Home Automation Using Google Assistant

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Abstract: The main objective of this system is to automate every connected device by use the interface which are the AI and the application program designed purposely for the technology. It is as easy as it only requires to press a button or give a command through the arbitrary system. With technology advancing in this era houses, offices, workplaces or any other place where there is a roof, they are becoming smarter and smarter. Present day homes are gingerly transitioning from traditional control to a more consolidated directed arrangement, involving wireless data transfer through mobile device, smart phones which has specifically in-built interface to interact with it. Current, ordinary and standard home switches established in contrasting parts of the house contribute to its difficulty that adds to the user using it to go close to them for it to operate. The physically impair persons who are put at an advantage due to their disorder sees it strenuous to perform these measures. Secluded administered home automation system technology come up with a most ingenious remedy with intellect phones. This is achieved through effective data and particulars distribution to the controller which fundamentally and indubitably present the adequate results to the components with which the user wants to have interchange of information with. This interplay with the particulars such as the strings sent over a networking protocol achieve the appropriate outcome with when the process will pull of the requisite consequence and effect the person using it desires.

Keywords: Arduino board; Android OS; Smart phone; Remote control; Bluetooth; Wi-Fi; GUI application; transmitter and Google Assistant.

I. INTRODUCTION

A home is a place where one last place is it is the plan of preference where one comes after a long and weakened day. Now some humans with a disorder are way too exhausted that they struggle to get back up from their couch, sofa, bed or any place of rest. Here comes the technology that would help them oneself can function the electrical and electronic devices from their location and do this with ease and comfort. An individual would find it simple and easy going if something such as warming of the bath water and regulation of the room's warmth were already done prior to them reaching their humble abode just presenting instructions through voice commands alternatively by command from a versatile device which uses an application. How it would be satisfying to find the room temperature, the bathtub water calibrated to their suitable fondness, and they could unwind as the crow flies thus feeling cozier rather than feeling extra amicable. By building human lives even more uncomplicated to compute and standard their contraption on their thumbs. The events of this decade show mechanics of technology to be convenient enough by catering to the moneyed sectors of the community, as these devices price tend to be higher than other mechanical apparatus. We can note that not everyone is well off to be equipped to spare the cash for a human assistant or any other some intelligent automated kit. Hence, there is a requirement for uncovering an economical and sharp assistant for common household keeps expanding. The main impetus of this outline is to make the employ the operation of technology in a low-cost way through some of the parts which are being handed down. The project uses an android program, NodeMCU microcontroller because the major components along with are relay board comprising of 4 relays along with different sensors are waged in aforementioned. Human based language voice can be utilized to instruct orders to the Google Assistant. Since this project familiarizes with IoT all the connections here are associated within internet over things. A home automation wielding google assistant system alternately a program built on android means that the person can administer motorized appliances through their voice command and in this case with the push of a simple toggle on a smartphone screen. An example is an easy device, like a light-weight are frequently set in motion by a signal from a motion detector, or are a part of a networked home self-operating system. We can come to conclude that a very normal clarity be prone to refer to the system is that anything that provide ourselves dim and distant involuntarily control of things on every side of a home.

The main aim of this project is to design and develop a home automation controllable from an android phone through Google assistance application. In order to obtain the purpose of its technology through various types of operations we have designed an easy and personalized home like environment through the prototype.

This project or prototype can motivate us in different ways such as time management, energy savings and is user friendly. For example, for a differently person when they arrive home, they can control their electronic devices through it instead of doing it manually which is very difficult for them. Suppose, if a person forgets to switch off electric appliances in home when they remember they can control it through the application anytime.

II. THEORETICAL BACKGROUND

This generation and these two decades see rise in connectivity of one person to another which includes a virtual connection where bits and bytes are sent over a network. It provides for the growing connections around the world IoT comes as a big player to be an ever-present technology which after the invention of internet has seen itself boom in popularity. This concept was earlier only accessible to only machines and the human being. But moderately the elevation in technology of connectivity, there is IoT available in almost all the devices that are in use today. A feature which comes into light in IoT is that it transforms any existing dull and normal functioning device to a smart and intelligent with the capabilities of sensing the environment, performing actuation, high level computation and effective communication with any other object. Demotics here which is the home automation is a significant entity which appoint a growing exercise of rise in automation of home appliances and many commercial working places, The previous couple of decades has led to the increase in production and decrease of such automated devices which results to prices to be as low as possible. The automation acts as a great player which finds itself functioning in windows, climate, control of many equipment's and checking for their proper task assigned. This control of home appliances from any present place whether the person is near or far away to his/her home. IOT makes a Home intelligent as it connects to them wirelessly or wired to a network that operates communication technologies such as Wi-Fi or Bluetooth together to control over all parts of the household. This overview subjects itself to includes changes to maintenance of room temperature, their humidity, the effective luminosity and the normal on or off appliances, they also include the water pump controller keeping track of the amount water there is in a tank. An important characteristic is home security that allows access control and alarm systems, the measurement of energy consumption and the remote monitoring of all the connections.

