HOME AUTOMATION SYSTEM CLOUD BASED

Project Report

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To

submitted in partial fulfilment of the requirement for the degree of Bachelor of Technology

Department of Computer Science & Engineering
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Candidate's Declaration

I hereby declare that the work presented in this report entitled **" HOME AUTOMATION SYSTEM CLOUD BASED "** in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science and Engineering** submitted to the Department of Computer Science & Engineering**,** of Jaypee University of Engineering and Technology, Guna is an authentic record of our own work carried out over a period of 6th Semester in 2021 under the supervision of **Mr. Gaurav Saxena (Assistant professor , Computer science department).**

Th is is to certify that the above statement made by the candidate is true to the best of my knowledge.

(Supervisor Signature)

Mr. Gaurav Saxena Assistant

professor Computer Science

Department Dated:

Acknowledgement

There are numerous individuals whom I might want to thank for their direction amid creation of this undertaking. It is a very important term to work on such a venture. To wrap things up I might want to thank my college for giving us chance to take a shot at this undertaking and giving us enough time to finish this venture.

Taking a shot at this venture is giving us parcel of data about the future innovation and the utilization of remote home automation framework in our everyday life.

Thankyou.

CONTENTS

SUMMARY

Home automation structures have gotten commonness of late, paralleling advances in the possibility of the Internet of Things. The current endeavour exhibits the utilization of an unobtrusive home computerization system, inside the structure of assistive advancement. The system utilization relies upon the Node MCU microcontroller along with Firebase Connected Android Application using Python Shell Scripting and it is proposed for use by the elderly and people with insufficiencies. The structure is anything but difficult to use, with an instinctual interface executed on an Android based propelled Device. Showings exhibit that the structure empowers control of home devices, lights, warming, cooling systems and security devices by the arranged customers, i.e., the elderly and crippled and also an additional features of voice command using Google Assistant on android device.

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

Home robotization frameworks have gotten inescapability beginning late, paralleling the advances in the likelihood of Internet of Things. Notwithstanding the manner in which that robotization for business structures is a make improvement, computerization applications for habitations are a decently new upgrade, which is being gotten a handle on by customers. Home robotization joins the checking and control of exercises, for example, lighting, warming, ventilation, cooling, electrical mechanical gatherings, sound frameworks, perception cameras, passage shocks, and cautions. Home robotization has various focal points, comfort, extended security, and essentialness viability.

The wide usage of home computerization can be found in cold urban networks, for instance, Milwaukee, where people set warming of go outside the house and they leave and switch on the more sultry 15 minutes before returning. The framework is called HVAC and is the best choice for home mechanization.

In a period of remote development, for instance, Bluetooth, WiFi, and GSM, customers need home mechanical assemblies to be related remotely. This system adequately uses Bluetooth with an open repeat of 2400 Hz, an extent of 100 meters, and a speed of around 3 Mbps.

There are two or three stresses to be kept an eye on while organizing a home computerization structure. The system should be arranged such that facilitates new devices, with the objective that these devices should't be an issue at a later stage. On the host side, the framework should be straightforward, with the objective that the devices can be checked and controlled viably. In the occasion of any issues later on, the interface of the structure should give definite organizations. Finally, the structure should be smart with the objective that it might be commonly used by anyone in the market.

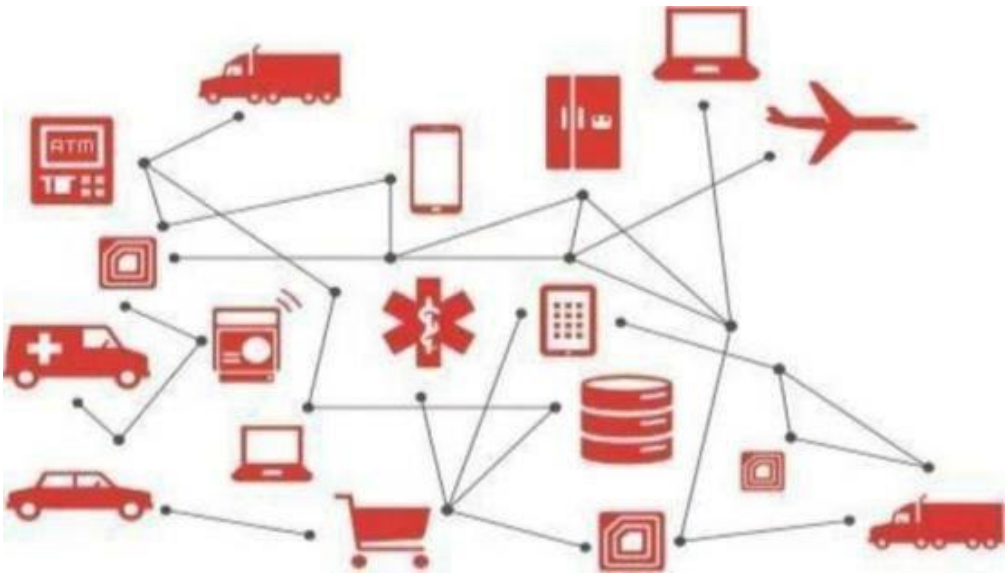
1.1 The Internet of Things:

In this age the gadgets that we're the utilization of are getting to be more brilliant and littler. They're connecting relatively without issue, and they might demonstrate to us that in almost every and everything of
our regular daily existences. This new reality this is there inside the period is alluded to as the net of things it's miles about adapting to and gathering the enormous amount of certainties that we are capable of picking up from these developing network of these hardware and sensors, which strategy such measurements, and furthermore share it with all the distinctive entomb related issues. it's miles a modern period, anyway we are plausible of having it with these now—found in keen sensors from our product associations, inside the security structures and inside nature we can control structures in our homes, and furthermore in our vehicle's capacities for self observing.

For once imagine all of the open entryways that may exist all together creating new devices and moreover besides for managerial in coming future. Gartner has watched the blend of regard comprising of (accounts in nature) from net of things which across over firms may accomplish upto US$1.9 trillion around the world. For instance, practically different years from nowadays, our morning calendars might be really surprising and very well on account of the net of components advancement. Our alert may blast off sooner than its standard time because of the way that our local clever center point may have analyzed side interest conditions which could advocate an unmistakably moderate power for that day. The sensor for climate alerts nation high residue incorporate continually, so really case of your and world's sensitivitiy, you would safe house picked whether to put on a suit with sensors that would sing the character of air and after that prepared you to reasonable record of that may likewise trigger an ambush.

