IOT-BASED HOME AUTOMATION FOR DISABLED PERSONS USING VOICE TAG

[1]Ms. M BHAVANI, [2] Dr. G SRINIVAS RAO, [3]SD RIJWANA, [4]M RAGA VENKATA SUDHA

[1] Assistant Professor, [2] Professor, [3,4] UG Students,
[1] Dept. of Electronics and Communication Engineering,
BAPATLA WOMEN'S ENGINEERING COLLEGE, BAPATLA, Bapatla, India

Abstract: This paper introduces a groundbreaking Voice-Controlled Home Automation System, harnessing the potential of IoT and smart technologies. Its core components include ThingSpeak for cloud-based data management, ESP8266 for wireless connectivity, Arduino for intelligent processing, and a mobile app for effortless user interaction. The system revolutionizes the control of lights and fans through intuitive voice commands, enabling users to manage their home environment naturally and hands-free. Integration commences with voice recognition technology, facilitating seamless communication via the mobile app. The Arduino translates these voice commands into actionable instructions for connected devices using relays. ThingSpeak acts as the central hub, efficiently managing user commands, device statuses, and sensor data. This project redefines home automation by offering users a sophisticated yet user-friendly platform to remotely control and monitor their living spaces. Through the fusion of cutting-edge technologies, the system pledges to deliver a seamless and intelligent home automation experience.

IndexTerms - **Arduino, Controller, ESP8266, Home Automation, Prototype.**

I. INTRODUCTION

This project is a simple implementation of a voice-controlled approach. All the home appliances are controlled by voice commands. Serial communication data sent from the Android application is received by the ESP2866 Wi-Fi module receiver interfaced to the Arduino processor and will control the appliances. Users can send commands using that application. A wireless controlling technique used in this project is IoT IoT-based ESP8266 Wi-Fi module. This project consists of a Wi-Fi module receiver. This Wi-Fi module is connected to the mobile application. This sends code for the respective command sent by the user. Then the electrical gadgets are controlled by the Arduino uno controller to switch ON or OFF depending on the command given. Home automation helps older adults, bedridden people, and those with disabilities to stay at home safely and comfortably. More and more, older adults, bedridden and people with disabilities choose to stay home because it is comfortable. People often look for the simplest way to save time and effort. Home automation is a simple way to save time and effort for many people. The main parts of this system include ThingSpeak for managing data online, ESP8266 for wireless connection, Arduino for smart processing, and a mobile app for easy interaction. The system changes how we control lights and fans with voice commands. Users can control their homes without using their hands. The system starts with voice recognition technology that lets people talk through the mobile app. The Arduino turns voice commands into actions for devices using relays. ThingSpeak is like a brain, handling commands, checking devices, and looking at sensor data. This project makes home automation modern and easy for users to control and watch their homes remotely. By using new technologies, we promise a smooth and smart home automation experience. The system assists sick, bedridden, disabled, or elderly people in using home appliances. For these people, it will be the simplest way to turn home appliances on or off from wherever they are. Many people do not like or find it hard to walk to a switch to turn on lights, fans, or other appliances. Voice commands make it easy even for blind users to control home appliances from an Android phone. This method is easy, cheap, and gets the attention of customers. The product can go to the market and the setup is simple. Customers can put it in by themselves.

II. EXISTING METHOD

Existing home automation methods typically involve a combination of remote controls, mobile apps, or fixed switches. While these methods offer some level of control, they often come with notable drawbacks such as complex interfaces, limited hands-free interaction, scattered ecosystems, energy efficiency, and limited voice control.

