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Voice Controlled Home Automation System

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Abstract— *In today's world technology, the lives of our people have become simpler and more fun. However, this new technology is a help to all of us, some people require greater support and assistance than others: the elderly or the disabled. Technology may allow a way for them to have a nearly normal life. So, the idea of a personal assistant robot has been our priority. This car is built specifically for this category of people and its primary function is to provide support for the care of the elderly or the disabled. Personal robotic aids aim to minimize people's social activities in their everyday tasks. In our project, we had developed a smart home system that uses a voice-controlled Android application to operate home appliances that transmit data multiple devices via wireless transmission. The HC-06 Bluetooth board, Arduino Uno, LED, Relay, and NODEMCU are the hardware components used in this project. The system built can be installed as a single portable unit and allows one to monitor lighting, fans, air conditioners, TV sets, surveillance cameras, electronic doors, computer devices, sound system, etc. wirelessly and transform any gadget that is plugged into a wall outlet on or off, receive the status of various sensors and take a decision the framework is compact and designed in a manner that can be easily assembled, programmed, run and managed, ThingSpeak cloud platform is used to combine the home devices; review and store the data then web server collect it using HTTP request from the ThingSpeak cloud and saved into MySQL database. The sensors read and update the current actions on the cloud and web application of ThingSpeak. People living alone may need a helping hand at home as well. A voice-controlled home automation system is also configured such that users can execute certain functions simply by using their voices, and the system is configured to provide a portable interface (remote) such that the user can say their orders quickly. Using a remote makes the device more compact and user-friendly.*

Keywords— ***Voice Recognition, Mobile Application, Web App with Web Server, ThingSpeak cloud, IoT, Home Automation.***

I. INTRODUCTION

The IoT (Internet of Things) is a larger future of which separate daily items will be linked through Internet. A basic example of an IoT entity is the control of different electronic devices by means of voice assistance or sensors that turn on the light or perform a function once the action is detected. People nowadays focus more on computers than ever before for multiple sectors of the economy, and the same is true for human observation. The literature has formulated many smart home system architectures. The mixture of sensors, home computers, and web platforms provides these systems (Ali et al., 2021).

It is also possible to do all this supervision and tracking by not being around all the time. Some component parts may cost a lot if not managed correctly, resulting in increased electricity costs. A home automation system based on Google voice or the Wi-Fi is then suggested, which allows anybody to remotely control home appliances from anywhere and anytime (Ahmed and Faeq, 2020).

Communications and information technologies have evolved increasingly in the modern era, making it possible for anyone to access or manage and track data information from a certain distance for any home or office appliances (Saleh et al., 2021). Now a part of each citizen in the society is the home security system. For e.g., IoT-Based Home Security System with Wireless Communication, smart door automation system, can be used in everyday life.

Home automation system for home appliance control, which allows it simpler and more effective for people to focus more and more on their mobile to help either everyday job or lifestyle. Several experiments of different approaches have been performed for these reasons, such as using voice recognition and speech recognition with some commands spoken by the owner to open or monitor home appliances

(Anwar and Shukur, 2015). Different hybrid strategies exist, such as using facial recognition to identify the face of the owner for protective measures so that the fans or lamps can be operated by speech command (Akoi and Yesiltas, 2020).

There is also the regulation of automation lights that use pins containing such codes, but only the user knows about (Ali et al., 2021). Often a small remote problem becomes an obstacle to the control and monitoring function of a smart home automation device so that the Internet of Things (IoT) can be applied (Faeq, 2022). But many of the applications still lack protections to make it difficult to hack the device. It would then be safer if added for secure, trusting and friendly consumer purposes with a high degree of protection, such that device consumers will be involved in using smart home technologies in their respective homes or workplaces (Faeq, 2022).

Some of these systems for home automation are geared for those who want easily accessible and modern home automation opportunities; others are targeted at those with severe disabilities, such as the elderly and the disabled (Anwar, 2016). It is possible to run household equipment from a wireless highly centralized control device using a conventional wireless networking system. According to major organizations involved in speech recognition science, voice will be the key contact between people and robots in the near future (Akoi and Andrea, 2020).

