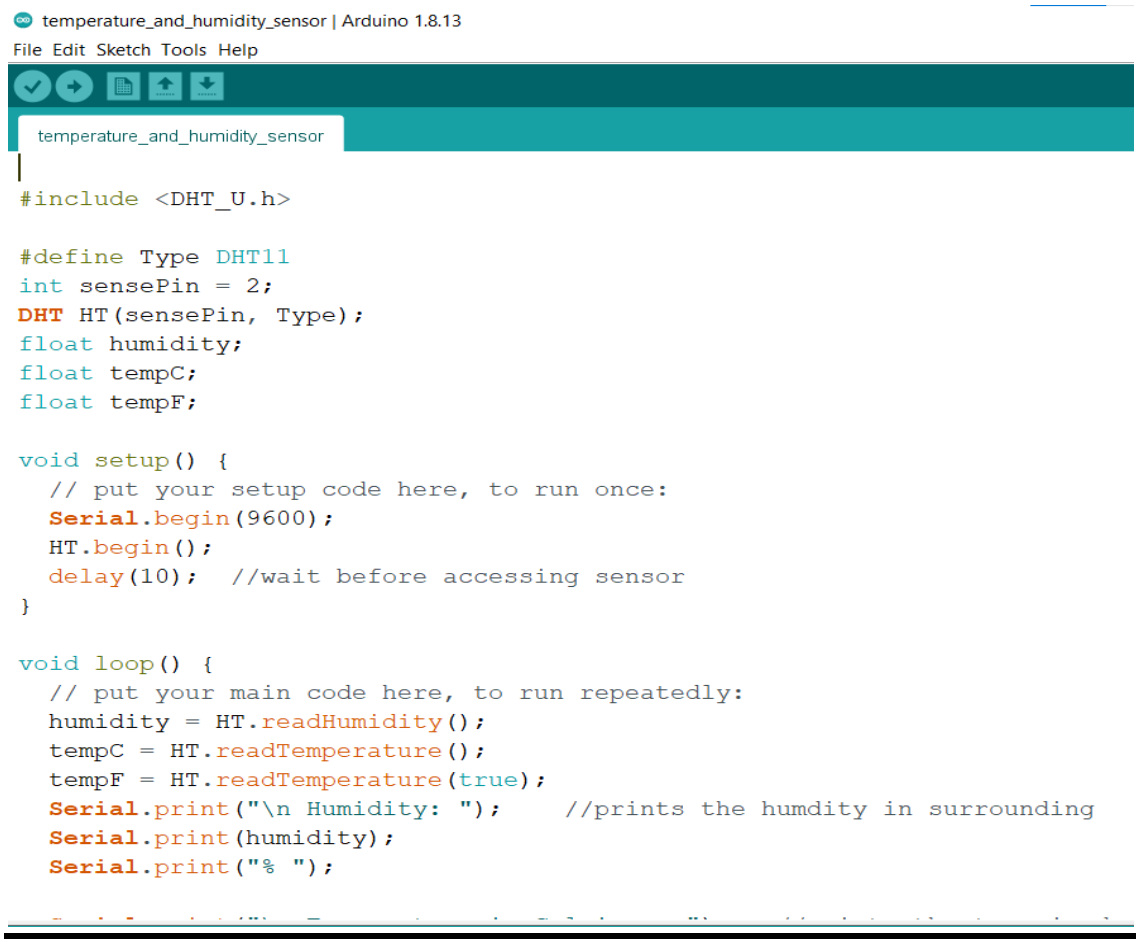

Fig 16: Temperature code 1

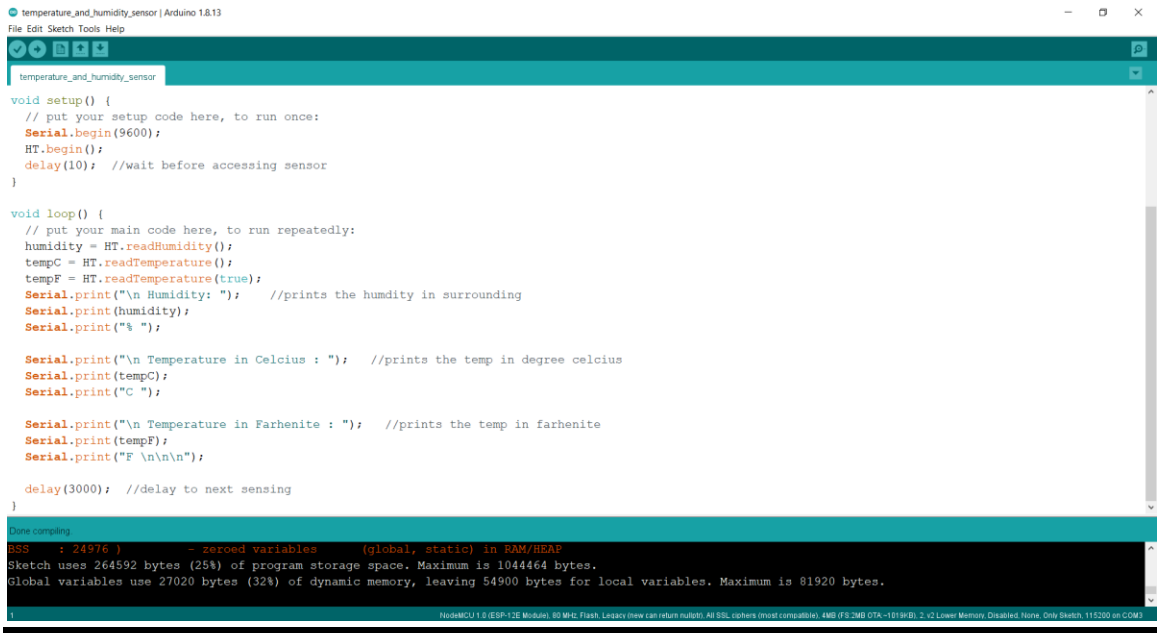

Fig 17: Temperature code 2

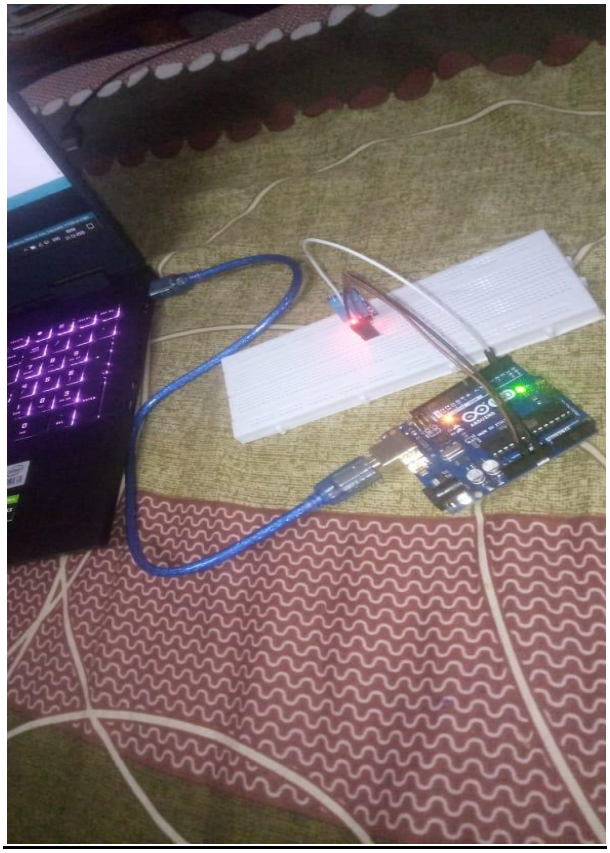

Fig 18: Sensor working

CHAPTER 9

CONCLUSION & FUTURE SCOPE

9.1 CONCLUSION:

This is an ongoing project. Our prime objective is to assist handicapped/old aged people. This report gives basic idea of controlling various home appliances and provides a security using android phone or tablet. This report is based on android and Arduino platform both of which are FOSS(Free Open Source Software). Therefore the overall implementation cost is very cheap and it is affordable by a common person. Because of tremendous increase in android enabled phone, phone, here we are using android application. The design consists of android phone with home automation application, Node MCU. User can interact with the android phone and send control signal to the NODE MCU module which in turn control other embedded devices/sensors.