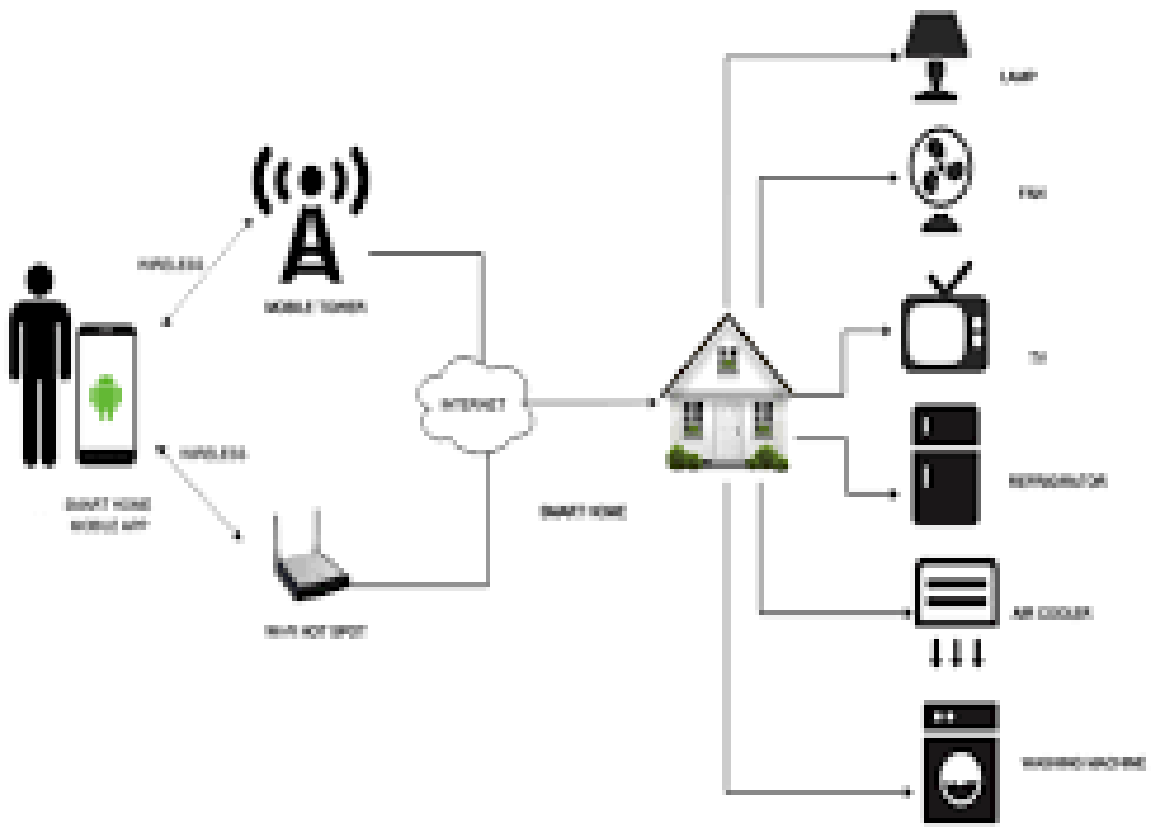
The basic reason for the passage is left open, and—with a couple of addon and basic extremely touchy response tranquilizes that is in charge of all the envelope cases—you pick to slip into your auto (that has progressed toward becoming on by your sharp center by utilizing crushing the catch this is there on the key dandy). The radio has been betting of your most extreme and least cherished morning appears, the well being structure for your house is outfitted, and moreover your GPS included gadgets has went with the fine course to have the option to work. The customary resilience of these things may dispense with away at the web lies as an excruciating instances of : how individuals assistant eventually of a program to amass the certainties or play out the exhibit they want for to complete on the web.

In web of things, gear speak with equipment and methodology demonstrate a - path interconnectivity to verify they may interoperate further both provincially and all round. picks can be made as in venture with prearranged controls, and the ensuing exercises emerge without the necessity for human intervention. those new exchanges have dependably been lashing out all stunning open entryways for some wipe out of the changing with the time organizations.



FIGURE

An international, accepting, imperceptible, ambient with all the networks computing placing constructed in the course of the sustained advent of clever sensors, smart cameras, database, gentle wares, and enormous statistics centers of the global-spanning which are on the basis of records that is called “net of factors”.



FIGURE

1.2 Why are Smart homes needed?

□**Savings**- With all the connected electrical devices that are inclusive of getting to know coolers, sprinklers which might be clever, lights which might be wireless tracking the enabled, electricity retailers in addition to water heating and cooling modules that reduce energy will also and water use.

□**Control-** Many of the todays apparatuses in a household, from broilers and fridge to deadbolts and cooling gadgets, might be controlled naturally by means of projects in PCs, phones and pills. In many occurrences, the control of every one of these gadgets works when you are out of the house as well and can transform them, which implies you could close the entry via the air terminal, check at the pooch from any of the nation, or affirm that you turned off your stove from the commercial center or some other store.

FIGURE

- **Convenience-** Having the majority of your lounge and room lightings interchanged as you achieve your property remotely, the home theater and TV machine consequently betting your favored melody and the front entry opens naturally when you approach it with hands total of acquiring stuff, is maybe the end rich highlights of the astute and home. in any case, solace and harmony isn't about sumptuous and simple life, shrewd locks can likewise give you a chance to allow with the privilege of section of the particular people at exact examples and not generally, so you don't must remain at home as well as supply out a key. so also, a sensor lets you know while your fridge vacant or out of stock encourages you to "arrangement" your entrance or leave entryway from wherever inside this world.

- **Security-** They are so clear, connected responses for wellbeing for the sharp home that are sensibly estimated choices for each checking security verified frameworks. remote empowered cctv cameras, associated development sensors notwithstanding astute smoke cautions might be observed from interior or outside a local utilizing a video live, electronic mail and ready writings.

- **Safety-** Sensors that are verified that can discover spillage of water, phase of stickiness, carbon dioxide, development, warmness and each ecological issue that could be envisioned assistance keep occurrence from transforming into catastrophes as they could speak with proprietor legitimately, on each event you're, wherever you need. Senior autonomy Automate sound update notwithstanding voice actuated ready frameworks are just a group of the elements of local mechanization that help seniors' have free existence for a greater drawn out timespan. moreover, cameras connected to the WiFi with - way report may furthermore help friends and family hold a watch on the senior inhabitants when they can't go and real beware of them.

1.3 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 robotization is progressing. 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. 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.
- The increasing consumption of energy and population, there is an urgent need to conserve energy in every possible way.
- The inability to access and control the electronics and electrical appliances remotely from any location is one of the major reasons for energy loss.

1.4 OBJECTIVES

- To assembling a remote home virtualization of home automation system using an Android Application System assembled for local network as prototype model.
- A web or an android application can be used by the users to give instructions to these systems and control the appliances remotely.
- Testing of the whole Node MCU setup based home automation system using an android application lined with firebase for having a virtual database system.
- To plan an easy to use and a guaranteed structure to control home machines particularly planned to support the more prepared individuals and weakened.

1.5 METHODOLOGY

1.5.1 Proposed Home Automation System

The end individual can utilize their mobile phone or PC to sign into the machine. A fundamental test is accomplished for whether the equipment instrument is ON or not. handiest on the off chance that the equipment is approved and ON, at that point the individual is verified. when the confirmation is done accurately, individual is then equipped for send the control alarms to the equipment machine. at the equipment device the SL intention power program will always follow for the change inside the distinction and will thusly transport the markers to the Circuit. while a client chooses an exchange inside the notoriet y for any of the instrument [I. e .. ON or Off], the records from the hand-held is sent to the web Server in a string design, wherein the web - site is the host. at the server the status is spared in the database of their non-open device field. at the equipment end, the circuit power program a web website page is utilized to rescue the notoriety of the contraptions in a reasonable example [for each 10sec]. those changes come quite close to treats [which are transitory web files] from the web server and are spared at the PC inside the name of the net site on the web. thusly every 10 sec on the grounds that the site page is revived and the new treat esteems are modernized.