The difficulty lies in the case of elderly or disabled individuals, who are normally unable to support themselves and may require extra help (Anwar, 2016). Many people believe programming a voice helper is enjoyable and normal. Moreover, it can be used much better by youth. It is no surprise that with such accurate wide usage, voice control is much in use (Hameed and Anwar, 2018).

Problem Faced

In this situation, communication between the smartphone and the microcontroller is a key aspect of the Wi-Fi module. Although only 3.3v control is needed for the Wi-Fi module, the Relay Board requires more power (Sadq et al., 2020). The hand-off and the microcontroller, respectively, would be given free power in this manner. In the event that the device is broken, it should not be able to switch and move between the microcontroller and the Wi-Fi module. It won't work properly.

Problem Solution

The Wireless Home Automation System is an automated system to simplify the use of an easy-to-use home security system for elderly and disabled persons that can be controlled based on speech commands. Paraplegic people and blind people at home find it impossible to manually handle appliances. While it is possible to monitor the system remotely, it is difficult for blind people to use it (Faeq et al., 2021). So, for those persons, speech recognition technologies benefit highly. Advanced-level voice recognition devices are pricey to afford, which is needless for basic home appliance power. So, we use commercially usable AI, such as Google Assistant, Alexa, etc (Anwar, 2017).

For those who are familiar with technology, it may be fun and used for personal jobs. A large number of studies have demonstrated that extremely caring robots can communicate with people with autism in a medical way (Akoi et al., 2021).

The project presents a device that can be combined as a single centralized place which allows lighting, fans, air conditioners, TV sets, security cameras, electronic doors, computing devices, audio/visual equipment etc. to be operated wirelessly (Anwar and Surarchith, 2015). The benefits of Smart Home (SH) automated systems include ease of service. Accessibility, reduction of electricity, ease, comfort, Peace of mind, entertainment, protection, and safety. A Summary The issues in the actual home was identified in order to identify Systems for automation. Many current frameworks are inadequate for Due to their high costs and complexity, many consumers Maintenance facility (Faeq et al., 2020). Furthermore, current systems for home automation They ignore IoT technology and provide user interfaces that are unfriendly. Protection is not found by some current SH automation programs. And defense. Health and protection are essential components of to stop incidents, every SH (Anwar and Shukur, 2015). Any current SHs have little features and accessibility because the initial installer does not have enough software skills. And device commission. Current networks have limited access to the wireless transmission spectrum because they use wireless short-range protocols, such as ZigBee, Bluetooth and Wi-Fi (Faeq et al., 2022).

Significant systems for home automation are available in About the market. This process can be divided into two major structures (Faeq et al., 2020). Local control and remote/global control types, namely, that vary depending on their organizational definition. In essence, A home unit with a local control system needs an in-home controller with a Wireless or fixed networking technology for linking to the major place or gateway which can be managed by users only Locally, home appliances (Anwar and Shukur, 2015).

Systems of remote/global access Users are able to monitor home appliances from anywhere. Through their smartphones/laptops, the Internet. The user-friendly use of home automation services should be Interface to track and manage home appliances effectively. Tackling these problems and minimizing home weaknesses the present

study implements a cost-effective and hybrid IoT@HoMeMe (local and remote) automation method (Faeq et al., 2021). Framework of automation to expand the spectrum of networking and Enabling users to quickly and efficiently monitor their homes through a User-friendly smartphone and/or desktop user experience Regardless of place and period. Security and defense are considered in the proposed framework. By using NODEMCU and free smartphone software to operate, the device expense is taken into account, Track and govern home appliances and circumstances across As to the Internet (Anwar and Qadir, 2017).