While wearing down this endeavor we have grabbed a lot of finding out about various modules being used in this errand. We are glad we can participate as a gathering in this endeavor and set up new musings. We believe the assignment completes as needed and the data grabbed in the midst of this period will be used in our future corporate life. Additionally, we might want to include that home computerization is the fate of places of new world.

The approach discussed in the paper is novel and has achieved the target to control home appliances remotely using the Wi-Fi technology to connect system parts, satisfying user needs and requirements. Wi-Fi technology capable solution has proved to be controlled remotely, provide home security and is cost-effective as compared to the previously existing systems. Hence we can conclude that the required goals and objectives of home automation system have been achieved. The system design and architecture were discussed, and prototype presents the basic level of home appliance control and remote monitoring has been implemented. Finally, the proposed system is better from the scalability and flexibility point of view than the commercially available home automation systems.

9.2 FUTURE SCOPE:

The going with stage for home automation advertise will happen subject to a couple of key overhauls in the progression open in Automation, for example, improvement in Wireless Automation blueprints and moreover bringing down of regard appears as the market starts perceive Home mechanization use in more noteworthy volumes. A couple of examples that we foresee for this time of the business are

• Big associations like Philips, Siemens and Schneider will as time goes on bring out truly mass market mechanization things with interfacing with UI in any case at lower esteem point as contrast with today, and more people will be able to bear the cost of the things.

• Solution commitments will bit by bit move to an all the more straightforward structure, where next to two or three key parts, customers will have the ability to buy and use the Automation things themselves without the guide of any specific ace

• Some remote players will have claim to fame in awesome motorization and focus on the prevalent market.

Future homes will be able to offer almost all required services, e.g., communication, medical, energy, utility, entertainment, and security. As we move into the next generation, more and more devices will begin to connect to one another. The dream is a future in which data is communicated between devices and humans without relying on manual input of individual bytes. Computers that can automatically mine data and then use that data to change aspects of the home environment is the future. For example, a smart thermostat that is able to automatically gauge the temperature of a room and then adjust the central heating and cooling units as necessary or a washing machine that automatically detects its contents and programs itself to be finished washing at a specified time. These are all goals that engineers are working toward and depend not only on advances in data-mining technologies but also in big data computing. Pert is the next generation home automation innovation, that lets you control, monitor and secure your home with your smartphone. The future healthcare service provider will consider the smart home an effective way of providing remote healthcare services, especially to the elderly and disabled who do not require intensive healthcare support. As technologies continue to advance, you can expect the house of tomorrow to be even more automated than that of today.

CHAPTER 10

REFERENCES

REFRENCES

1. https://create.arduino.cc/projecthub/iotboys/control-home-appliance-from-internet-using-arduino-and-wifi-f65e10
2. https://create.arduino.cc/projecthub/techstudycell/home-automation-using-arduino-and-wifi-module-esp01-e37614
3. https://www.youtube.com/watch?v=5SvRolROPxA&list=PLNvfepV2JiWmlNDzKz01Qgcw7AT69ILXt&index=1
4. S.Praveen, "IOT and its Signifance ", 2015, Online.
5. "Best Home Automation System - Consumer Reports". www.consumerreports.org Recovered 2016-02-14.
6. https://www.youtube.com/watch?v=uaq_NOS9B7c&list=PLNvfepV2JiWmlNDzKz01Qgcw7AT69ILXt&index=3