1.5.2 Proposed Home Automation System Functions

The foreseen home motorized structure can control the going with activities in customers home and watch the going with alerts:

- □ Control lights
- □ Voice Command

It can likewise control following machines:

- □ Lights on/off/diminish
- □ Fan on/off
- □ On/off various apparatus

CHAPTER 2

REVIEW/ BACKGROUND MATERIAL

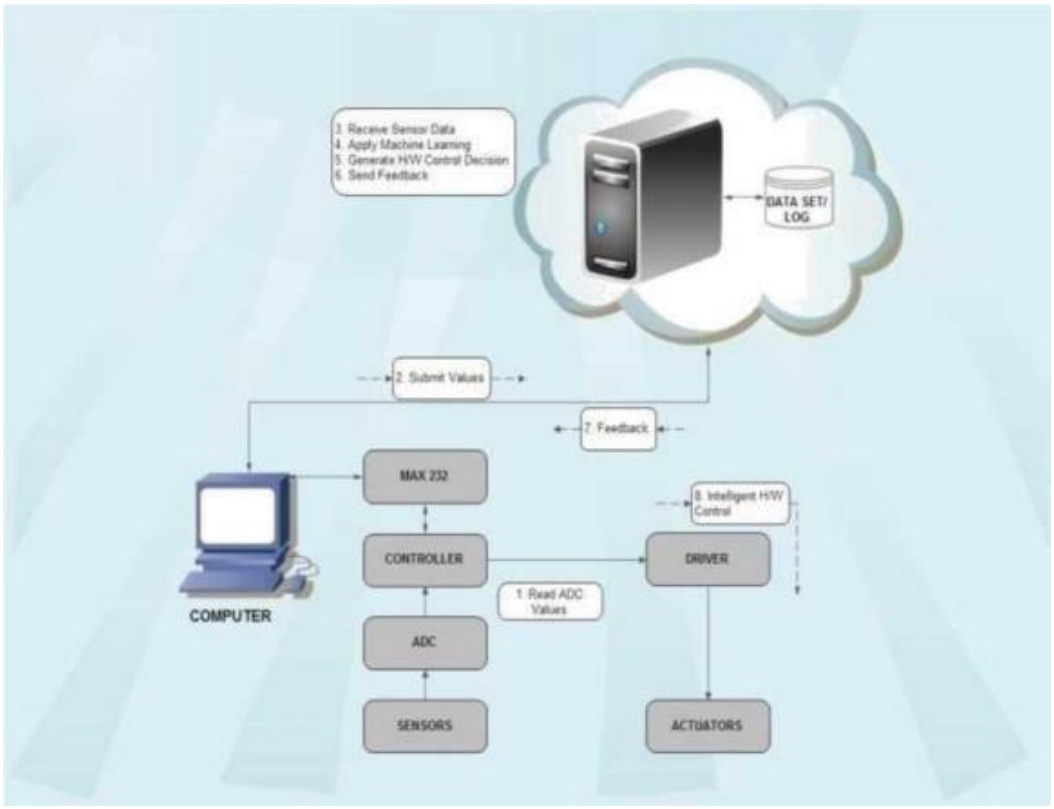
Home robotization was first brought into the world market amid the 1970s, anyway it fail to meet the wants for people and was fruitless. There were various reasons related with the mistake of the home robotization system. The system was neither straightforward nor cost capable. At present, the main point 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.

2.1.1 Framework of the System

By techniques for and huge this diagram is remoted into two number one responsibilities to be explicit controlling contraptions and giving gift data. The controlling and for the reason that the records errand is driven by strategies for joining the Node MCU little scale controller which mates with the switch inside the house and may be gotten to by bleeding edge cell phones utilizing the web. The given records errand will assist the customer with looking the dimension of electrical case utilized as a bit of a stay with a jumbled cell in well ordered, as a matter of course, and month to month premise inside the extent of Indonesian Rupiah. meanwhile as the procedure that help the records supply to be sent and got are: Modem for exchaning sort of administrations and make enormous amount of records and realities.



FIGURE

2.1.2 Conclusion and work in future

This net has modified independently in the way we are living, shifting communication among human beings in this digital degree in several contexts on both sides of from the professional existence to social relationships. The net of things has the potential to feature a brand-new dimension to this method through allowing interactions with clever items, accordingly leading to a better vision of anywhere, anytime, any electronic media, anything communication. Due to this reason, we have to look at this good feature of internet of things should be measured as a part of the overall net of the future, that is probably to be amazingly extraordinary because of the internet we are using nowadays.

2.1.3 Future enhancements

Within the coming days the net and wi-fi technology will join exceptional sources of records consisting of sensors, cellular telephones and vehicles in a tighter way. The quantity of gadgets which also connects to the internet is : apparently exponentially - growing. those billions of components create, devour and system facts in exceptional environments including programs that are logistic, airports, factories and in the work and ordinary lives of humans. This world needs new and companionable, scalable and at ease solutions for both the management of the ever more extensive, complexly networked internet of things, and additionally in order of supporting diverse models of business.

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.

3. 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

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.

4.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.

5.D. J. Cook adequately coordinated the MavHome adventure at the University of Texas, Arlington. The endeavour used sensors to recognize the state of the earth, and with the help of controllers, made the significant move to take care of concordance. These sensors outline an off the cuff framework to settle on the decisions.

6.H. Kanma guided a restorative research to screen people who require remedial assistance and present a remote plan at the University of McGill in Canada. The endeavour made usage of telephones and efficient sensors. It worked by making usage of remote shows, for instance, Bluetooth, ZIGBEE, and what's more GSM and separating data through an adaptable plan. The examination had a structure that involved three essential parts. At first, sensors assembled the remedial data and transmitted it by methods for sensors to mobile phones. Second, an application called J2ME on phones took care of the accumulated data. Finally, all of the data that was accumulated was joined to address the necessities of the older. The genuine favourable position of this undertaking is that it could be realized at an affordable expense in a restricted ability to canter time.

2.7 N. Liang, University of Erlangen, Germany,

In the past couple of years, basic research has been driven in the field of Smart Homes to improve the advancement for disabled and old people. N. Liang have depicted troubles related to Smart Homes and drove ask about at the University of Erlangen, Germany, for the improvement of these masses and perceived the preferences with the true objective to empower them to lead all the more free lives. For the execution of these endeavours, there are distinctive sub-frameworks used, for instance, “Wireless LAN, RFIDs, TCP/IP, and Bluetooth module”. This Bluetooth composes of transportation of the sensor information and after that interconnects the system. According to the region of the inhabitance recorded, the RFID framework transmits information from the RFID marks. The messages are then transmitted by techniques for Bluetooth utilizing Bluetooth modules. This decreases the expense, as no further equipment is required for the utilization. The idea displayed in this endeavor is the one like the errand presented by the understudies at the University of Nigeria concerning the arrangement of a home computerization system using Arduino. The endeavor bases on the arrangement of a home robotization structure using the Atmega 328 microcontroller.

The endeavor does, regardless, stress the upsides of using a remote standards. To connect with a broad assortment of contraptions, Bluetooth is an overall standard and is easily available in all devices, for it is definitely not hard to set up and use. It in like manner scrambles data using a 128 piece since quite a while back shared key, making it a moored affiliation moreover. With movements in RF Technology, for instance, Zigbee and Bluetooth, these systems have furthermore ended up being outstanding in the market. Past infrared structures had different security issues and there additionally were impedances between signs, making it unbound and less notable in the worldwide market. Research is up 'til now occurring around there; various systems have been proposed, yet not a lot of them have been realized in the worldwide market.