II. RESEARCH OBJECTIVES

Any project's success is based on the ultimate reason it has been proposed for. The guiding mechanism to plan the project must have a number of objectives. Objectives are those numbers that help the initiative. And solid deadlines still endorse the priorities and open the gates to the future to help improve the concept (Faeq et al., 2021). Android-based application for home utility management undoubtedly has an amazing influence on culture, where inequality against ordinary items will be eliminated, as everyone has the same easiness to access utilities (Sadq et al., 2021). The key goal of this project is to have an unparalleled platform. The client application will operate with the speech recognition resources of Google, where the voice command will be received and translated into text format so that it can be understandable in a logical way and that command will be transmitted via Bluetooth or Wi-Fi to the Arduino Uno computer, and at that point the command will be enacted to accomplish the tasks.

When we have shorter and more perfectly balances, some of the main aims and goals of our project are achieved.

- This project is planned to monitor household utilities such as lighting and fan using voice recognition technologies
- The introduction reflects in particular on the needs of people with disabilities.
- Input voice is used with a Google voice recognition system.
- Server cloud services is a major factor in accessing data care to people, including common file storage, website hosting and databases.
- Another important point is that in this project we have created a secure system in which we will connect to the IP address with NODE MCU board so that if the application falls into the hands of anyone it will not be possible to control the home appliance because the IP only knows the owner of the house.
- The smartphone program, related to the Google voice command input, is used on Android phones.
- The program of operation can translate the voice order into the text format.
- •The app program is eventually moved via Bluetooth or Wi-Fi module to the Arduino Uno in text formats
- This microcontroller (Arduino Uno) is smart enough to translate the executable language command to the appropriate programming.
- And the action will be carried out until execution
- Commands used are on/off lights, fan on/off, all on/off orders
- Red/blue/yellow/green light and fan are the main home appliances for our project. each them follows the programmed instruction.
- This IoT technology tries to make life more fun for people of all ages, people of all gender, and even people with special needs.

III. LITERATURE REVIEW

There are several home computerization frameworks, according to our study and the use of Android-based telephones or tablets is managed. There are different examples of each module. A few organizations are actually safely chosen and are aiming to provide them better home automation (Anwar and Shukur, 2015).

Automation is simply an idea that uses the computer rather than the human physical action to execute the work manually (Anwar and Ghafoor, 2017). This approach is being suggested to the benefit of society and its development gets higher on a daily basis, provided that this mechanism has modified dramatically the routine of each person's life and has also brought many benefits to corporate entities. Researchers and scientists continue to work hard to make this for everyone, the conceptually and practically most relevant, more productive and secure (Abdullah et al., 2017).

Any home automation projects use Wi-Fi technologies for their service. When taking the Wi-Fi system into consideration, the infrastructure typically consists of three key components (Anwar and Abd Zebari, 2015).

• Web-based server

• Interface module

• Wi-fi connection

In terms of the user interface, this device is very versatile as

all it takes is to log into the web server using the I-e Arduino Uno interface module that comes with Wi-Fi connectivity. All the effect is the flexibility of the sensors and the controls, which unexpectedly respond to web-based information. Without local limitations, the user can log in directly (Faeq et al., 2022).

Related works

Voice Control Human Assistance Robot

The human voice command is given to the robotic assistant remotely, by using a voice module (it is like ears of the robot). The tasks are based on some features embedded in the Assistant. The automaton will perform different movements, turns, start/stop operations (Faeq, 2022). The robot can also read and recognize characters like alphabets as well as numeric (Anwar, 2017). This enhances the capability of the robot to detect objects and relocate them from one place to another. The most important characteristic of the Assistant is to give the trending information that the user has asked for (Faeq et al., 2022).

