

IOT BASED HOME AUTOMATION

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ABSTRACT :

Home automation is a famous and most used technology in the world. The main object of this project is to develop a home automation system with Android operating system using Wi-Fi technology. The Automation technology, life is getting simpler and easier in all aspects. In today's world Automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IOT is the latest and emerging internet technology. Internet of things is a growing network of everyday object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities. Wireless Home Automation system(WHAS) using IOT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. In this paper we present a Home Automation system (HAS) using Intel Galileo that employs the integration of cloud networking, wireless communication, to provide the user with remote control of various lights, fans, and appliances within their home and storing the data in the cloud. The system will automatically change on the basis of sensors' data. This system is designed to be low cost and expandable allowing a variety of devices to be controlled. The process of controlling or operating various equipment, machinery, industrial processes, and other applications using various control systems and also with less or no human intervention is termed as automation. There are various types of automation based on the application they can be categorized as home automation, industrial automation, autonomous automation, building automation, etc....In this project, we are discussing about wireless home automation. Home Automation is the process of controlling home appliances automatically using various control system techniques. The electrical and electronic appliances in the home such as fan, lights, outdoor lights, fire alarm, kitchen timer, etc., can be controlled using various control techniques.

INTRODUCTION :

Homes of the 21st century will become more and more selfcontrolled and automated due to the comfort it provides, especially when employed in a private home. A home automation system is a means that

allow users to control electric appliances of varying kind. Many existing, well-established home automation systems are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building. But for already existing buildings the implementation cost goes very high. In contrast, Wireless systems can be of great help for automation systems. With the advancement of wireless technologies such as Wi-Fi, cloud networks in the recent past, wireless systems are used every day and everywhere. The Internet of Things based Home Automation system, as the name suggests aims to control all the devices of your smart home through internet protocols or cloud based computing. The IoT based Home Automation system offer a lot of flexibility over the wired systems.

OBJECTIVE OF THIS PROJECT :

The main objective of this project is to build a smart home device which can be used to control the home appliances via internet. The home automation device that you build can be integrated with almost all the home appliances and can be used to control them remotely from any part of the world. To facilitate the wireless connectivity with the system, the Arduino Uno will be embedded with a WiFi module. This establishes the internet connection to the system and all the home appliances can in turn be connected and controlled by internet.

- With this internet of things project, you can control 4 relays from Arduino IoT Cloud dashboard, Alexa, IR remote, and manual switches.
- You can also monitor the real-time room temperature in the Arduino cloud dashboard and Amazon Alexa app.
- If there is no internet available still, you can control the appliances from the IR remote and switches.
- I have used all the FREE tools and you don't need any Alexa devices or Amazon Echo Dot for this voice control smart home IoT project.

The main objective of home automation and security is to help handicapped and aged people that will enable them to control home appliances and alert them in critical situations. The aim is to create a home automation system that performs all basic functions of a virtual assistant like telling the time, date, temperature and also controlling the electrical appliances that it is connected to. It is developed for making everyday life of a user easy.

Apart from this, the system also aims to provide for efficient utilization of electricity.

REVIEW OF LITERATURE :

Home automation is the hottest new trend at your home improvement market with a greater number of technological advances. Home automation ways to literally run your property automatically. This central computerized control of the home allows homeowners a planned out types of going about household duties. An individual as you had to discover the clock for stuff that needed to be done at various times

on the day. Now with one press of the mouse or flip of an switch you are able to let the house run by itself.

Real estate automation system mechanizes your own whole house from turning on of sprinklers at specific time of waking time, activation for the cooling/heating system using internal room temperature, deactivation of heating/cooling system automatically when anyone with in, shifting on the energy conserving mode when residence is unoccupied, turning on the lights of this driveway once your cars pulls in say only from 7 pm to 1 am and other such functions.

Literature survey of home automation system ppt is practiced for assorted purposes. It could be to make your home friendlier for any elderly or use the children, taking home security to the next level and to build home operations easier and then run them smoothly. A home automation system consists of assorted subsystems which are under its operations. These change from lighting, security and ac to entertainment, music, TV volume and motorized blinds and drapes.