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

2.8.1 " 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

2.8.2 "Raspberry Pi Home Automation Using Android Application". The endeavor introduces a negligible exertion and versatile home control and watching structure using a Raspberry PI module and a Static Relay, with web accessibility for getting to and controlling devices and mechanical assemblies remotely using Smartphone android application.

2.8.3 "Shrewd home computerization: Gsm security system structure use". Sharp home automation has pulled in light of a real worry for the investigation arrange in the midst of the latest decade, at a mind boggling way. Home security structures involve a continually making investigation field. In this paper, a security system for smart home robotization is proposed.

CHAPTER 3

WORK, DESCRIPTION AND RESULTS

Home mechanization depicts a course of action of sorted out, controllable devices that participate to make your home increasingly pleasant, revamp, capable, and secure. You "talk" with your automated home through a remote control or astute contraption. In the accompanying area we will examine the advancement of our home robotization framework.

3.1 HARDWARE DESCRIPTION

3.1.1 Node MCU

NodeMCU is an open source firmware for which open source prototyping board designs are available. The name "NodeMCU" combines "node" and "MCU" (micro -contro ller unit). The term "NodeMCU" strictly speaking refers to the firmware rather than the associated developmen t kits. Both the firmware and prototyping board designs are open source.

The firmware uses the Lua scripting language. The firmware is based on the eLua project, and built on the Espress if Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPI F FS. Due to resource constraints, users need to select the modules relevant for their project and build a firmware tailored to their needs. Support for the 32-bit E S P32 has also been implemented.

The prototyping hardware typically used is a circuit board functioning as a dual in -lin e package (DIP) which integrates a USB controller with a smaller surface-mounted board containing the MCU and antenna. The choice of the DIP format allows for easy prototyping on breadboard s. The design was initially based on the ESP-12 module of the E SP8266, which is a Wi-Fi SoC integrated with a Tens ilica Xtensa LX106 core, widely used in IoT applications (see related projects).

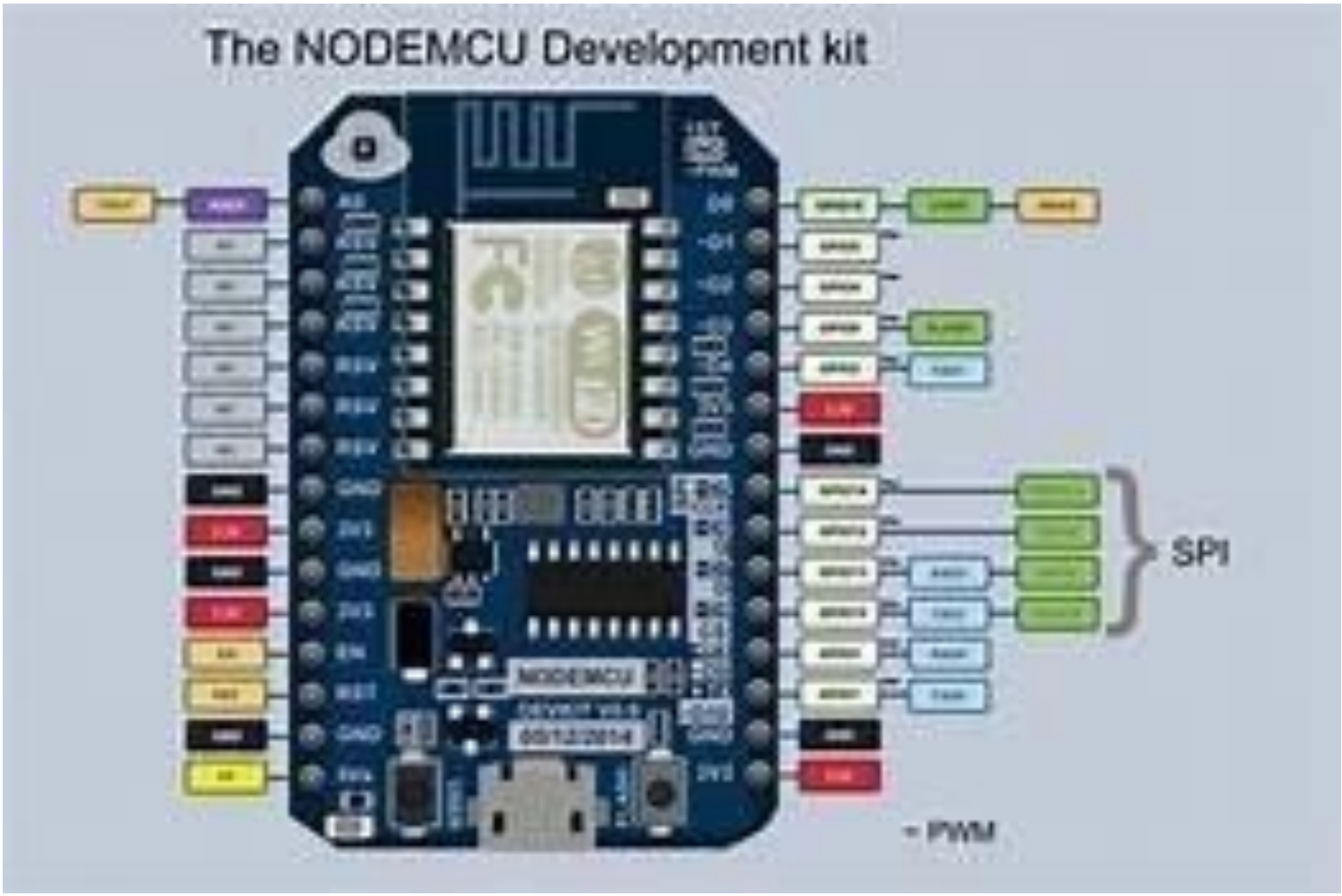


FIGURE: Node MCU Kit

3.1.2 LED display An LED display to show the status of the devices connected to the system.

Model: EDS803

Appearance Size:50.8*30.48*2.8mm Visual Area Size:45.72*16.51mm Display Mode: TN, positive display Polaroid Type:semi-transparent Visual Angle: 6 O'CLOCK Connection Type:metal pin Driving Way: static Driving Voltage: 5.0 V