Robot Interaction Styles for Conversation Practice in Second Language Learning

The description of Robot Interaction Styles for Conversation Practice in Second Language Learning, four different interaction styles for the social robot Farhat acting as a host in spoken conversation practice with two simultaneous language learners have been developed, based on interaction styles of human moderators of language cafés. We first investigated, through a survey and recorded sessions of three-party language café style conversations, how the interaction styles of human moderators are influenced by different factors (e.g., the participants language level and familiarity) (Anwar, 2017). Using this knowledge, four distinct interaction styles were developed for the robot: sequentially asking one participant questions at the time (Interviewer); the robot speaking about itself, robots and Sweden or asking quiz questions about Sweden (Narrator), attempting to make the participants talk with each other (Facilitator); and trying to establish a three-party robot–learner– learner interaction with equal participation (Interlocutor) (Faeq et al., 2022). A user study with 32 participants, conversing in pairs with the robot, was carried out to investigate how the post-session ratings of the robot's behavior along different dimensions (e.g., the robot's conversational skills and friendliness, the value of practice) are influenced by the robot's interaction style and participant variables (e.g., level in the target language, gender, origin) (Anwar, 2016). The general findings were that Interviewer received the highest mean rating, but that different factors influenced the ratings substantially, indicating that the preference of individual participants needs to be anticipated in order to improve learner satisfaction with the practice. We conclude with a list of recommendations for robot-hosted conversation practice in a second language (Faeq, 2022).

Door automation system based on speech command and PIN using Android smartphone

Several control-based smart home automation systems, linked to both voice recognition and security systems, have been investigated. Research made by Hayu Arifin, who uses Bluetooth technology to monitor automatic doors based on voice directives and also PINs with data sharing between smartphones and Android (Anwar, 2017). In form of control set and even protection systems, this scheme also has disadvantages because anyone will use it as long as they know the command pin code.

Bluetooth Based Smart Home Automation System using Arduino UNO Microcontroller

A smart home automation device based on Bluetooth technology was introduced by [19]. Two relay modules are being used in this project to connect to the electrical switches of home appliances. As a microcontroller, Arduino UNO is used to control the relay on or off directly. To pass relay status and user commands between the microcontroller and a cell phone, the Bluetooth module HC-06 is used. The authors find that the overall range of contact between the HC-06 Bluetooth module is about 60 meters. A current software, called ArduDroid, is used for smartphone apps (Anwar and Surarchith, 2015).

Bluetooth Based Smart Home Control and Air Monitoring System

This program should have been specifically applied Google Play Store download. Apart from that, [20] The Bluetooth-based home automation scheme was also seen. The Arduino UNO microcontroller, the HC-05 Bluetooth module, and four relay modules were used in this project (Sadq et al., 2020). In addition, the mobile software is used to monitor the on and off switching of four relays linked to control the home appliances and monitor inside home air quality: temperature, humidity and toxic gas (Faeq et al., 2020).

Intelligent Home with Air Quality Monitoring

The Arduino Super and Raspberry Pi are used as microcontrollers in this proposal to attach various sensors and electronic items. Arduino Uno is used to monitor the smart home setting inside, using TGS2442 sensor, TGS4161 sensor, SDS021 sensor, and DHT22 sensor respectively to measure many parameters such as Carbon Monoxide (CO), Carbon Dioxide (CO2), Particulate Matter (PM) 2.5 and 10 concentration, temperature and humidity. The Raspberry Pi is used to directly link and monitor the home appliances that are available at home (Sadq et al., 2021).

Smart phone as a controlling device for smart home using speech recognition

Authors suggested in (Anwar and Ghafoor, 2017) a price smart home device recognized for voice. To connect the relay modules, Arduino UNO is being used. Users may send the smartphones a voice order to control the relays on and off using the HC-05 Bluetooth module and further control the electronic devises. This section describes that the delay between the instruction of the user and the response is as long as the distance from the Bluetooth module is longer (Faeq, 2022).

Face and Speech Recognition Based Smart Home

In addition, a stable face and voice recognized smart home was built by (Anwar, 2017), This paper envisages a smart home focused on two distinct and evolving innovations for protection and language comprehension, for automation purposes. Speech control over the whole house is an effective device that could prove a major charitable tool for the poor, elderly and paralyzed individuals, in remote areas without internet connectivity with a single voice order in the Arduino V3-connected microphone, Arduino UNO and Raspberry Pi are often used as embedded systems (Faeq et al., 2021).

Voice Recognition Application Based Home Automation System with People Counter

Research conducted by (Sadq et al., 2020) is also available were the study focuses mainly on monitoring a few lights and tracking individuals that go in and out of the room. As a way of connectivity between Android and smartphones, the device also uses Bluetooth (Anwar and Climis, 2017). This system has a drawback because it does not identify who is just countering people in and out of the room and also has a restricted range management problem (Anwar and Louis, 2017**)**.