A user using home automation has more independence than any other normal user as there are more time to do things because the system that function in their home is mostly automated and need less looking after making time for more leisure work, family communications become more simplified which brings with it fast exchange of info, personal security and safety exceptionally increases, bills for cooling and heating devices are much lower and manageable, which brings with it energy efficiency, an alert system that informs the user of emergency situations. Home Automation is a growing essential with the speeding lives in well-developed sections. The evolving and better growth of technology that makes a person living more congenial and amplify the grade of living.

A list is given below those shows the importance of Automation.

1.   Security: Remote connectivity to a person's home has helped many a man or woman to check and verify whether there is an emergency in their homes or not, many parents that have children and are working tend to be more at their desks at work than be with their offspring , addition in increasing cost of child care has led to mothers and fathers to use this technology to improve their conditions by monitoring their own through surveillance and various detection tech. Parents and owners of small shops have benefited from this. This has further led to increased security with decrease in crime over all sections in society where this applied science has its presence.

2.   Saving Energy: Using this type of science has had a major impact to the environment and the ecosystem alike, we live in a world where there is the impending doom of Global warming looming over our shoulders, solutions to this include making the best use and save the most energy from everything. Now comes this which plays to be to save and provide efficient energy directly and indirectly to humans as a whole. Energy saving saves the pockets and the globe as a whole. Amore efficient energy device is the desire for humanity at large.

3.   Saving Water: Most developed societies have to pay their water bills and use most of the fresh water supply. This has led to wastage of an unsurmountable amount of water which have impacted and might have an impact to others depending on water. How would it be nice to know that there is a way to solve this through technology, the use of this machinery (automation) will help regulate the water supply on its own, which automatically makes the size of the pocket deeper and directly impacts to the economizing of this precious liquid.

The foremost construction of home automation comprises of sensitive sensors, the CPU (Microcontroller), interconnected technology, IoTs with its server and the software interface. The interlink of different sensors work simultaneously to provide the data sharing from one connected term to another. Any term here specifies the various sensitive equipment

where they share and talk(communicated) to perform to live up to the name that is given to it. All these primary constituents are actually physical and can be in the direction of the end person using it whose only performance here is to either make it come alive and have their own command by the interface which is the voice-over of the simple touched screened button.

III. LITERATURE SURVEY

People think that home automation is a structure thought of by them in a glance an intelligent home: A remote direction for home gadgets, automatically cooked food, starting the AC by its own, the automatic heating of water for bath and closing the shades by itself during night. To an extent automation of the house concludes smart home   Convenience and faster live with comfortability comes with this idea which in some cases seems revolutionary. In those days automation started with labour-economical systems.

Own-centred electric and substance-powered household appliance came in the early 1900 with the start of electrical power energy steamrolled to the introduction of washing machine in the year 1904, heater water in 1889, refrigerator, machines capable for stitching, washers for dishes and dry clothing machine. With successive survey we came to see currently there is a system neither at cheaper rates nor easy to handle. Various systems are hard to install, difficult to use and maintain. Current systems are generally proprietary, which is not very comforting to use. Home automation system Based on Arduino device or a Global system Mobility with a low-cost home security system.

Smart home tech is so called as the home automation is used in appliances in the surroundings of the homes that interconnects every system through a network which comes wired and wireless. It utilizes devices such as sensory electronic and much appliances attached together with the Internet of Things (IoT) that has remote monitoring capabilities, controlled with permission or provide services that answers to the required wants of the end user. The five features of a smart home system are:

1.   Advanced Home Networking: It indicates the wireless manipulated network of devices that is fetching a big part of our livelihood. An intelligent home interlink performs as a smart home centralized system that function within.
2.   Distant Access: A user staying walking, running stationed anywhere on any location can control and access the interconnected devices in the automation.
3.   Advanced Security: This customizable system is ever present to function as a virtual guard against your home from malicious strangers as it uses identification tech to differentiate the known from the unknown.
4.   Control lighting and Windows: Full automation of the fans home lightings, windows etc.
5.   Audio Distribution: The owner to controls the audio such as music while doing housework, showering, resting, working and various duties.