FIGURE : Led screen

3.1.3 Light bulbs Two light bulbs to demonstrate home automation.as a protype model and used for demonstration purpose

FIGURE: Bulb

3.1.4 Relay module A relay module is used to connect various devices to Arduino uno R3.

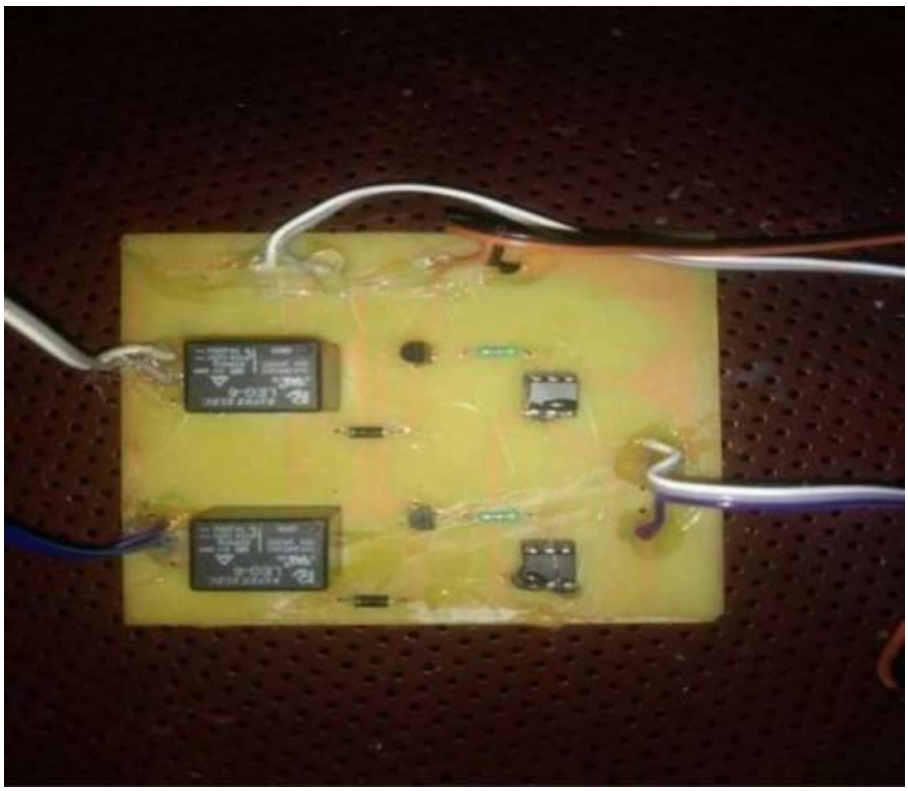


FIGURE: Relay switch

3.2. System Design

In our home automation system we have shown how we can control two devices using internet of things (IOT). The Node MCU is the microcontroller. There are two sorts of correspondence engaged with this venture: wired and remote correspondence. We have used remote communication to operate the device using internet of things. Thus the system purpose to have an implementation using software control in form of android application .

3.3. Programming

Node mcu is the main component used for the hardware programming and the python is used for the connection of module programming Thus the whole programming setup is for the IP address of Node MCU so that using it the python code be implemented Also the firebase link is used for the connection of application developed using Android Studio in java language .

3.4 Associating the Android application

After every one of the associations are done, the home machines ought to be associated with the android application lined with firebase. The positive end of the home apparatus must be associated with the anode port of the optocoupler and negative end of the machine must be associated with the power source utilizing wires. Utilizing distinctive optocouplers and Node MCU ports, the associations is made for different apparatuses. At last, with the assistance of a Android Application is used finally for the controlling of whole setup and demonstration module.