Speech controlled automobile with three-level biometric security system

Other trials of the smart home system use three Security device thresholds first, then voice control and voice response It is necessary to execute the order (Faraj et al., 2021). The method, in those situations, an external fingerprint sensor is still used and face recognition It also uses computer assistance to make it less efficient and less efficient. Reliable as specifically applied (*KM* et al., 2021).

Implementation of IoT in smart homes

Consequently, the analysis It is suggested that we merge previous research using speech, Regulation of commands with an advanced-level protection framework It consists of many protection layers, such as web login, Protection, authentication with biometrics, for tracking who manages it, basic speech direction and background monitoring control (Anwar and Shukur, 2015). For the restricted remote issue, the device also uses IoT solutions. It'll become a superior and secure smart home software device, integrating sophisticated protection systems and IoT (Farid et al., 2019).

Reference (Faeq et al., 2021) implemented an IoT-based framework for powerful computer energy and protection control. The key idea of this work is to monitor home appliances using mobile as the communication protocol through Wi-Fi, which provides the details on the software and hardware components needed. The configuration of the IoT used in smart homes is defined as follows: (Anwar and Qadir, 2017) First, all devices are connected to a computer called the smart remote control, which for each connected device is related to the switch and thus allows access to each individual device. Subsequently, the computer is linked via a router to the Internet, enabling the user to link as necessary (Faeq et al., 2021).

Designing and implementing resilient IoT applications in the fog: A smart home use case

Reference (Abdullah et al., 2017) mentioned the design and application of scalable approaches to practical research in the Fog-IoT Smart Home environment, where this system was applied and evaluated, taking into account environmental details (Abdullah et al., 2017). In a cyber-physical, complex, and clustered Fog-IoT environment, this report summarizes the usability of the architecture that enabled IoT app developers to provide worldwide distribution (Anwar and Abd Zebari, 2015).

IV. MATERIALS AND METHODS

Introduction

The hardware and software approach were used for the implementation of this document. This was done by connecting between the hardware device and the smartphone using the Bluetooth module (HC-05) and the NODEMCU board for Wi-Fi. The part of the program was based on two Android apps, one developed using MIT App Inventor and the other created using Google assistance, MIT App Inventor, an easy-to-use web platform used to build the Android app. On two devices, namely the microcontroller and a wireless network known as the Wi-Fi NODEMCU, the whole system was operated (Faeq et al., 2022).

Google Assistant (BT Voice Control for Arduino) is based on speech recognition for Bluetooth. There were five main parts of the system architecture, namely the microcontroller unit, warning unit, relay and test unit, communication channel and power supply unit, as seen below. The input, which can be a voice prompt or a graphical user interface (GUI) instruction, but not both, is used by the Android

device as an input to the mobile smartphone (Anwar, 2017). The received command is transmitted by both Wi-Fi and Bluetooth interfaces, which are integrated into the mobile device, then detects their activities and sending the detected data to the Thing Speak cloud for storage (Faeq et al., 2022).

Research Methodology

There are a variety of options to complete the challenge, which are both hardware and software-based methods and techniques. Now comes the essential point to recognize these factors of production, and we identify them in the sense of the literary review beforehand. This not only allows one to define the best approaches, but also offers an effective contrast and reference guide to the different previous methods and outcomes.

Development Methodology

There are a range of techniques for any project to be done that can be used depending on the project's goals. There are also some methodologies to be taken into account for software and hardware. As regards the creation of applications, the following are some of the widespread methods:

- Waterfall Model
- V-Shaped Model
- Evolutionary Prototyping Model
- Spiral Method (SDM)
- Iterative and Incremental Method
- Agile development

In spite of these, we have selected waterfall method of machine growth lifecycle, although a key explanation is as follows, in comparison to other methodologies:

• The systemic solution is impressive

• All steps are well specified and organized accordingly.

• Retains the time schedule from start to finish for any process.