[1], Internet of Things (IoT) is on its high ground with the advancement of technology. This has led to many applications here discussed which is home automation, monitoring data. Home automation shows depiction of homes which are nearly all the interconnected appliances, electrical openings, cooling and warmth systems are linked to a distantly remote efficient framework. Home automation must specify inter-communication of a significant amount of IoT devices. Node-RED is a type of wiring tool for visual that accommodates in analogous gadgets fairly easy by coming together about effective and lessened connection construct. Gadgets are inter-linked with each other with the ESP8266 and MQTT which is Mosquito based that uses the features of Node-RED and a connection is made up for remote control and monitoring of the entire system within.

[2], This paper defines the execution of an Internet of Things (IoT) application that shows the humidity and temperature sensors being used for sensing using DHT11 sensor upon Raspberry Pi software with the additional transfer of data to the Cloud which is inside the software IDM Bluemix. The carrying out is done using programming system with Raspbian Stretch Lite on Raspberry Pi. The IBM Internet of Things (IoT) based platform on the Node-RED tool installed with the Raspberry Pi accessing data with the IBM Cloud.

[3], MQTT Based presents the structure and development of cloud in IoT platform with by Node-RED flow design to assist programmers or developers such that time is saved to put it up to the pre-discussed platform by oneself. The user interaction of this platform takes the shape of a web application designed with the MERN stack software. It comes with three main services: (1) Data transmission in broker of MQTT (2) Flow of data processing and displaying data in Node RED presenting in graphical form showing in dashboard (3) Storing data in Influx DB and MongoDB databases. A test is used by making the IoT system for observing and outputting humidity values, that resulted showing support by the platform to and help users in developing the IoT systems and devices exceptionally well.

[4], Discussed here is a way to provide a particular ease in communication and monitoring of the home-based system, switching on/off is just the start for the appliances. How about a user command sent through a phone via voice, interpreting the voice data and sending out the correct command to the wanted appliances. Fan, Light, Coffee Machine and Door Alarms are the plan on implementation foe the common home appliances as concept of proof for this project. Natural Language processing is used for the understanding of the voice command from the user to the mobile. Here the mobile device substitutes as a centralized console, which operation determines what must be the completed result by which request to the appliance is being fulfilled. The console might here show to be either a smart phone application, desktop PC, web page. Nearly most of the transferred data are to be executed by the cloud server. In the light for the convenience of the one using and expansion of mobile functionalities we thus prefer a smart phone for this project.

[5], This project aims at having a complete control over the home appliances in the structure of efficient smart wired/wireless security in house systems using Wi-Fi(wireless fidelity) as particular for information sharing . Communication measures such as ZigBee, Wi-Fi, sensory gadgets, GSM, and even Bluetooth are the foundations of implementation here. They also come with their own drawbacks which is short range signal. This drawback can be reduced or even removed we are going to for implementation of this project in IOT Smart home Automation. The primary objective of this extend focuses on lights control and fans regulation referred as the automatic(smart) home and which cares to provide essentials of Smart security by presenting out an image captured by a camera to the owner in the Email using internet connection when something is detected. NodeMCU is used here as an application in the project. This serves greater purpose and more care for physically challenged and the aged group.

[6], This paper shows implementation of the MQTT monitoring system for quality of air which it is based upon. The device for quality air measurement is a hardware that is the ESP8266 NodeMCU that interfaces to the sensors for accurate temperature measurement, humidity regulation, carbon monoxide and its concentration, even ozone gas. A publisher which is actually the firmware of the device that understands the data from the sensors and directs them to the MQTT Broker software. Node-RED here displays as a connector that connects to accept data from MQTT Broker. With the presence of Node-RED, received data is comfortably managed and substantially eased. Now the Node-RED will try to come out with data to be sent to the medium that displays it in web application which is responsive to gauge out the data result in text and chart owner (User) interface. With the addition of the estimates of some particular data overtaking the configured scope, the Node-RED will convey a message as an alarm informing the users.