III. PROPOSED SYSTEM

The proposed Voice-Controlled Home Automation System boasts several key features designed to enhance user experience, efficiency, and flexibility such as Intuitive Voice Control, Seamless Integration with ThingSpeak, ESP8266 Wi-Fi Connectivity, Arduino-Based Intelligent Processing, Reliable Device Control with Electrical Relays, User-Friendly Mobile App Interface. So in this we are going to propose an

emergency alert for disabled persons using a voice tag now we are going to implement the buzzer so that if a disabled person is in threat then they can simply give the voice command as buzzer on & off so that they can rescue from that threat.
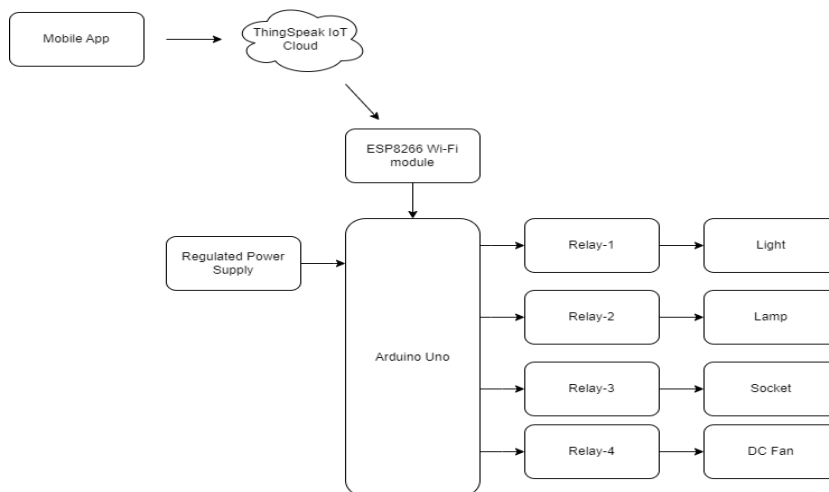

Fig 3.1: Block Diagram

First, need to pair the phone's Wi-Fi to the ESP8266 Wi-Fi module. Once all the connections are set up, you'll need to tap on the microphone icon within the app to start transmitting data via voice commands.

IV. WORKING

The main objective of our proposed system is to identify the Emergency alert signal through a Voice-Controlled Home Automation System. This project aims to provide greater independence and convenience for people with disabilities and bedridden persons by allowing them to interact with their environment using their voices. So for this here we are using a Mobile app, Thingspeak IoT Cloud Relays and a Wi-Fi (ESP8266) module connected to a regulated power supply Arduino Uno.

Relays serve as electrically operated switches, capable of opening and closing in response to electrical signals received from external sources. So here we have used four relays named relay-1, relay-2, relay-3 & relay-4 which are connected to an external source light, lamp, socket, and DC fan.

Upon receiving a voice command, the system matches it to the corresponding voice tag associated with the desired action or device control. For instance, when the user utters the phrase "light on & off," the system discerns and acts upon these commands promptly, toggling the light accordingly. Similarly, if the user articulates "lamp on & off," the system interprets and executes these instructions accordingly, ensuring seamless control over the lamp's state. the user might say "Socket on & off then the system would interpret and execute these commands accordingly. When the user commands "DC fan on & off," the system processes and executes these instructions accordingly, facilitating the activation and deactivation of the DC fan as requested. Similarly, now we are going to implement the buzzer so that if a disabled person is in threat then they can simply give the voice command as buzzer on & off so that they can rescue from that threat.

Overall, this home automation project empowers disabled individuals to interact with their surroundings more efficiently and independently, enhancing their quality of life and promoting greater accessibility within the home environment.
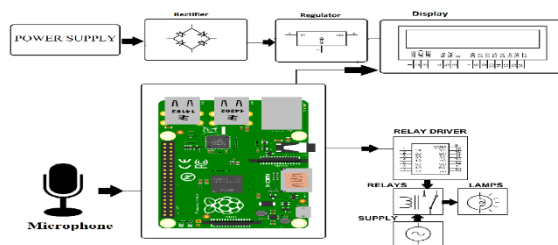

Fig: 4.1 Circuit Diagram of Home Automation for Disabled Persons using Voice Tag.

