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Home Automation for Disabled Person Using His Voice Tag

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Abstract: Home automation is playing an important role in our lives. So home automation allows us to control all the electrical appliances of a house like door, fan, ac, light, etc. The main purpose of home automation is to help blind or disabled and old aged who can not see anything and because of that it is hard for them to turn on or off all the home appliances & As in our busy schedule we cannot be able to help them. And there is a chance that the elderly or disabled people may fall when they tend to operate something at home. a voice controlled home automation system is designed, so that the users can perform certain tasks by just the use of their voice.

Keywords: Home Automation, Voice Control System, Speech Recognition, Smart Home Device

I. INTRODUCTION

The project is based on a voice controlled approach the system needs to recognize human language not machine instructions or programming languages. For that analog audio needs to be converted into a digital audio signal. The speech patterns are stored on the hard drive and loaded into memory when the program is run.

The vocabulary size of a voice recognition program is directly related to the RAM capacity of the computer. Processing speed is crucial, as it affects how quickly the computer can search the RAM for matches. Voice recognition systems may have errors due to background noise and words that sound alike but have different meanings.

However, using voice, many projects related to home automation can be easily achieved, making life easier for individuals with special need. Home automation has become a vital component of modern living, offering users the ability to seamlessly control household appliances such as doors, fans, air conditioning, and lights. This technology is particularly advantageous for individuals who are blind, disabled, or elderly, as it alleviates the difficulties associated with manual operation, thereby reducing the likelihood of accidents and falls. With the increasing demands of daily life, it can be challenging to provide the necessary support for these vulnerable populations, underscoring the urgent need for effective, user-friendly solutions. The development of a voice- controlled home automation system addresses this need, enabling users to manage their environments with simple voice commands. This not only enhances safety but also significantly improves the convenience and quality of life for individuals in their homes. So the system will be designed using arduinouno microcontroller, bluetooth module, wires, relays, piezo buzzer, battery.



II. METHODOLOGY

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The voice-controlled home automation system is designed to provide users with a seamless and hands-free approach to operating household appliances. The core of the system consists of an Arduino Uno microcontroller, a Bluetooth module, relays, a piezo buzzer, and a 9V battery for power supply. The system functions by processing voice commands from the user and converting them into electrical signals that control different home appliances.

When a user gives a voice command, it is first captured by a smartphone or any voice-recognizing device that is connected to the system via Bluetooth. The Bluetooth module (HC-05 or HC-06) acts as a communication bridge between the user's voice input and the Arduino Uno. The voice command is transmitted as a digital signal to the Arduino, which then processes it according to the pre-defined instructions stored in its memory.

The Arduino Uno acts as the central processing unit of the system. It deciphers the received signals and activates or deactivates the corresponding relay switches. Relays play a crucial role in this system as they control high-voltage appliances such as lights, fans, air conditioners, and door locks. The relays used in this setup are dual coil latching relays, which ensure efficient switching with minimal power consumption. When a command like "Turn on the fan" is received, the corresponding relay switch is triggered, completing the circuit and powering the fan. Similarly, a command such as "Turn off the light" results in the Arduino sending a signal to deactivate the relay, thereby switching off the light.

One of the system's significant advantages is its real-time response. Since the Arduino processes the commands within milliseconds, the appliances react almost instantaneously, offering a smooth user experience. Additionally, the system is designed to handle errors that may arise due to background noise or unclear voice commands. If the Arduino receives an unrecognized input, the piezo buzzer alerts the user by producing a short beep, indicating that the command was not understood or successfully processed.

The power supply for the system is provided by a 9V battery, ensuring that it remains functional even in the event of a power outage. The use of battery power also makes the system portable and adaptable to different environments, from smart homes to assisted living facilities.

This voice-controlled home automation system significantly improves accessibility and convenience, particularly for elderly individuals, visually impaired people, and those with mobility challenges. It minimizes the risks associated with manual operation of electrical appliances and enhances independence for users, making their daily lives easier and more secure. The integration of Bluetooth technology further adds flexibility, allowing users to control their home appliances remotely within a certain range. Future improvements may include Wi-Fi-based connectivity, enabling global remote access and smart home integration through cloud services and AI-based automation.

Hardware and Software Requirements for the Voice-Controlled Home Automation System

1. Hardware Requirements:

The hardware components used in the system play a crucial role in ensuring smooth operation. Below are the key components:

- Arduino Uno Microcontroller Acts as the brain of the system, processing voice commands and controlling relays.
- Bluetooth Module (HC-05 or HC-06) Facilitates wireless communication between the smartphone (or voice assistant) and the Arduino.
- Relays (Dual Coil Latching Relay) Used to switch high-voltage appliances (lights, fans, AC, etc.) ON or • OFF based on voice commands.
- **Piezo Buzzer** Provides feedback to the user when an incorrect command is detected.
- Wires and Connecting Cables Establish connections between different components in the circuit.
- Battery (9V) Supplies power to the Arduino and other components, ensuring portability and reliability.
- Electrical Appliances (Lights, Fan, AC, etc.) The devices that will be controlled using the voice automation system.

2. Software Requirements:

The system also relies on software components to process voice commands and communicate with the hardware. The required software includes:

Arduino IDE – Used to write, compile, and upload the program (sketch) to the Arduine Une • Copyright to IJARSCT DOI: 10.48175/568 www.ijarsct.co.in



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- Embedded C/C++ Programming The primary language for coding the Arduino to interpret voice commands and control relays.
- MIT App Inventor (or Any Voice Control App) Used to create a mobile application for sending voice commands via Bluetooth.
- Bluetooth Terminal App Allows users to send commands from their smartphones if a dedicated mobile app is not used.
- Google Voice Recognition API (Optional) Can be integrated for advanced voice processing and better recognition accuracy.





Fig 2: Circuit Diagram

III. RESULT AND DISCUSSION

The main purpose to develop this project is to help the disabled person in as the result the person who is using this will control all the home appliances of his home by his voice only. He don't even need to move see anything to control it.

IV. CONCLUSION

Voice-controlled home automation systems represent a significant advancement in making living environments more accessible and user-friendly, particularly for the elderly, disabled, and visually impaired individuals. By allowing users to control household appliances through voice commands, these systems not only enhance convenience but also promote safety by minimizing the risk of accidents associated with manual operation. Ultimately, the continued development and adoption of these systems can lead to improved quality of life and greater inclusivity in our communities.

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