[7], Fuzzy Inference System here can be a term of application for the IoT. In these solutions on air medium wireless communication are performed as communication share messages in the form of signals. The communication based on message sharing in these systems can be proclaimed as control link of event network. In this event network control, the capture such is data values are not there for availability showing at the required time that tends to be same. A fairly not impossible comes as the aim for solution to narrate Takagi-Sugeno Fuzzy Inference System (FIS) . This paper sets out the validity and its implementation to control network-based within the event-driven design inside Takagi-Sugeno FIS, this come within the Node Red toll used for programming.

[8], With the advances in 3G networks data sharing among devices has improved significantly , it seems that information is readily accessible at the device itself by the push of a button, In serving various services and applications useful at the tips of the finger, industry of mobile manufacturing and development has been from time to time been seen as a tremendous growth in benefiting the citizens. For the purposes of connection IoT has been very helpful playing the role for data sharing, communicating, user controlling and proper management of intelligent/smart entities(objects) which all have internet connection with their own IP addresses. Here applications range from governance in smart mode, intelligent/smart education platforms, smart agriculture, health provisions that are automated, homes that can make decisions for itself etc., may take advantage of what the IoT provides for them effectively as a delivery service with no particular mediation in an effectively higher form of manner. This article debates over about how IoT, in what way it can be used for discerning smart home automation employing a small-controller-based Arduino structure and Android mobile software programs. This paper discusses two prototypes rooting from home automation alongside Bluetooth modules in a contained and closed environment and automated smart house preferring Ethernet in a for the open outdoors.

[9], Technology of the present decade has become presumptions, the outline provocations in home automation are becoming greater and greater with its evident. A productive seamless efficiency of control in systems will have yet to take a foothold in the current generation we are in. This poses to be a permissible to the summons of developing a thoroughly individualistic and stretchable home system that provides to brace technologies with devices of pertaining compatibility and rule. This paper recount the methods to be used to administer household electrical/electronic stuff with android application software via web services. With the existence of a substantial amount of materialistic home automation controllers readily accessible in retail. Although, they tend to perform for a finite amount of time limiting

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their use. Consequently, appliances of the home have to some extent sole control together from inside the closed space or the vibrant outdoors. The physically challenged, disabled one are the beneficiaries of this technology. The practicality and the aim of such discussion here has been to construct a digital(virtual) with practicable usability android using home control tools. Commands/data are sent using the android mobile software to the Arduino to have a monitor over mostly the outlets linked to the appliance. An added feature or characteristic of such technique is to have a complete or partial control of the levels of volts surging inside home appliance which comes through with momentum of fan based on humidity and temperature of the surroundings, sensor read intensity of lightings for balance etc. and further features are the real time situation seen for home appliances from our software in android. For this to work several sensors such as humidity, light sensors, and even some sensors for temperature.

[10], With the ever expansion and increase development in IoT using its application has set off the futuristic mechanization within the community of research because other availability of the presence of Internet at every location. To achieve a user friendly made application, internet established and android rooted robotics have the achieved the upper hand in their dependance in this technology that is innovating. Discussed here are an automation benefits such examples include efficient energy intelligence in home self-operating system put off by those that have accessibility and jurisdiction to the home equipment's coming forth from every all the land in the globe. In this system, web using connections or network entities is bound together to the central power section of the system which only works with web and internet connectivity by authorized access. The advent of wireless networks has the package of IP addresses. Voice recognition using voice processing has the resources to use it coming with ordering of commands for the user having the Assistant designed by Google AI or server in the internet that gives web page application. In conclusion, the real and only intention of this system put through thus, making oneself home self-functioning system ever increasingly protected and smart.

IV. PROBLEM STATEMENT AND PROBLEM FORMULATION

A. PROBLEM STATEMENT

Comfortable, simpler and enjoyable these are the aspects the project is meant to be brought about to and be presented as it. When something goes wrong home automation take a heavy toll on the user and to the trust of the system itself, poorly integrated systems are the cause for these unfortunate events. More stuff of undesirability is functioning inadequately, delay in integration, these statements that affect the design comprises the best features make it more complicated to solve and have negative effects to the end user itself.

