IOT BASED HOME AUTOMATION WITH VOICE CONTROL

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ABSTRACT

IoT based home automation with voice control is a system that enables users to control various electronic devices and appliances at their homes through voice commands. The system consists of a set of sensors and actuators, a microcontroller or a single-board computer, and a voice recognition module. The sensors detect various parameters such as temperature, humidity, and motion, while the actuators control devices such as lights, fans, and ACs. The microcontroller or single-board computer receives the input from the sensors and processes them to perform actions on the actuators. The voice recognition module is responsible for recognizing and interpreting the user's voice commands. It converts the voice commands into digital signals that the microcontroller or single-board computer can understand. The system can be controlled through a mobile application, which communicates with the microcontroller or single-board computer using wireless communication protocols such as Wi-Fi or Bluetooth. The user can give voice commands to the application, which is then processed by the voice recognition module and executed by the microcontroller or single-board computer. The benefits of this system are numerous. It allows users to control various devices in their homes without the need to physically interact with them. This system is also energy-efficient as it automatically turns off devices when not in use. It can also be used for security purposes, as it can detect and alert users of any unauthorized entry into their homes. In conclusion, IoT based home automation with voice control is an innovative and efficient system that can significantly improve the quality of life of users by simplifying their daily tasks and making their homes more comfortable and secure.

1. INTRODUCTION

The concept of IoT (Internet of Things) has revolutionized the way we interact with the objects around us. IoT involves connecting everyday devices and objects to the internet, allowing them to send and receive data, and communicate with each other. This opens up a world of possibilities for automation, monitoring, and control, leading to increased efficiency, convenience, and safety in our daily lives. IoT has been successfully implemented in various industries such as healthcare, transportation, agriculture, and manufacturing. In healthcare, IoT devices such as wearables and sensors can be used for remote monitoring of patients, providing real-time data to healthcare professionals, and improving patient outcomes. In transportation, IoT-enabled vehicles can communicate with each other and with the infrastructure, reducing accidents and improving traffic flow. In agriculture, IoT sensors can monitor soil moisture and nutrient levels, enabling farmers to optimize their crop yields. In manufacturing, IoT can be used for predictive maintenance, reducing downtime and increasing productivity. However, as with any new technology, there are also concerns about security and privacy. IoT devices are vulnerable to cyber attacks and can be used to collect personal data without the user's knowledge or consent. It is therefore important to implement security measures and privacy policies to protect users and their data. Overall, IoT has the potential to revolutionize the way we interact with the world around us and has already made significant progress in improving various industries. It will continue to be a major focus of innovation and development in the 21st century.
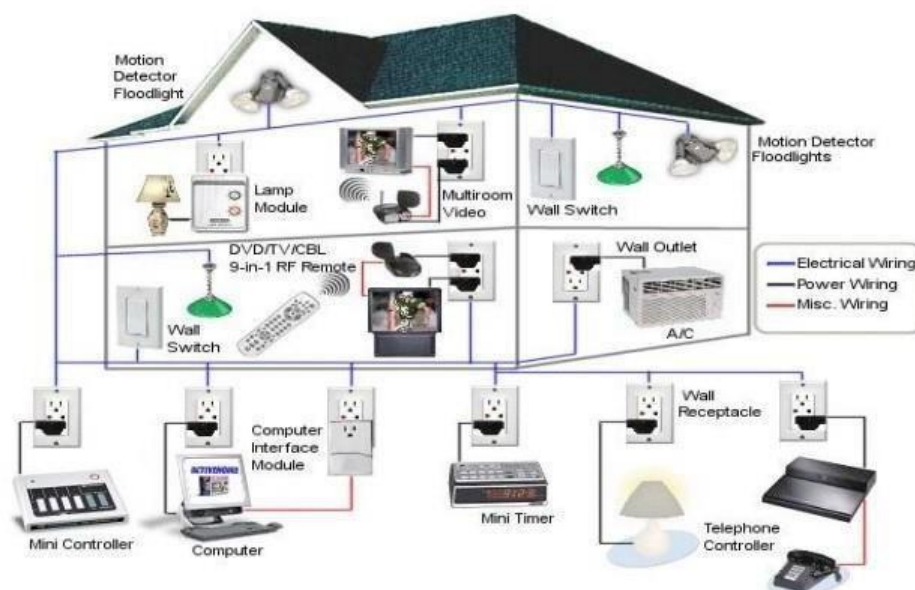
2. WORKING

