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Voice Operated Lift Control System

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ABSTRACT:The internet of things (IoT) is connecting the devices and tools to the internet network to be controlled by websites and smart phone applications remotely, also, to control tools and instruments by codes and algorithms structures for artificial intelligence issues. This project presents the design and construction of voice operated lift/elevator control system. This system acts as human-machine communication system. Speech recognition is the process of recognizing the spoken words to take the necessary actions accordingly. The main purpose of designing this project is to operate the Elevator by using voice commands. This device is very helpful for paralysis, short height people and physically challenged persons.

KEYWORDS:ESP8266, Motor Driver, Voice sensor.

I. INTRODUCTION

The main aim of this project is to design and construct a voice operated lift/elevator control system. This system acts as a human-machine communication system. Speech recognition is the process of recognizing the spoken words to take the necessary actions accordingly. This device is very helpful for paralysis, short height people and physically challenged persons. The speech recognition system provides the communication mechanism between the user and the microcontroller based lift control mechanism. This project makes use of a DC motor for moving the lift/elevator based on the voice/speech commands given by the user and MATLAB code is used for recognition of the voice commands. Microcontroller is programmed, with the help of embedded C instructions.

The microcontroller is capable of communicating with all input and output modules. The voice recognition system which is the input module to the microcontroller takes the voice instructions given by the user as input and the controller judges whether the instruction is to lift upwards or to the downwards, and according to the user's voice the switching mechanism controls the lift. For fault detection and power failure a buzzer is used. The WiFi receiver and microcontroller are built in one kit to be used as an IoT project. It's called NodeMCU.

To connect the system to the Internet, a WiFi receiver is needed. In my case I used ESP8266 that is connected as built-in in the NodeMCU board that contains a firmware that runs with the ESP8266. The firmware is a low-level control computer software.

The NodeMCU is coded via the Arduino Integrated Development Environment (IDE) with the Universal Serial Bus port (USB) to tell the NodeMCU what to do, I want to make the NodeMCU control a four-channel relay kit by Blynk hand phone application and shows the temperature that is measured by LM35 sensor.

II. LITERATURE SURVEY

Speech recognition has been effectively contemplated since the 1950s, however late improvements in Personal Computer (PC) and telecommunication technology have enhanced speech recognition abilities [1]. From a valuable perspective, discourse acknowledgment has handled issues, improved advantages, and purchased a more prominent transformation in the current situation [1].

Voice control can replace the function of a push-button efficiently [2].

Speech recognition is a very complex issue. It includes numerous calculations that oblige high computational necessities [2]. The mixture of the utilization of programmed speech recognition systems, human PC interfaces, telephony, or robotics has driven the exploration of a vast academic group over decades ago [3]. Automatic speech recognition is used in various areas ranging from medical transcription to game control, from call center dialogues systems to data recovery [4].

This automatic speech recognition process is used in most voice-controlled systems. The voice-controlled wheelchair for the physically challenged was proposed in 2002 [7].

This paper had portrayed an investigation that thought about the presentation of abled and impaired individuals utilizing voice control to work a force wheelchair both with and without route help, where the navigations were assisted by the sensors to identify and avoid obstacles in the wheelchair's path [7].

The intelligent lift control model that uses voice recognition was proposed in 2003 [8]. This proposed elevator system had been controlled by speech and sensor panel [8]. The modification of the well-known DTW (Dynamic Time Warping) algorithm was used [8]. The set of various voice commands for the model consisted of eight Lithuanian words [8]. The model was specifically designed for domestic use (smart houses).

III. PROPOSED WORK

Input voice of the user is received by the system using the inbuilt MIC in the pc. This sound input is given to the MATLAB code in pc. After receiving the input voice MFCC of the voice is found. This MFCC is compared with the previously created database in MATLAB. Using DTW algorithm similarity between the two MFCCs are calculated. Thus we can decide the floor insisted by the voice command of the user.