Computer technology is used in the smart systems thus as being referred to it as its computer-based system. Computer systems have the ability to from a distant/ remote authority/control of lightings with the assistance of complex, complicated micro controller or a computer-controlled tech with several statures of intelligence in automation. With its security provisions, power savings with efficiency and ease of comfort to use, it is adopted more and more. It supplies to the user more interface communication to home appliances that provides web browser access for monitoring, control, jurisdiction, authority.

1. Non-Installation of Sub-systems: They encompass the security cameras not giving outputs, heating entities not being responsive, units for leisure activities striking down. These issues have an adverse effect on every system, ranging from a regular plugged-in thing to the epicenter of the self-performing construct. Ineffective and incompatible hardware combining with software are in need of advisement from the professionals who have the capability of tracking the solution to the pertaining complication.
2. Functionality and Characteristics are not methodical: With the common happenings as the system integrated are not up to mark and not up to practices of the enjoyer. Less education with understanding the various hardware is the central aspect of this trouble.
3. A numerous amount of hardware installed: This issue is caused as a result in a substantial amount of load to the central control with inputs coming from every links of connections, this has major consequences as they reduce the performance and efficiency of the system.
4. Bugs in the Code: A correct running and compilation of the source code does not mean the firmware will run correctly as simple logic can be misinterpreted by the coder leading through to various complications with which the system fails to even start, barely working.
5. Not up to the requirement of standards: A design of the system with simple tools and equipment with disregards to the rules and regulation and the incompetent development will eventually out-turn a mechanical equipment of limited and maybe non-functioning system.

B. PROBLEM FORMULATION

With the discussed Flow chart as figure 1 given above shows the block structure and inner workings as the voice commands are specified from the AI assistant or from the program software in the web are named through for operation and it decides the data/info from the apps or web to put in front with the those written as same in the source codes, the behaviors is to carry out a distinct task which can be as simple as turning on and off, a correct input to the mains will give the desired results as an output which is seen visually. An incorrect input will be seen and be rejected and be subjected to another cycle of waiting for command from the input devices. An anticipated functionality of the project is realized through to the application by programming it to be split-off it into two stages. Centralized controlled board (Arduino)code is selected to gather all the basic and needed information/data/commands and maybe standard push button description. Then comes the code for application, that describes the operation structure every time and, in the realm of being in a distantly designed mode, which commands the actuators operations never without the controller acting every time in sequence with the main microcontroller.
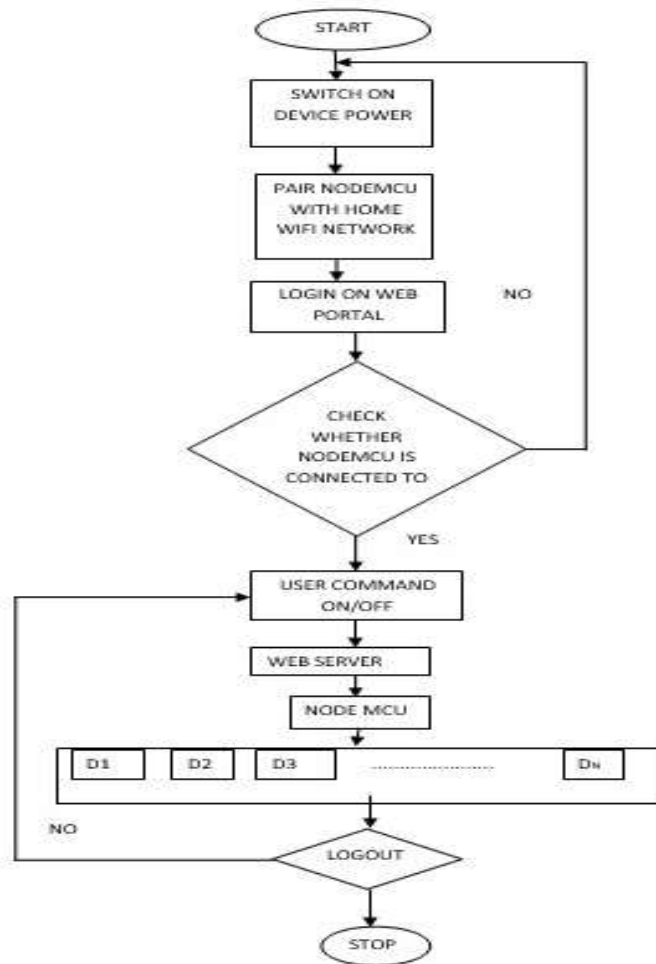

Figure 1 Flow chart of the prototype

V. METHODOLOGY AND SYSTEM DESIGN

A. METHODOLOGY

1.   Proposed Block Diagram

Figure 2 Block Diagram

The block diagram can be divided into

1.   Input Block: The input block comprises of 5-volt DC adapter that provide power to the processing unit. The input block also comprises Google voice assistant application. This application usually gives signal to the processing unit to control the output block.