• The single deliverables are available in any phase of the SDLC.

• A further significant feature is its sequential model where the improvement is seen in its software development in the sluggish and downward flux (as the water falls from the spring

Data Collection Methodology

It is necessary to acquire all the statistics used previously in the implementation of the same project or even a similar project. As this is a product-based project, there is no need for a deep theoretical and practical evaluation, however the product-based project requires a detailed knowledge of the various procedures. As we talked about various control mechanisms through home automation based on Android, showing the number of procedures used to handle home utilities.

Fig.1: Smart house.

According to a report undertaken by go-assist.co.uk, the adults aged 25-65 years surveyed the housing development, whether they like it or not. About 700 people of the thousands said they'd like to have an intelligent home.

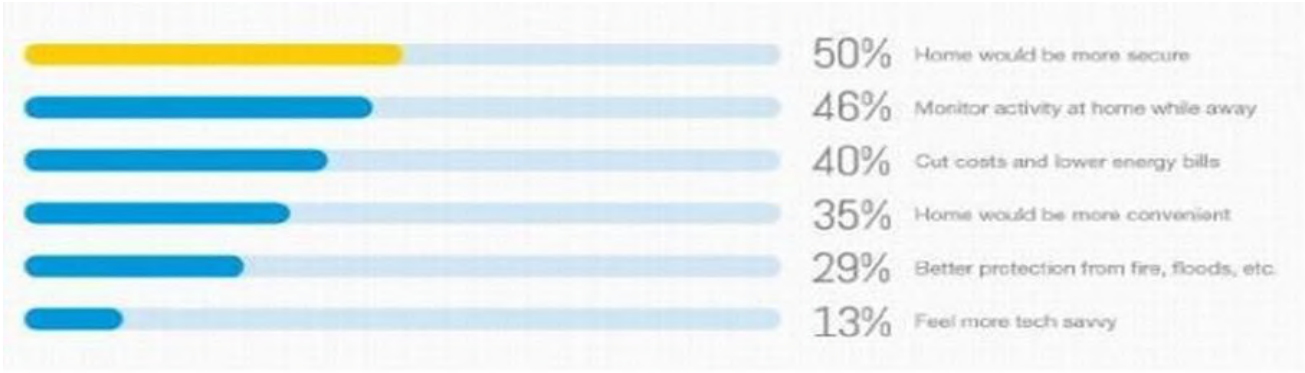

Fig.2: Percentage of the people.

They want their homes as automation for safety, controlling, costs and electricity, comfort, privacy and a stylish design feeling.

The figure above shows the number of people for the protection of a domestic automation.

Data from the literature review have also been collected (Anwar, 2017). The Literature Reviews not only provided us with the rationale for refining our approach to this idea, but also helped us figure out why this Android-based technology should be used.

Software Methodology

We had to use different software methodologies in order to achieve the project so that we could fulfill the specifications more efficiently. There are a number of technical resources on the market, and even that can depend according to the aim of the usage. Thus, in our case, we have picked MIT App INVENTOR for its unique advantages after careful study. We might maybe use any other apps, but chose to use MIT App INVENTOR as it is easy to create an Android app. There are Android and eclipse studios which use Java to submit, but our aim was to accomplish the project more easily and efficiently, so that the other android trials are very complex and much less successful. We agreed, because of this, to go with the simpler and easier-to-use Software INVENTOR (Faeq et al., 2022).

Hardware Methodology

Looking at the hardware methodologies, our project shows clearly that we used a microcontroller, because it's the critical element for the completion of all the required compilation of the software and it affects the users input on the utilities. Many microcontrollers like raspberry pie, Arduino Uno and so on are available on the markets. But Arduino Uno is the best option for our idea, according to our comfort and the performance we were looking for. Raspberry pie is very complex since it uses the Python language and the Linux operating system. Work was performed in this language We opted to go to the Arduino, not only for its simplicity and performance, but rather our newly designed inventions.