CHAPTER 4

CIRCUIT DIAGRAM

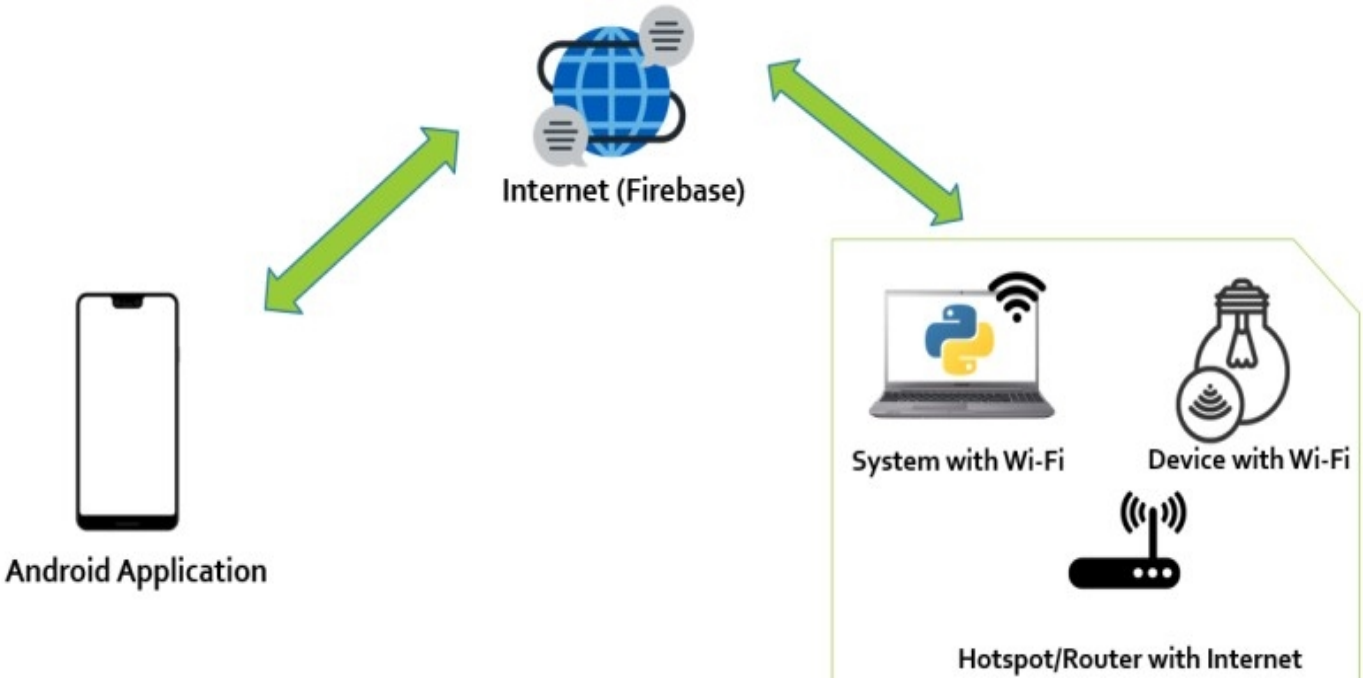


FIGURE : CIRCUIT DIAGRAM

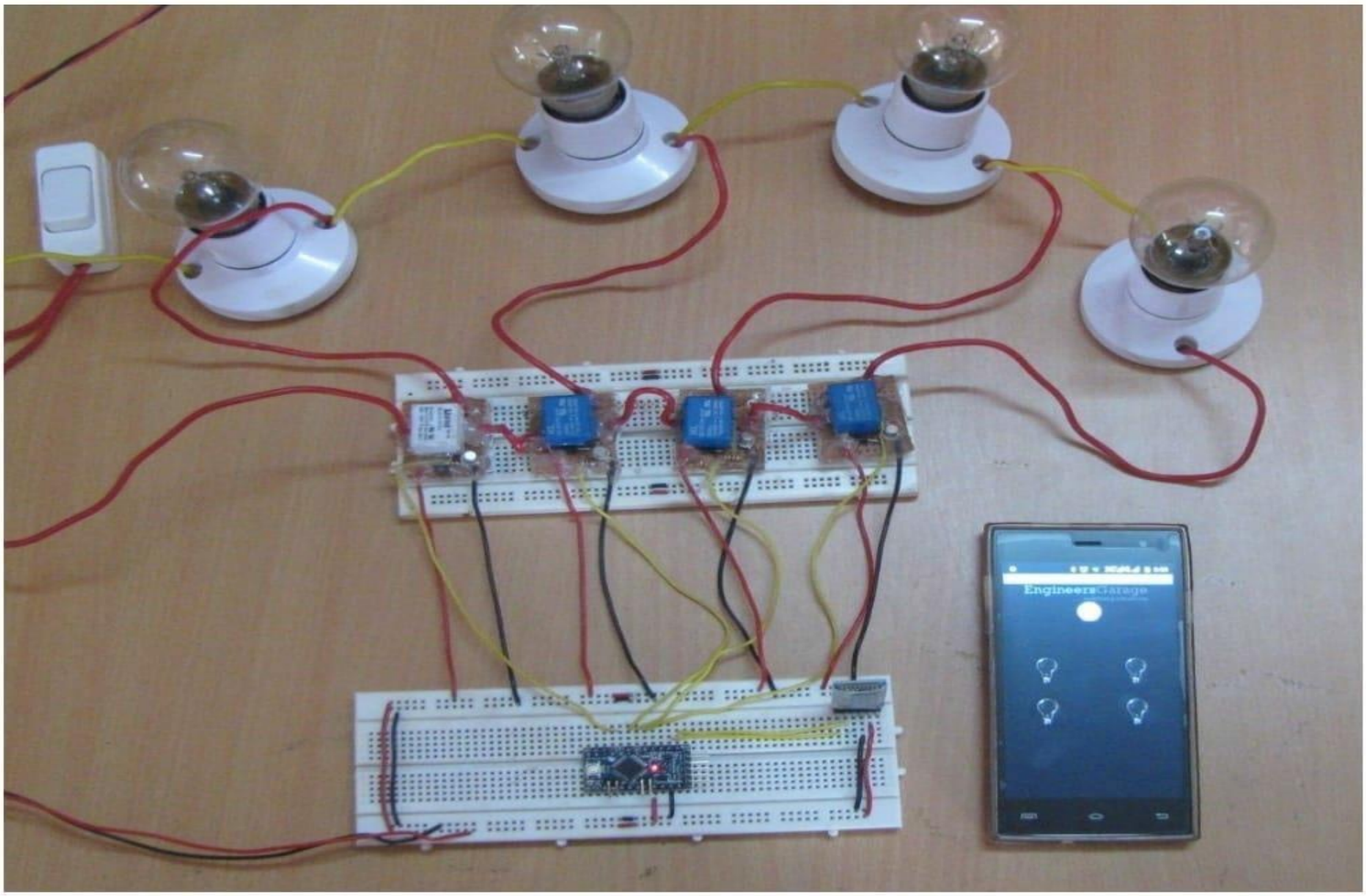


FIGURE: HARDWARE SETUP

CHAPTER 5

ALGORITHMS

& SOLUTIONS

Programming the Node MCU for the maintaining of the IP address isn't extremely troublesome task .It just need the maintain and the correct hardware driver for the code to run on the Node MCU and the desired output. When the hardware circuit has been assembled on the breadboard, you'll have to transfer the program (known as a draw) to the Node MCU system connected with the operational devices. The draw is an arrangement of guidelines that tells the board what capacities it needs to perform. Hence , the following code is followed by the Python Shell Script which is the mode to connect the hardware and the software system into one-another. The product used to make Wireless portrays is known as the IDE which represents Integrated Development Environment. It held up the devices using a self developed android application for the control of hardware components using button and Voice command using Google Assistant enabled in the android device.

For, this particular project we have developed a simple code. The code has been illustrated using screen shots taken from our laptop.