A. Home automation system using Android application

In this system user send signal to arduino board by using an android application and a Wireless module connected to that arduino board receives these signals and further sent to arduino for controlling of smart appliances using relay board. Arduino device is used as the controlling hub for this system. To perform the operations"ON" and "OFF" we use the relays. This system is useful for the peoples who could not move frequently from one place to another for the controlling of home appliances. In this system user send signal to arduino board by using an android application and a Wireless module connected to that arduino board receives these signals and further sent to arduino for controlling of smart appliances using relay board. Arduino device is used as the controlling hub for this system. To perform the operations"ON" and "OFF" we use the relays. This system is useful for the peoples who could not move frequently from one place to another for the controlling of home appliances. In this system user send signal to arduino board by using an android application and a Wireless module connected to that arduino board receives this signal and further sent to arduino for controlling of smart appliances using relay board. Arduino device is used as the controlling hub for this system to perform the operations"ON" and "OFF" we use the relays. This system is useful for the peoples who could not move frequently from one place to another for the controlling of home appliances. In this system user send signal to arduino board by using an android application and a Wireless module connected to that arduino board receives these signals and further sent to arduino for controlling of smart appliances using relay board. Arduino device is used as the controlling hub for this system. To perform the operations"ON" and "OFF" we use the relays. This system is useful for the peoples who could not move frequently from one place to another for the controlling of home appliances. In this system user send signal to arduino board by using an android application and a Wireless module connected to that arduino board receives these signals and further

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B. Home Automation system based on Gesture Human-Machine Interface (GHMI)

This system focuses on the hand gesture recognition algorithm and its corresponding UI. Hand gestures are determined by accelerometer and flex-sensor. The GHMI machine will act like a remote control for operating all the smart home appliances installed. These all activities are done using hand gestures instead of pushing buttons . This project mainly focuses on detection of various types of gestures made by hand using a number of sensors, to implement face recognition for authorization and unlocking of doors, By using Wi-Fi as transmission module update the end user by sending an Email message.

C. Home Automation System Using Voice Recognition Module HM2007

The main feature of this system is that the peoples with hands disability can use this system by voice recognition this feature makes this a totally hands free home automation system. This is mainly used system by handicaps and elders who are suffering from hands disability or those who cannot move their limbs frequently. This is an affordable, easy to use system. Initially the system takes input as voice signals and stores these voice signals in the systems memory. Then the user want to control a specific device then system again take an voice input and compare the input with the already saved directory and if matches then PIR sensor activated for checking the presence of any human if human presence test passes then it activates the relay that is responsible for to perform user intended operation.

D. IOT Based Home Automation System Using Intel Galileo Board

Basic Intention behind adaptation of home automation system is for the sake of Energy Efficiency, Ease in life and for the Security. Home Automation system is a step forward to increasing the Comfort in life and to improve quality of life. This system is proposed for the disabled persons. This system provides the means of comfort and security for the persons with a certain disability and for elder persons. This system uses the Intel Galileo Board for achieving the information like temperature, humidity, gas, smoke, motion and fire and for controlling of the different home appliances attached with the system. Incase if the achieved information value increase highly then system is capable of activating the required safety system. Another feature of the system is that by means of internet one can monitor and control his home appliances from anywhere in the world.

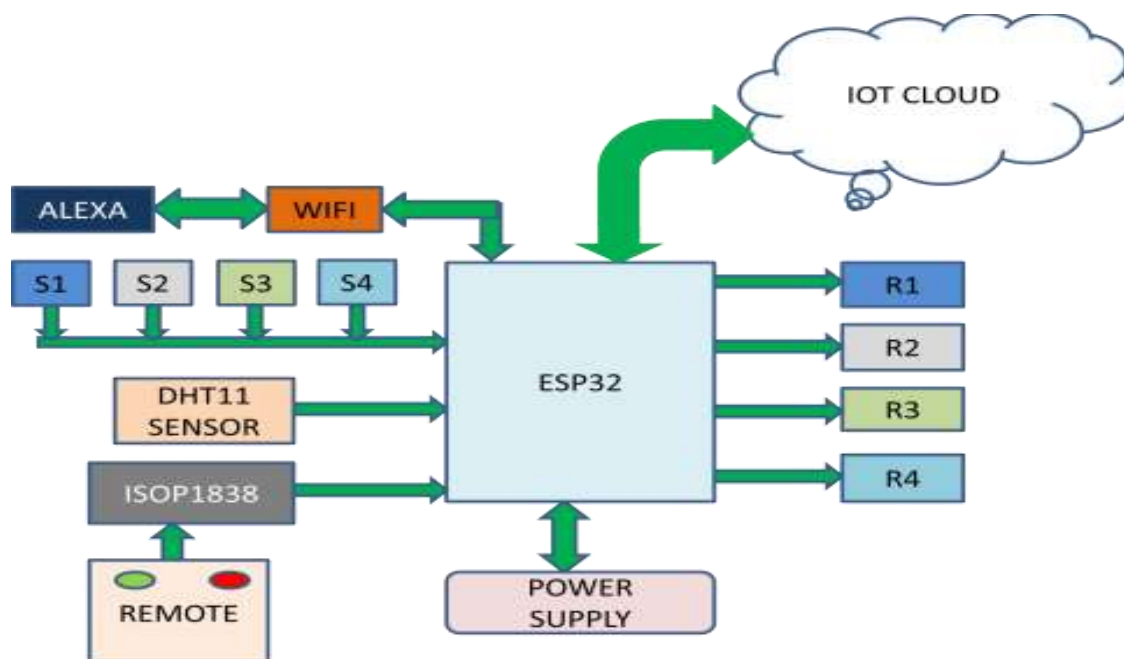
E. Home Automation System Using Speech Recognition and Machine learning

