Review Article

INTRODUCTION TO VOICE RECOGNITION IN SMART HOMES

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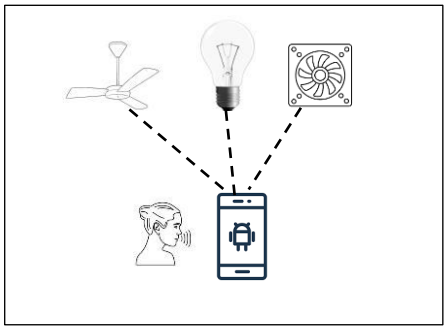
Abstract: These days, smart homes are a need in the modern world. The days of smart homes only appearing in science fiction films are now a thing of the past, as they have achieved a lot in the last few decades. Home automation has given life a completely different meaning than it did in the past. In the past, each of our household appliances—including the TV, air conditioner, lights, fans, and more—was controlled by a separate remote control. Another issue is that managing all those remote controls can be stressful at times, particularly for the elderly and disabled. In the twenty-first century, everything—from homes to factories—is mechanized. Devices like fans, screens, air conditioners, lamps, and more are controlled by home automation. In addition to saving time and energy, home automation lessens human labour. Additionally, it serves as a protective measure. The elderly and others with physical disabilities can easily transition from the centralized unit to household appliances. Voice-controlled home automation controls the household's gadgets with a person's voice. The control unit receives voice commands via a smartphone. All of these systems and technologies are reviewed in this study.

Keywords: Smart, internet of things, challenges, applications, energy efficiency, Arduino uno , MCU node , GSM, IOT, SHS.

INTRODUCTION

Automated household appliance power is what is meant by the terms "smart home" or "intelligent home" [1]. The elderly and others with physical disabilities benefit greatly from it. They are unable to control the equipment since the electrical switch boards are located in separate rooms. They become extremely resilient as a result. Therefore, the solution to that issue is home automation. It enables consumers to utilize voice commands on their cell phone to operate household appliances. ARM9 controllers, Raspberry Pi kits, and AT89S52 home automation devices are used in this article to examine all currently used home automation methods. Every methodology has a unique set of specifications and communication methods.



The fascinating field of home automation systems is examined in this essay, with an emphasis on those that use GSM and Internet of Things technology. We explore the core ideas, elements, and functionalities of this cutting-edge technology, illuminating its revolutionary potential to change how we live in and maintain our houses. A notable degree of ease has been brought about by the development of GSM-based home automation systems, which allow remote supervision and control. Whether they live on the property or miles away, homeowners can now easily manage their houses with easy messages via text or specialized smartphone apps.

This experience is further improved by the incorporation of IoT devices, which gather data in real time from sensors placed thoughtfully throughout the house.Users of all technical backgrounds may now easily operate and access the system's functionalities thanks to the integration of voice assistants and intuitive mobile applications. A crucial component is customization, which enables homeowners to adapt their home automation experience to their particular tastes and way of life.

The different parts and features of GSM and IoT-based home automation systems will be discussed in this article, along with their uses in practical situations and the possibility of scalability and expansion. We will also go over how machine learning and data analytics may

improve the system's usability and performance. We will explore a world where our homes are not just places of refuge but also intelligent, flexible, and responsive areas that meet all of our needs, improve our everyday lives, and safeguard our future as we set out on this adventure through the world of GSM and IoT-based home automation.

FUNCTION

To turn lights and appliances on or off, send signals. To operate both high- and low-voltage devices, open and close contacts. Plan and start activities, like watering the garden. Infrared commands are issued and accepted. Connect to other systems, such as X 10, the phone, the computer, the heating system, etc.

Anything that allows you to remotely or automatically control items in and around your house is considered home automation. You have control over the following systems: appliances, lighting, heating and cooling, security, and monitoring systems.

Communications (phones, internet, and intercoms), entertainment (home audio and video), lawn sprinklers, shutters, pool filter pump, spa heater, filtration unit, gate/garage door motor, shade motor control, electric strikes, keyless entry, and more.

Interfaces such as keypads, wired or wireless touch screens (with or without video), universal remote controls, and mobile devices can all be used to access and control this central controller. The family can enjoy a more convenient and refined environment that fits and complements their lifestyle thanks to home automation.

Through integrated control of daily scheduled common lifestyle activities, the entire family enjoys the comfort of automation with added convenience. For comfort, convenience, and safety, an automated home can control the lighting, temperature, security, and music.

It develops dependable and well-coordinated controls to automate the operation of household appliances, making tasks simpler.

By automating repetitive tasks like watering your lawn, shutting off all lights, putting the thermostat in economy mode, controlling the operation of scheduled appliances, and arming the security system when you go to bed, home automation saves you time and effort.

With home automation, you may experience the convenience of whole-house audio/video integration, which allows you to enjoy any source from anywhere in your house.

Proactive home security is made possible by home automation, which enables you to check in on your house from anywhere in the world, have your house call you if it detects anything suspicious, or have your house respond to a fire by waking you, turning off the gas and

ventilation system, turning on a lighting path for your escape, and automatically phoning the police or fire department. To put it another way, it combines your alarm system with other home systems to provide an enhanced level of safety in the event of an incursion.

Most I.T., automation, communication, and wiring components of our homes are now considered to be included under the phrase "home automation."