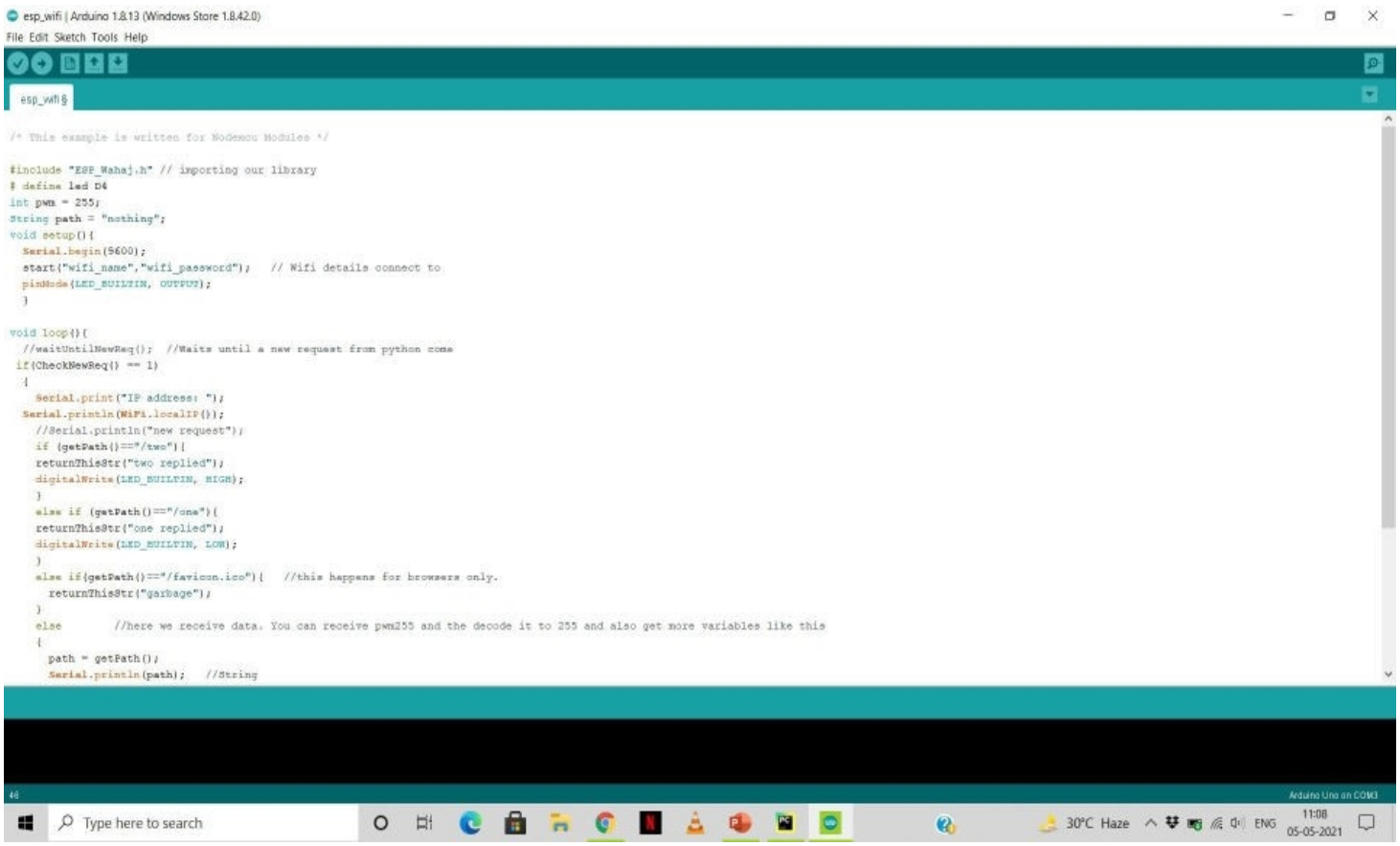


FIGURE: Node MCU code

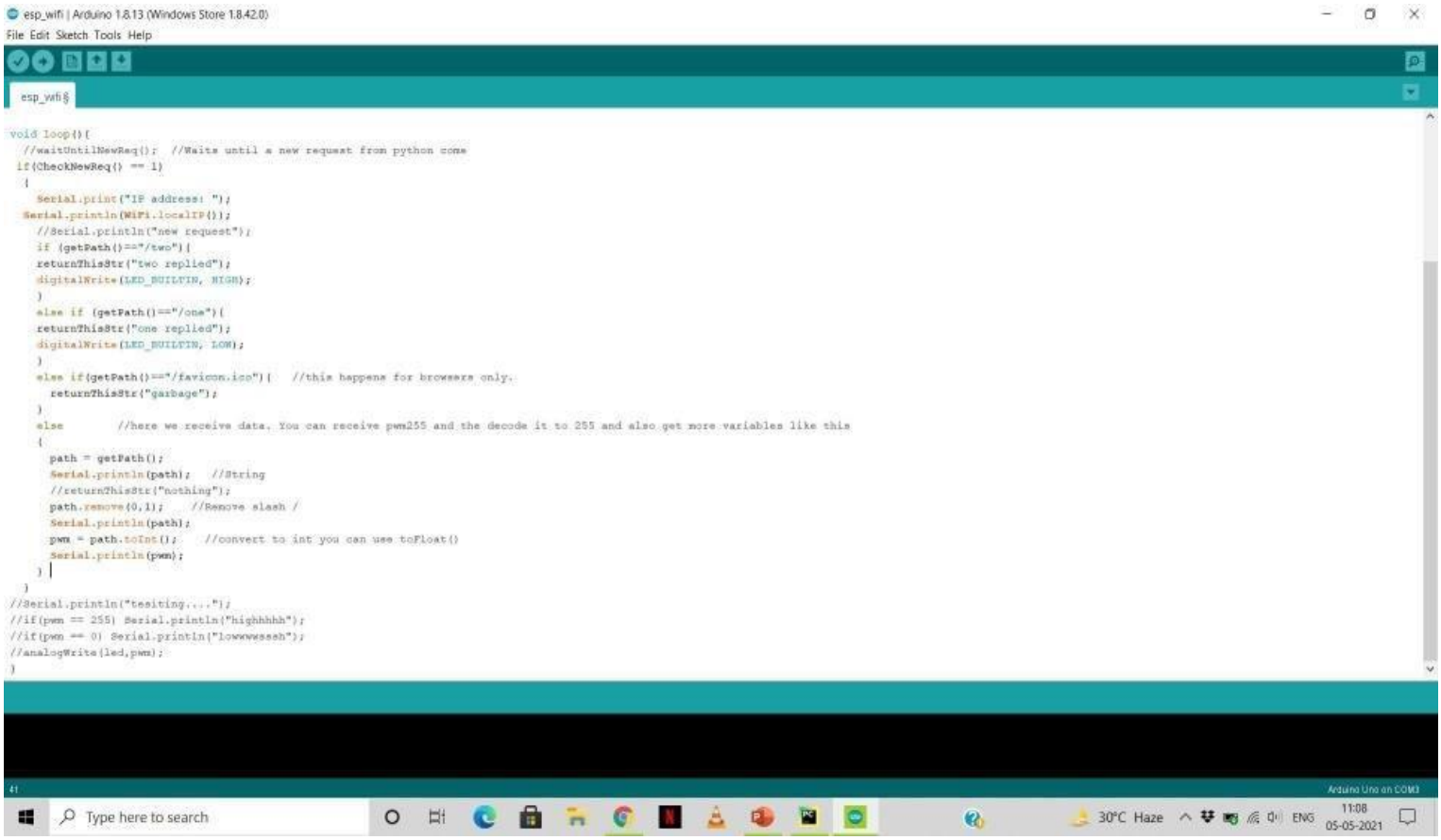


FIGURE: Node MCU code

Here is the Python Shell Scripting code for the connection purpose here are screen shot the developed code from the Laptop Screen.