V.   TOOLS USED

HARDWARE TOOLS :

- Arduino Uno
- ESP8266 Wi – Fi module
- Relays
- Dc Motor
- PCB
- Connecting Wires

SOFTWARE TOOLS :

- Arduino IDE
- Arduino – C Programming language
- Things speak Platform
- Mobile App

5.1 ARDUINO UNO

Fig 5.1 Arduino Uno

The Arduino Uno is a versatile microcontroller board renowned for its simplicity and accessibility in electronics prototyping and development. Built around the ATmega328P microcontroller, it offers a user-friendly platform with 14 digital input/output pins, 6 analog input pins, and various interfaces, including USB for programming and serial communication. With its onboard power regulation and compatibility with a wide range of sensors, actuators, and shields, the Uno enables users to easily create interactive projects, from basic LED displays to sophisticated robotics systems. Its integration with the Arduino IDE, featuring a beginner-friendly programming language based on C and C++, allows users of all levels to quickly develop and upload code, making the Arduino Uno an indispensable tool for makers, hobbyists, and professionals alike in the realm of embedded systems and electronics experimentation.

5.2 ESP8266 Wi-Fi MODULE

Fig 5.2 ESP8266 Wi-Fi Module

The ESP8266 WiFi module is a compact and versatile device that integrates both a microcontroller unit (MCU) and Wi-Fi connectivity into a single chip. Developed by Espressif Systems, it has become widely popular for its low cost, small size, and powerful capabilities. The ESP8266 enables devices to connect to Wi-Fi networks and communicate with other devices or servers over the Internet, making it ideal for Internet of Things (IoT) applications. With a range of GPIO pins, low power consumption, and easy integration with development platforms like Arduino, the ESP8266 module has found extensive use in various projects, from home automation to sensor networks and beyond. Its robust community support, including extensive documentation and libraries, further enhances its appeal, making it a go-to choice for both hobbyists and professional developers seeking to add Wi-Fi connectivity to their projects.

5.3 RELAY

Fig 5.3 Relay

Relays are widely used in various applications, such as automation, telecommunications, and automotive electronics, where they serve to isolate control circuits from high-power loads, provide electrical protection, or enable remote control and automation processes. They come in different types, including electromagnetic relays, solid-state relays, and reed relays, each tailored to specific needs and requirements within different industries and applications.
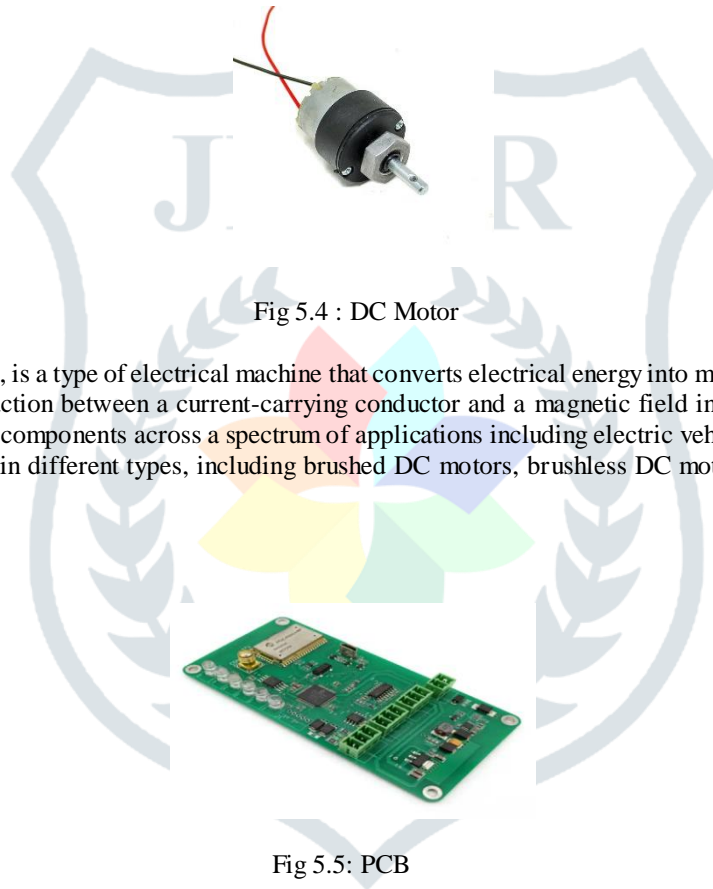
5.4 DC MOTOR

Fig 5.4 : DC Motor

A DC motor, or direct current motor, is a type of electrical machine that converts electrical energy into mechanical energy. DC motors leverage electromagnetism, wherein the interaction between a current-carrying conductor and a magnetic field induces a force, driving their operation. Their versatility makes them integral components across a spectrum of applications including electric vehicles, industrial equipment, household appliances, and robotics. They come in different types, including brushed DC motors, brushless DC motors, and stepper motors, each with its own advantages and applications.