2.   Processing Unit: Node MCU ESP8266 and Arduino UNO is the main drain of the system. The processing unit accepts the input from the input block and processes the data according to the requirements and provides the output to the output block.

3.   Output Block: The output block comprises of a relay module which triggered according to the input (Google voice assistant) of the input block.
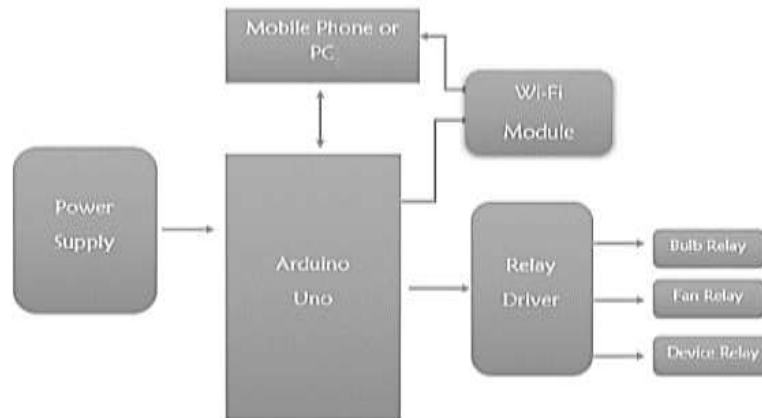

Figure 3 Block diagram of the prototype

The above block diagram describes the system which will is implemented in the system with its various components that are installed. This block diagram shows how a device such as a bulb, fan etc. are controlled by Arduino through commands given by the mobile device through a google assistant installed in the phone itself. Thus, by giving commands through voice in the application the various devices connected by a relay are switched either on or off. The Arduino Uno component is the brains of the system which has the source code installed such that the commands can be processed, it sends the various signals required to control the devices. Power supply given to the system is also controlled as the Arduino component consumes less power but the devices are may require different power voltages. The relay in the block diagram is used because it helps in the integration of the various electrical components with the Arduino and it also helps to give the required voltage to the devices. without the relay the system cannot function properly and thus eliminating the need if the system itself.

B. SYSTEM DESIGN

The underlying hardware or physical components - It has the capacity that allows it to identify itself to the router. It also functions as a turn on/off device which caters to lights and fans. The proposed Software - Given at this project shows Google Assistant and the aforementioned software which is an android program in helping in the connection and working of the electrical device to programmed system would be consolidated in the smart device. The Control/Function Unit contains the microcontroller with four Channeled relaying board which exert together with the Assistant/App, thus in turn communicates by sending the preferred signal alongside the internet. Figure 3 above shows the basic system design block diagram.
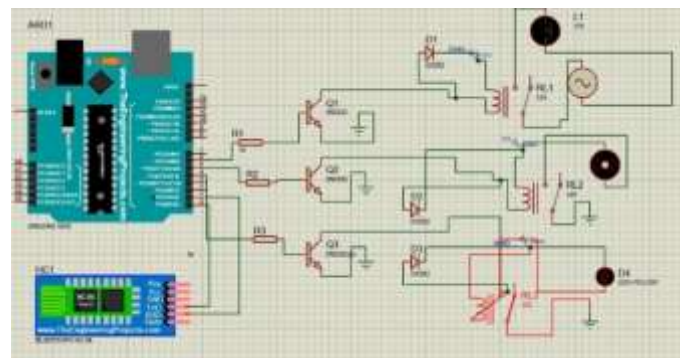

Figure 4 Circuit Diagram of the prototype.

The hardware also called the Control Unit comprises of the micro-controller and the Relay board. Arduino's digital output pins are connected to the Relay pins of the Relay board. Finally, each Relay is connected to an appliance. In the fig above the relays are connected to the various output devices which are needed to be switched on/off by the Google assistant AI. The solid hardware named the Control Unit take in the micro-controller and the Relay board. The main unit (Arduino) gives out output through the pins are brought together using the board. This leads to each transfer (Relay) to be connected to the controlled device. In the Figure 4 above the relays are connected to the various output devices which are needed to be switched on/off by Buttons alternatively by the program (App).