The device name which has to be controlled is pre-programmed and registered in the ALEXA server. So every time, we call upon the device name to be turned on and off, ALEXA gets its information from its Server through the internet connection. When we give the Wake word "ALEXA", the device (Echo dot) gets ready to accept the command which is indicated by the blue circular light. When we give the command such as "Alexa, turn on the light" or in some similar manner which is recognised by its advanced AI system, the command gets processed through the Server and the processed signal is transferred to the ESP8266.The ESP8266 is registered with the APP KEY to enable connecting to the phone and the Wi-Fi and to help in auto connection to the Wi-Fi, a SSID name and its password is registered in the ESP module. Each ESP is distinguished from one another by its APPKEY. The command gets received by the ESP8266 and the command gets interfaced with the programming of the ESP module. Based on this, the relay gets turned ON. The Command signal irrespective of the load device activates the load. They operate irrespective of the voice of the user and it is greatly useful in Automation system in offices. By simply connecting to a Wi-Fi network whose name can be configured in the ALEXA cloud server, automation of appliance becomes easier.

3. LITERATURE REVIEW

"Smart Home Automation: A Literature Review" by M. Ramli, et al. (2018) This paper provides a comprehensive review of smart home automation systems. The authors discuss the importance of IoT in home automation and the potential benefits of using voice control for smart homes. The paper presents various IoT-based home automation systems, including those with voice control. The authors also identify the key challenges associated with IoT-based home automation, such as security and privacy concerns. "Voice-Controlled Home Automation System Using IoT" by A. Bhattacharya and D. Das (2018). This paper presents a voice-controlled home automation system using IoT. The authors propose a system architecture that includes a voice recognition module, an IoT gateway, and IoT devices. The system allows users to control home appliances through voice commands. The authors also discuss the benefits of using voice control, such as ease of use and accessibility for people with disabilities. "IoT-Based Home Automation System Using Voice Recognition" by S. S. Das, et al. (2021) This paper presents an IoT-based home automation system that uses voice recognition. The authors propose a system architecture that includes a Raspberry Pi, a microphone, and IoT devices. The system allows users to control home appliances through voice commands. The authors also evaluate the performance of the system in terms of accuracy and response time. "Voice Controlled Home Automation Using Amazon Echo Dot" by P. A. Krishna and A. G. Shaji (2020).

4. BLOCK DIAGRAM.
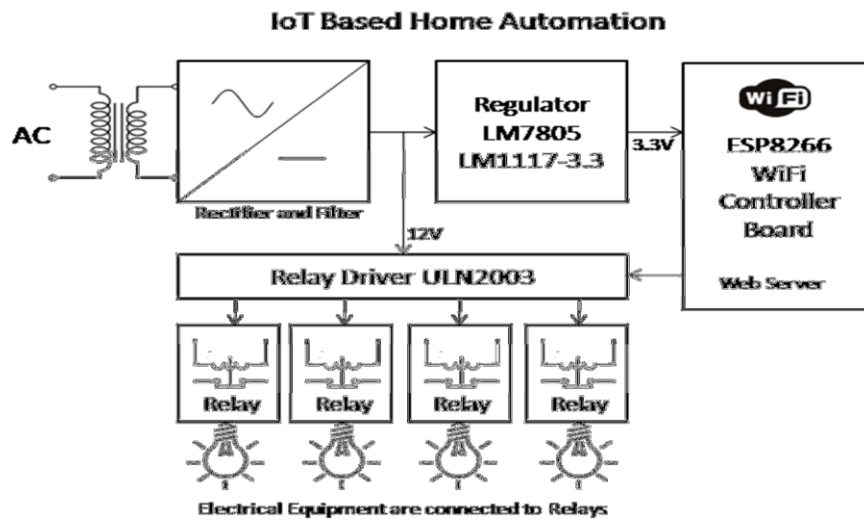
5. OPERATION OF BLOCK DIAGRAM

i. Rectifiers and filters:

   For AC to DC converter, we used rectifiers circuits and filter thereafter. For circuit simplification we used external 12v, 1A power adapter.

ii. Regulator LM7805 and LM1117-3.3:

   It is voltage regulator of +5v DC regulated power supply to WIFI controller board.

iii. ESP8266 WIFI Control board:

   The ESP8266 is a WIFI microchip with a full TCP/IP stack and microcontroller capability. It should have to do program as per our requirements of used.

iv. Relay Driver IC ULN2003:

   The IC ULN2003A comprises of 7-NPN Darlington pairs and is typically used to switch inductive loads (dissipates voltage spikes if anyusing suppression diode) and to drive stepper motors.

v. 12V Sugar Cube Relays:

   DC control relay is used in our project to connect and disconnectload from AC mains power supply.