Artificial Intelligence is the art in computer science through which we want the computer system to perform that action which involved intelligence. In response to these actions the machines react on the basis of past experiences. To explore the idea of artificial intelligence lets have some examples like Self-driving Cars, Face recognition, Web searches, Industrial robots, Missile guidance and Tumor detection. . Like many more complex problems are already solved by using Artificial Intelligence. Due to interdisciplinary nature of Speech recognition it makes this as most complex area of computer science. Naturally the speech is dynamic. Artificial Intelligence has a special impact in home automation with the new emerging technologies and learning methods. It is a highly beneficial for the disable person if the home automation system works on the basis of voice/speech recognition. Ant colony Optimization found very helpful in solving many issues regarding decision trees. This system helps the disabled persons to perform their routine tasks efficiently.

F. Home automation system using Electro-Oculography (EOG) Signal

Many of the Systems designed for Disabled peoples become useless when it comes to a case that anybody which is not capable of moving their hands and also unable to speak. If someone succeeded in achieving the directional discrimination of eye moment then disable persons may be able to handle the smart home appliances and this system will be helpful in improving the quality of their life. An EOG Bio-potential amplifier is designed and develop in order to obtain the eye signal moment. This amplifier can obtain the low frequency value ranging from 0.01-10HZ. There is also another system available in the market which use the EEG technology but it ranges from 70-1000HZ. So this system with EOG are more efficient as compared to the EEG technology.

BLOCK DIAGRAM :



WORKING PRINCIPLE :

The concept of Home Automation aims to bring the control of operating your every day home electrical appliances to the tip of your finger, thus giving user affordable lighting solutions, better energy conservation with optimum use of energy. Apart from just lighting solutions, the concept also further extends to have a overall control over your home security as well as build a centralized home entertainment system and much more. The Internet of Things (or commonly referred to as IoT) based Home Automation system, as the name suggests aims to control all the devices of your smart home through internet protocols or cloud based computing. The IoT based Home Automation system offer a lot of flexibility over the wired systems s it comes with various advantages like ease-of-use, ease-of-installation, avoid complexity of running through wires or loose electrical connections, easy fault .detection and triggering and above and all it even offers easy mobility.

RESULT AND DISCUSSION :

App Buttons	Load Values	Device status	Control Relay (Relay Pin)
Button 1	1	Device1 On	Relay-1 (IN1)
	A	Device1 Off	
Button 2	2	Device2 On	Relay-2 (IN2)
	B	Device2 Off	
Button 3	3	Device3 On	Relay-3 (IN3)
	C	Device3 Off	
Button 4	4	Device4 On	Relay-4 (IN4)
	D	Device4 Off	
on All	9	All Devices (1, 2, 3 & 4) On	Relay-1, Relay-2

off All	I	All Devices (1, 2, 3 & 4) Off	Relay-3, Relay-4 (IN1, IN2, IN3, IN4)
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- The circuit is very simple; I have used D23, D22, D21 & D19 GPIO to control the 4-channel relay module.
- And the GPIO D13, D12, D14 & D27 connected with pushbuttons to control the relay module manually.
- I have used the INPUT_PULLUP function in Arduino IDE instead of using the pull-up resistors with each push button.
- As per the source code, when the control pins of the relay module receive a LOW signal the relay will turn on and the relay will turn off for the HIGH signal in the control pin.
- IR remote receiver (TSOP1838) connected with D35. And the DHT11 sensor connected with RX2 (GPIO16).
- If you want to use the latched switches instead of pushbuttons, then just connect the switches instead of the pushbuttons across GPIO pins and GND

CONCLUSION :

The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data, like temperature, gas, light, motion sensors , but also actuates a process according to the requirement, for example switching on the light when it gets dark. It also stores the sensor parameters in the cloud (Gmail) in a timely manner. This will help the user to analyze the condition of various parameters in the home anytime anywhere.

Using this system as frame work , the system can be expanded to include various other options which could include home security feature like capturing the photo of a person moving around the house and storing it onto the cloud. This will reduce the data storage than using the CCTV camera which will record all the time and stores it. The system can be expanded for energy monitoring, or weather stations. This kind of a system with respective changes can be implemented in the hospitals for disable people or in industries where human invasion is impossible or dangerous, and it can also be implemented for environmental monitoring.

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