The majority of these features may be installed separately, but when these many components interact with one another, the automated home's full potential is realized. For instance, it may seem like the latest technology to have two PCs networked together in the house and provide internet access to both users, but what if they were connected to our home's wiring and could use the internet to automatically turn lights and appliances on and off when we are not home?

Assume if our home security cameras' images might be shown on our work computer screen if the PC was connected to our security system. Imagine being able to speak with anyone at your door from anywhere in the world if your security system was connected to your phone. It could even ring your cell phone in the case of a break-in.

BLOCK DAIGRAM

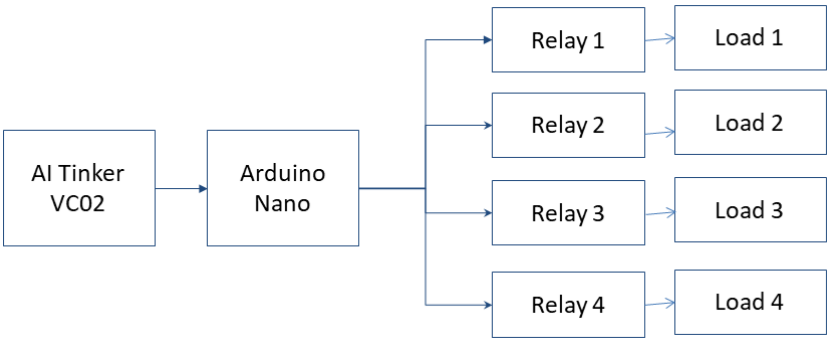


Fig. 2 :- Block Diagram

BASIC IDEA

The fundamental concept of cloud-based smart home automation is remote internet control of household appliances.

Homes of the 21st century will grow more and more self-controlled and automated due to the comfort it brings, especially when utilized in a private home. Users can control a variety of electric appliances with a home automation system.

Wired communication is the foundation of several well-known home automation systems

currently in use. This is not an issue until the system is installed during the building's actual construction and is planned long in advance. However, the cost of implementation is relatively high for buildings that are already in place. On the other hand, automation systems can greatly benefit from wireless systems. Nowadays, wireless systems are utilized everywhere and every day because to the development of wireless technologies like Wi-Fi and cloud networks. Using an Arduino Uno ATMEGA328, we will demonstrate a Smart Home System (SHS) that integrates wireless communication, cloud networking, energy monitoring, and weather stations. It also takes pictures of people moving around the house and saves them to the cloud. SHS will save the data on the cloud and give the customer remote control over different lights, fans, and appliances in their house. The data from the sensors will be used to automatically modify the system. This system's inexpensive cost and expandability enable it to control a wide range of devices.

APPLICATIONS

The Offline Home Automation System's Use The project

Lighting manager: Users may simply manage interior and outdoor lighting, altering brightness or turning lights on and off using voice commands.

Heating and Cooling Control: The system has the ability to control heaters, fans, and air conditioners, enabling temperature changes according to user preferences.

Home Security: Without relying on the internet, home security can be improved by controlling appliances like motion sensors, cameras, and alarms.

Entertainment Systems: Users may conveniently control audio and visual entertainment by controlling TVs, speakers, and other multimedia devices.

Home Appliances: By controlling a variety of home appliances, like toasters, humidifiers, and coffee makers, the system can simplify daily chores.

Smart Gardens: By automating garden lights or irrigation systems, users may guarantee that plants and landscape receive the best possible care.

Accessibility Solutions: By using voice commands to control their surroundings, the technology offers a practical option for people with mobility issues.

Energy Management: Users can monitor and lower energy consumption by regulating different appliances, which promotes more environmentally friendly living habits.

ADVANTAGES

Benefits of the Project for an Offline Home Automation System

Improved Security Operating without internet access lowers the possibility of data breaches and hackers, protecting user privacy and security.

Reliability: The technology consistently controls domestic appliances and continues to operate even during internet disruptions.

User-Friendly Interface: All users, including those who are not as tech-savvy, may easily and intuitively operate it thanks to voice recognition.

Customization: To quickly adapt the system to their unique requirements and tastes, users can add new appliances and change voice commands.

Cost-effective: The system is kept reasonably priced while maintaining reliable performance by utilizing standard parts like relays and the Arduino Nano.

Setup Simplicity: Users without a lot of technical expertise may handle installation and setup thanks to the simple wiring and component integration.

Low Power Consumption: The system's architecture makes it possible to use energy effectively, which helps reduce household power consumption. Feedback Mechanisms: By verifying that commands have been correctly carried out, visual and aural feedback improves the user experience.

CONCLUSION

The modern era of technology has made remote-controlled equipment at home inevitable. The ease of use and instant mobility enable those controllers to be used in daily life. You can use a single controller to operate all of the devices rather than separate controllers for each one. Additionally, it may be operated using a smartphone, giving one of the most popular handheld devices an extra benefit.

Smart phones that can detect voice and control the gadgets appropriately take over the function of household appliances. Via the Bluetooth channel, smartphones transmit spoken commands to an Arduino device, which responds to the commands. The purpose of these spoken instructions is to ensure that they are simple to convey and retain. This project is easy to use because of its straightforward commands. A smartphone, LED, and fan coupled to a circuit are used to successfully test the idea. The lives of the elderly and the disabled can be considerably improved with the development of this project for a variety of electrical and electronic gadgets. For both the young and the old, our lives will be much more convenient and glamorous. The universal controller with speech recognition capabilities can help the wide

community.

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