System development

In this effort, we are combining two things together, hardware and software. So, due to this, we need to be mindful of each move that is needed to take. As we are coding in the microcontroller, and for the applications, we need to be informed of the developing stage of the process and of course the hardware which is connected to it. We are going to Use SDLC (Systems development life cycle) approach to explain the developing stages of the hardware and the applications.

Following is some of the steps that we have pursued for our project, which involves the implementation process (software) along with the hardware development.

Phase one: software development

We are implementing an application with a graphical user interface (GUI) for translating the voice into text and transmitting the order over the internet / Bluetooth. This GUI would appear for the user to execute the certain task by voice. Software development of our project is qualified to take the input and translate to machine readable format (text), and after it is done, the speech is to be transmitted over the Internet/Bluetooth, so that it could reach to the Arduino board and the operation is performed.

V. RESULTS

The outcome of this research is the development of a totally voice activation smart home device that accepts voice commands (such as "turn on", "turn off", "operating light "...etc.) via a smartphone application, and the resulting operation is then acted out. Transform the voice command to text command is achieved by using Voice to text Google API which is a plug-in for Scheduled tasks system.

We are sending Voice commands to the Google Assistant in two ways, one of them including AMR VOICE application which system linked with Bluetooth module (HC-05). In MIT Inventor software, we decode the commands and then sent to NODEMCU (ESP8266) micro - controller. The NODEMCU microcontroller as the main aspects together with a relay board consisting of 4/8 relays IC. The microcontroller is used to control the relays by switching sensor on or off linked to it according to the customer request to the Voice Control. The module is NODEMCU (ESP8266) and the interaction between both the NODEMCU and the app is provided over Internet. such the automation of this system is warned by placing it with the Cloud and forwards measured values to the Node.js server in real time. Node.js saves the measured values in the MySQL database, and forwards these values to the web applications to help users of view their process from the far away (or from another area of the world).

We will have the full control throughout the smart homes through a long distance. It will Improve the relaxation capacity of human living and that should decrease the Life form time and effort. The results show that the answer is quick and 100% correct.

As a result, we figured out that using the voice recognition board would receive the information earlier and show our results earlier. But it only recognizes information 2 metres away, and if we are more than two metres away, it will not

recognize the voice. And that's good for people who don't have the ability to stand on their beds.

In the same way, controlling home appliances via Bluetooth is fast but only receives information 10 meters, and if we are farther away, it does not recognize the sound.

Finally, we used the ESP8266 board to add the Internet to our project through which we were able to connect to the cloud so that in another country we could control our devices and see devices information via web apps to see our devices used and turned off.