The hardware which has been used in this project is as follows:
1.   **NodeMCU:** Wi-Fi Module ESP8266 is used with only the Arduino UNO device or any other version of it. The board itself is an ATmega328P inbuilt with an module integrated. It is a self-accommodated SoC which uses a network protocol called the TCP/IP inside which has TCP/UDP communication protocol to connect with server and client which in chain allows entry to the users Wi-Fi network It also functions as an access point. The module supports a needed feature for over-the-air programming. The IDE (Integrated Development Environment) familiarizes itself to both operation This cost effective standalone wireless detection device is used for end- to - end point interaction with Internet of things expansion with online and offline modes. Thus, authorizing internet correspondence to implanted applications.

Figure 5 NodeMCU

2.   **Relay**: This component is an electrically intervened control which tasks with electromagnet to by mechanically operating a switch, but other make go postulates are also used, such as a relay in its solid state. Relay comes into play where it is necessary to control a particular and functioning circuit by a distinct signal of power which is relatively low, or where multiple circuits uses one signal to be controlled. Logical operations and exchanges in telephone are the main features of relay.

Figure 6 Relay module

3.   **5 Volt Adapter**: It is basically an AC/DC adapter or it can be also called AC/DC converter which is a type of external power source, which comes enclosed in a case. These adapters are in use with various electrical components(devices)not those devices which needs full supply but a smaller or a significant amount as their internal electronics are small and need only minute amounts of DC energy. The circuitry of its internal piece as compared to the power supply on its outside is particularly close to the design that of an in-built internal supply.

Figure-7 5-volt Adapter

The software which has been used in this project is as follows:
1.   **Proteus**: This software allows the user to design and simulate in a virtual environment as it serves to function the virtual scope of many electrical/electronic devices. It has a schematic capture which acts as a board for the devices to be used upon. This software leads in front in simulating the circuits which ranges for a very small to the very big which can consist the micro controllers that runs circuit inserting(uploading) the code in .hex file to the controller. Proteus

printed circuit board tools flawlessly incorporate the schematic capture with the last of the PCB to come up with an integrated, strong easy to work with suite of tools for white collared circuit board style.

2.   Arduino IDE: The IDE (Integrated Development Environment) for Arduino comes with a editing for text software for putting down codes, space for comments/message area, a software console for text, with the basic functions in a toolbar and several buttons that include a compiling and running. For the code to work it needs to be communicated with the hardware device (Arduino), sketches are the name of the code written in this software, sketches which are coded in the editor and are saved with the file extension.ino. Cutting and pasting and for searching with replacing text is a common feature which comes with it. The area for message is a black screen which provides displays errors and feedbacks. An output of the IDE console is displayed in the console of the software, counting the absolute error text with some more related data Serial ports connections and configured board are shown in the bottom righthand corner of the editor. Verification of the program after it compiles is also shown on the toolbar, and it also exhibit creating, opening, serial monitoring, and the most crucial saving the sketch.

3.   Android application and the AI (Google Assistant):
Here in this project, we have come up with two alternatives which is the android application or the AI for voice commands, the AI needs only voice commands for it to direct the components (Electrical/Electronic) to be either switched on/off. The android functions similarly to the previous software but here direction is done by pushing buttons on the screen rather that speaking.
Its features includes:
- Having automated, finger or voice control over devices by the user.
- Control over various equipment's from any location over the internet.
- Have a real time views of the functionality of the components.
- Restarting or switching off the devices with a simple command or a push of a button.
- It sends a text in both the software's.
- Apps here are convenient and more efficient.
- Real time communication whenever there is a connectivity to the web.
- Functioning anytime anywhere with internet.

The prototype of this system is as follows:-

Figure 8 When all the controls are switched off

Figure 9 When some of the controls are switched on/off

Figure 10 When all the controls are switched on

The circuit consists of Node MCU, Relay module, Arduino. After uploading the algorithm to the Arduino and Node MCU after connecting the circuit diagram mentioned, our home automation using google assistant is ready to use. After

giving command from google voice assistant, the node Arduino accepts commands through Node MCU and according to the command given by the users the required output is controlled.