6. ANALYSIS OF IOT BASED HOME AUTOMATION WITH VOICE CONTROL.

IoT (Internet of Things) based home automation with voice control has revolutionized the way people interact with their homes. This technology allows users to control various aspects of their homes, such as lighting, temperature, security, and entertainment systems, using voice commands. One of the key advantages of IoT based home automation with voice control is convenience. Users no longer need to manually control devices or use a smartphone app to adjust settings. They can simply use their voice to command the system to perform various tasks. Another advantage is energy efficiency. Smart home devices can be programmed to automatically adjust settings based on usage patterns and environmental conditions. For example, lighting can be turned off in unoccupied rooms, and the temperature can be adjusted based on the time of day and the outside temperature. Security is also a significant benefit of IoT based home automation with voice control. Users can monitor and control their security systems from anywhere, at any time, using voice commands. They can also receive notifications on their mobile devices if there are any security breaches, such as a door or window opening. However, there are also potential drawbacks to this technology. One concern is privacy, as voice commands may be recorded and analyzed by the system. There is also the risk of security breaches, as IoT devices can be vulnerable to hacking. Overall, IoT based home automation with voice control has significant potential to improve the convenience, energy efficiency, and security of homes. However, users should be aware of the potential risks and take steps to protect their privacy and security.

7. RESULTS AND DISCUSSION

IoT based home automation with voice control is a cutting-edge technology that is transforming the way we live. This technology enables homeowners to control their homes remotely and manage devices such as lights, appliances, thermostats, and security systems using voice commands. The system uses sensors and internet connectivity to collect and process data, which is then used to control various devices in the home. One of the main benefits of IoT-based home automation with voice control is convenience. With voice control, users can easily turn on or off devices, set the temperature, and control lighting without having to physically interact with the device. This is especially useful for people with disabilities or mobility issues. Another benefit is energy efficiency. With IoT-based home automation, users can set up schedules and automate devices to turn off when not in use, resulting in lower energy bills and a reduced carbon footprint. In terms of security, IoT-based home automation with voice control allows homeowners to monitor their homes remotely and receive alerts in case of suspicious activity. This provides an added layer of security and peace of mind. However, there are also some concerns with this technology. One major concern is

privacy.

IoT-based home automation devices collect a lot of data about users, which could potentially be used for nefarious purposes. Additionally, there are concerns about the security of these devices, as they are vulnerable to cyber attacks. Overall, IoT-based home automation with voice control has the potential to revolutionize the way we live, providing greater convenience, energy efficiency, and security. However, it is important for users to be aware of the potential risks and take steps to mitigate them.

4. CONCLUSION

IoT-based home automation with voice control is a technology that has gained significant popularity in recent years. With the advancement of technology, smart homes have become a reality, and the integration of voice recognition technology has made it even more convenient for users to control their home appliances and devices.In conclusion, IoT-based home automation with voice control offers several benefits, including increased convenience, energy efficiency, and improved security. It allows users to control various aspects of their homes, such as lighting, temperature, security systems, and entertainment systems, using their voice commands. Additionally, this technology offers greater accessibility and convenience for people with disabilities, allowing them to control their homes independently. Overall, IoT-based home automation with voice control is a promising technology that has the potential to revolutionize the way we interact with our homes and make our lives more comfortable and convenient

5. REFERENCES

Here are some references for IoT-based home automation with voice control:

"Voice Controlled Home Automation System Using IoT" by Pritesh H. Dongre, Shubham S. Kulkarni, and Amol A. Deore (International Journal of Innovative Research in Science, Engineering and Technology, 2018) "Smart Home Automation Using IoT and Voice Recognition System" by Vishal M. Dabhade, Prashant M. Jagtap, and Vishal S. Suryawanshi (International Research Journal of Engineering and Technology, 2018) "Design and Implementation of IoT Based Home Automation System Using Voice Recognition" by Amrutha R, Gopika G, Lijiya J, and Pranav Kumar (International Journal of Engineering Research & Technology, 2019). "IoT-Based Smart Home Automation System Using Voice Recognition Technique" by Shubham V. Jadhav and Manoj S. Kavade (International Journal of Engineering and Advanced Technology, 2019). "Voice-Controlled Smart Home Automation System Using IoT" by Ankita G. Gaidhani and Pranav B. Agrawal (International Journal of Research in Engineering, Science and Management, 2020). These papers provide detailed information on the design, implementation, and evaluation of various IoT-based home automation systems with voice control.