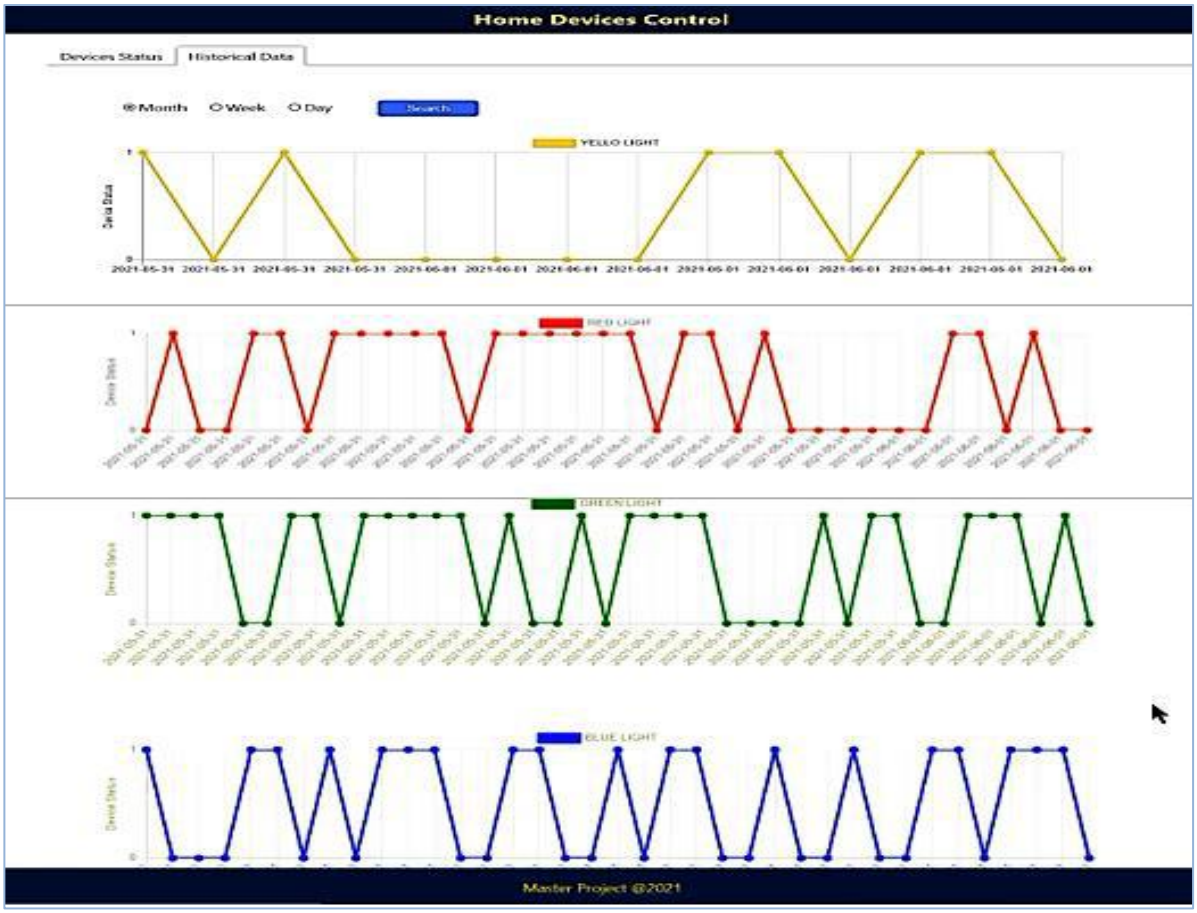

Fig.3: Historical Data in Web Application.

VI. CONCLUSIONS AND FUTURE WORK

Conclusion

This project uses IoT technologies to create a low-cost, Wi-Fi module and secure Bluetooth-based home automation couples software system. The smart home system manages and accurately operates the home setting and household devices such as fans, light, AC and doors. This project could be used effectively to help enhance the comfort and convenience of residents' living environments, especially for elderly and disabled persons. In addition, a highly interactive Interface for an Android phone has been developed. Residents can remotely view and monitor home appliances using a smart cell phone, All the data is stored in real-time successfully in the cloud thing speak and forward in live time measured values to the server Node.js. Node.js is able to save and provide these values to web apps in a MySQL database, the connection between the sensor network and the cloud is through the HTTP protocol, creating the flow that will gather sensor data. In future, more sensors will be installed within the house and combined with artificial intelligence technologies to recognize voice-quality and smart home self-adjustment.

Limitations

While working on the system, several limitations are highlighted, The main issue to be considered is the module for speech recognition, In the first stage of building our project we used voice recognition module to recognize our voice commands, but we had to move our words through microphone to do our job, it was taking everyone's voice command and we had to be near of the mic other ways it will not take your voice command and won't recognize it because of that we removed that module from our project.

The big point needs to take into account is that its barrier of distance. As we are focusing on these systems using Wi-fi and Bluetooth module, we have to be attentive about the range of all these facilities i.e., there is often a limit ranged for Bluetooth module to be connected to the smartphones, so it's necessary while performing the test keep the spacing in mind. Because, if we are using Bluetooth, then the Bluetooth range is just 10meters. However, we can solve this problem by using the internet.

Future Scope

A basic speech app that understands voice commands is used by the automated voice control system. In order to catch only the command and thus make the device more effective, the app can be further built using background noise removing tools. The source of detectors used in smartphones that remove noise and sense only the necessary speech signals is also undergoing comprehensive study. Using such complex signal processing methods, it is also possible to impart facial recognition using machine learning to enhance security.

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