Figure 11 Hardware model of the Project

VI. SYSTEM IMPLEMENTATION AND ANALYSIS

A.   SYSTEM IMPLEMENTATION

The simulation for the project was done in the Proteus Professional Software where the various components were tested individually and then they were integrated with each other and then tested as per the design of the architecture. Various commands were kept to understand how each component work individually or together, the whole automation device was tested and the results are noted to verify whether it was working properly or not. During the simulation of the device in software mode it came out conclusive with almost all the systems functioning properly without any errors. The voice commands were given to the device using the google assistant app to see whether the device was functioning properly or not. The commands as per the code such as to switch on/off the lights were given and the components to which the device is to be interacted responded with positive results. The simulation part of the project worked as planned and as predicted, from this simulation it shows that many more components can be inserted or plugged in such as a fan or any other device which has an on/off option thus they can be voice controlled. The testing of the system is done through Arduino IDE software and Google voice Assistant. The testing of the program code is compiled and successfully executed in the Arduino IDE software.

B.   ANALYSIS

SL. NO.	SERVER SWITCH NO.	COMMAND OF SERVER SWITCH	OUTPUT OPERATION
1.	1	SWITCH ON	LED1 ON
2.	1	SWITCH OFF	LED1 OFF
3.	2	SWITCH ON	LED2 ON
4.	2	SWITCH OFF	LED2 OFF
5.	3	SWITCH ON	LED3 ON
6.	3	SWITCH OFF	LED3 OFF
7.	4	SWITCH ON	LED4 ON
8.	4	SWITCH OFF	LED4 OFF

Table 1 Output of Home Automation using online server switch

SL. NO.	GOOGLE VOICE COMMAND	OUTPUT OPERATION
1.	SWITCH ON LED1	LED1 ON
2.	SWITCH OFF LED1	LED1 OFF
3.	SWITCH ON LED2	LED2 ON
4.	SWITCH OFF LED2	LED2 OFF
5.	SWITCH ON LED3	LED3 ON
6.	SWITCH OFF LED3	LED3 OFF
7.	SWITCH ON LED4	LED4 ON
8.	SWITCH OFF LED4	LED4 OFF

Table 2 Output of Home Automation using Google Assistant

As a result, the circuit corresponds to the algorithm and the switching of the device will be selected according to the users google voice assistant command, thus giving the output of the proposed system.

VII.   CONCLUSION AND FUTURE WORK

A. CONCLUSION

The primary aim for "Home Automation using Google Assistant" is to develop a prototype in which devices can be controlled from end of the world to other end of the world. It saves time management, saves energy savings. A user friendly, and gives fast response.

When the construct of this particular has an adverse effect on the pockets of an individual there lies an issue of attaining it. Regular networking amenity are dissimilar and needs to come by with other, that concludes with enormous incline in their value. To find a solution to this adversity the NodeMCU and the Arduino reduces makes it friendly to the pockets. Most of all, location control which means a distancing way to administer the entities linked makes the user lives more comforting and substantial. Independence is the outcome achieved using web page or an application. A want for an OS for platform is rejected here. It itself has the capability to provide the optimal.

B. FUTURE WORK

For future enhancement, there are few suggestions to improve the system abilities. Firstly, the currents system mostly works for those electrical devices which basic instructions are to switch on/off. For its enhancement more other components can be inserted such as various sensors which are humidity, temperature etc. many more devices can be integrated which are voice controlled such as lowering the temperature, increasing it, control a fan. The system can be further improved by additional devices such as to incorporate sensors to help regulate the temperature inside a room automatically on its own.

In Android app there will be direct buttons for ON or OFF the system or to receive the OTP. For more security purpose camera module can also be implemented on the system. If any person attempts to enter in home with more than three-time wrong password then at that time camera module will be activated. And camera module will capture the image of person who trying to attack on system. It can use antivirus so that hacking of the system can be difficult.

Its further Scopes are: -

1.   Smart Homes: In the coming years, fully automated smart homes will surely become a reality as the home automation is developing rapidly. Due to good user convenience, smart homes are appealing a wide range of people all over the globe. The User can check for the electricity usage, the condition of his devices and get notification accordingly.
2.   Smart Cities: With increasing number of automation and IoT human and device can communicate with each other without hence it reduces its time and energy.
3.   Agriculture: This proposed system can also be used in agriculture.

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