5.5 PCB

Fig 5.5: PCB

PCB stands for Printed Circuit Board. A printed circuit board (PCB) is crafted from non-conductive materials such as fiberglass or composite epoxy, featuring pathways etched or printed onto its surface. These pathways facilitate the electrical connection between electronic components through conductive tracks, pads, and other features, all created by etching copper sheets laminated onto the board's substrate. They are commonly used in electronic devices like computers, smartphones, and household appliances.

5.6 ARDUINO IDE

Fig 5.6 : Arduino IDE

The Arduino Integrated Development Environment (IDE) is a software platform used for writing, compiling, and uploading code to Arduino microcontroller boards. It provides a user-friendly interface for writing code in the Arduino programming language, which is based on C and C++. The IDE includes a text editor with features like syntax highlighting, automatic indentation, and code completion to aid in writing code. Additionally, it has a compiler to translate the code into machine-readable instructions and a bootloader to upload the compiled code to the Arduino board via USB or other communication interfaces. The Arduino IDE is widely used by hobbyists, students, and professionals for prototyping and developing various electronic projects and applications.

5.7 MOBILE APP

Fig. 5.7 Android mobile

There is also a mobile version of the Arduino IDE available for both Android and iOS devices. This mobile app allows users to write, compile, and upload code to Arduino boards directly from their smartphones or tablets. While it may not offer the same extensive features as the desktop version, the mobile app provides a convenient way for users to work on Arduino projects on the go, without needing access to a computer. It's particularly useful for quick prototyping, testing, and debugging of Arduino code without the need for a full development setup.

VI.   RESULT

Fig 6.1: Circuit without voice command

Fig 6.2 : Circuit with voice command Light on

Fig 6.3 : Circuit with voice command Light off

Fig 6.4 : Circuit with voice command Fan on

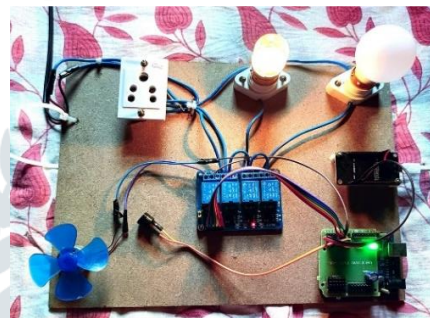Fig 6.5 : Circuit with voice command Fan off

Fig 6.6: Circuit with voice command Lamp on

Fig 6.7: Circuit with voice command Lamp off

Fig 6.8:Circuit with voice command Socket on

Fig 6.9: Circuit with voice command Socket off

Fig 6.10 : Circuit with voice command Buzzer on

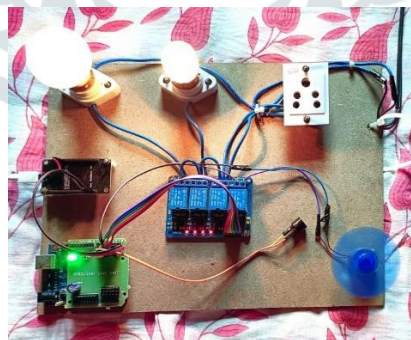Fig 6.11 : Circuit with voice command Buzzer off

Fig 6.12: Circuit with voice commands

VII. CONCLUSION

Our system aims to detect emergency signals by voice. Home automation often uses remotes, apps, or switches. Our goal is to help people with disabilities control their homes with their voices. We use a mobile app, Thingspeak IoT, a Wi-Fi module, and Arduino Uno for this. We will add a buzzer for emergencies. Individuals with disabilities have the option to verbally command "buzzer on" or "buzzer off" to signal for assistance. Our project helps those in danger with a buzzer alarm. They command devices with their voice. They can adjust heating or activate alarms by speaking. Our system offers them support and ease of use. It combines assistance with simplicity for users.

VIII. ACKNOWLEDGEMENT

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