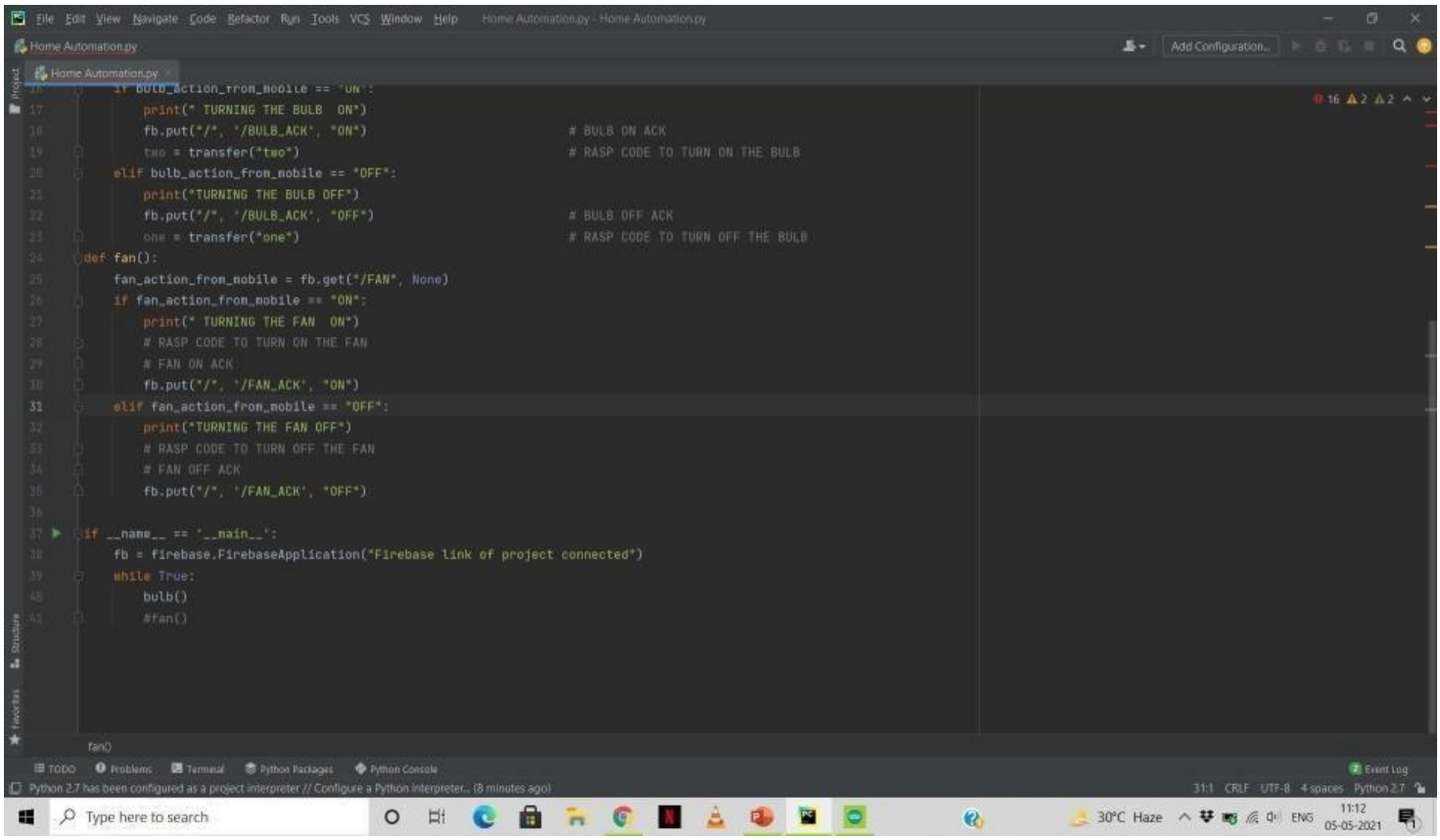


FIGURE: Python code

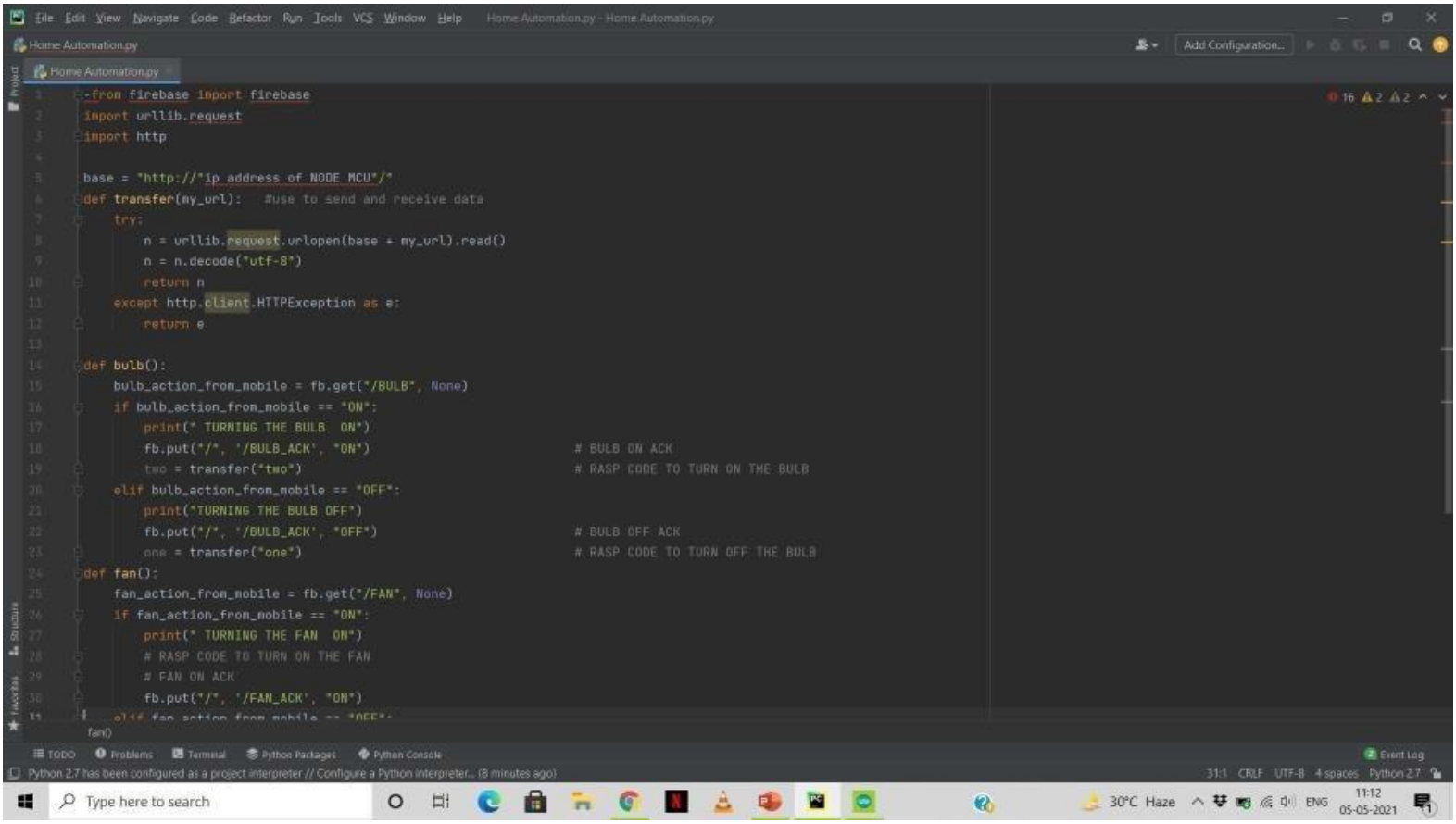


FIGURE: Python code

FIGURE: App Interface

FIGURE: App Interface (Login)

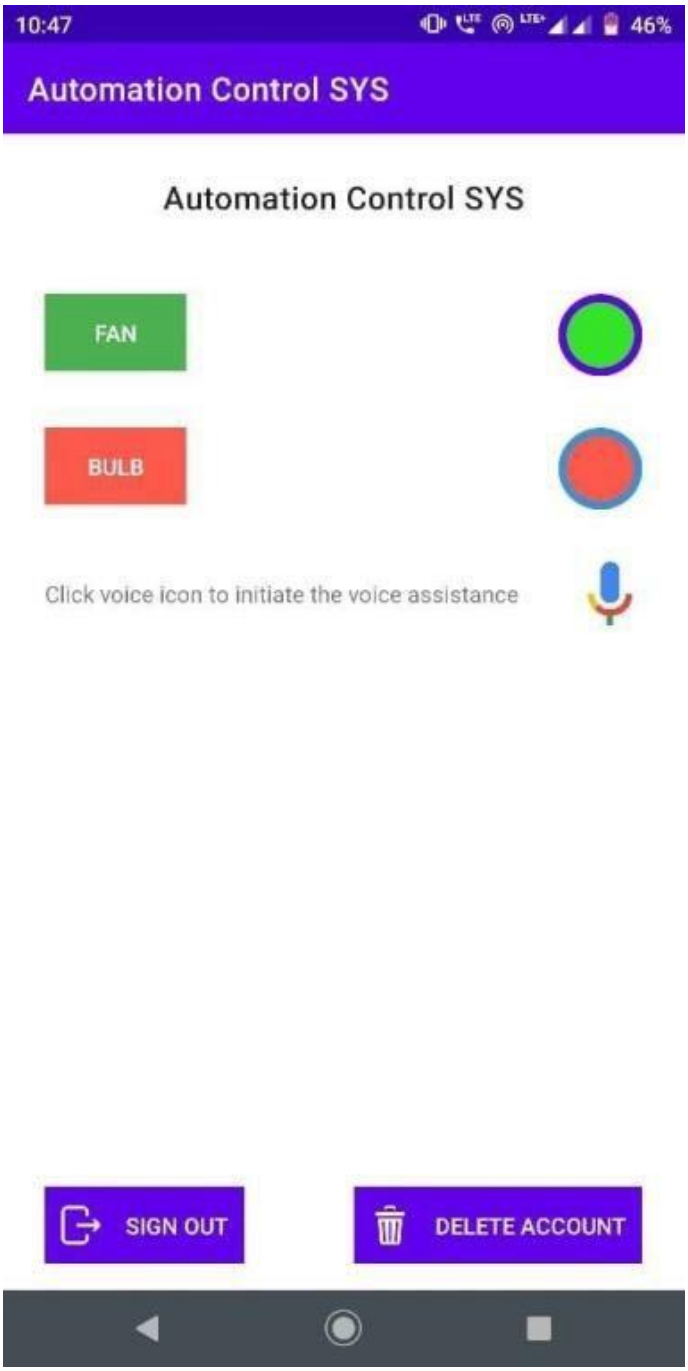


FIGURE: App Control Screen

Hence This Code is used to run appliances connecting with the board using the android application build and connected to local network.

CHAPTER 6

CONCLUSIONS

6.1 CONCLUSION

While wearing down or building up this system 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 delivery of this period will be used in our future corporate life. Additionally, we might want to include that automation system developed is the fate of places of new world.

6.2 FUTURE SCOPE

The going with stage for home robotization 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.

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