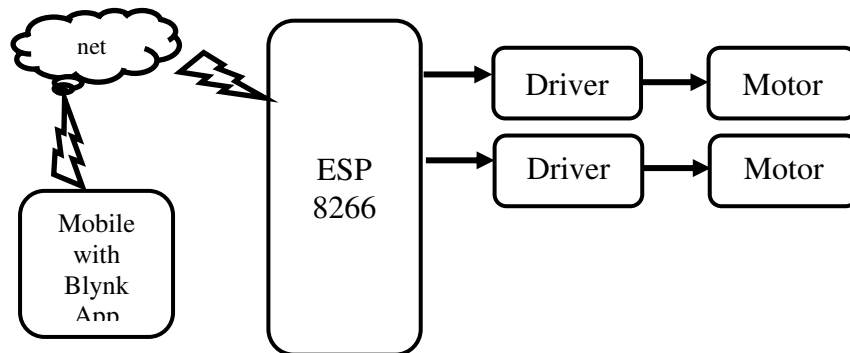


Fig. Block Diagram

The system is based on NodeMCU board as an internet of things system. The NodeMCU is connected to the internet from the hotspot of the smart phone via WIFI connection as the NodeMCU has ESP8266 circuit to connect with the internet. NodeMCU to be connected to the hotspot of the smart phone, needs to be identified to the name of hotspot, the password and token code letting the server of Blynk connects them together. You may need the computer once to transfer code from Arduino IDE to the NodeMCU kit to prepare the software part of the project. Figure 1 shows that the server of Blynk application will process the smartphone-NodeMCU connection. Blynk libraries are ZIP files can be downloaded from Github website to be imported to the Arduino IDE library.

Blynk server will check for internet connection, NodeMCU with android hotspot, the NodeMCU code includes the token code, the name of hotspot and its password. The information included to the code must be match with the hotspot information to allow ESP8266 connect with the WIFI to be as a channel to exchange commands between smart phone and NodeMCU. Remaining processes are just commands sent from Blynk application to NodeMCU to control loads those are connected to the relay kit as shown in Figure 2. And sensor output value is sent reverse to the Blynk application from NodeMCU kit.

ESP8266 CONTROL RELAY WITH BLYNK APP –

If the ESP8266 is connected with Wi-Fi, then we could control the relay module with Blynk App. We could control, monitor the current status of the relays from anywhere in the world from the Blynk App. When the internet comes back,

the ESP32 will fetch the previous state of the switches from the BlynkIoT server and accordingly turn on and off the relays.

CONTROL RELAYS WITH SWITCHES OR PUSH BUTTONS –

We could also manually control the appliances from the switches. If the ESP8266 connected with Wi-Fi then it will send real-time feedback to the Blynk server.

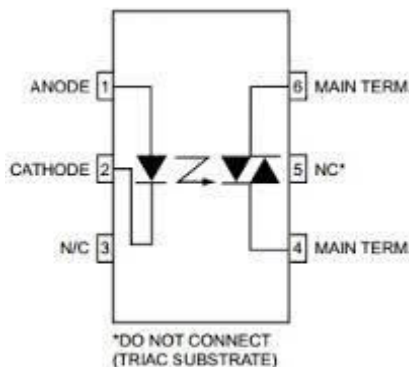
MAX 232:

We are using MAX 232 for serial communication with the components that are Wi-Fi module. MAX232 is used to provide TTL to the components as per the requirement. GSM needs TTL so it is connected to Arduino through MAX232. Some Wi-Fi module doesn't require TTL because it's already build in it and some may require based on its working.

Wi-Fi MODULE (ESP8266):

Wi-Fi stands for Wireless Fidelity. We are using Wi-Fi which acts as heart for IoT. Through Wi-Fi the consumer can set changes in threshold value, he can ON and OFF the electric use. Time to time the readings of units and cost are displayed on blynk app. Consumer can accesses the Arduino board and smart switch with help of Wi-Fi.

DRIVER CIRCUIT (moc3071):



- It is a 6 pin device known as opto coupler or opto isolator.
- In our project we are using this opto coupler to cut off the AC load.
- It is connected to the SSR to cut off the AC load.

SWITCHING DEVICE:

In our system we are using SSR as switching device even though we can use RELAY because SSR is highly advantageous. We are using switching device to switch the energy meter. For ON and OFF purpose of meter we are using switching block. SSR stands for SOLID STATE RELAY.

Why SSR instead of RELAY?

- Both are used as AC switching device, but if switching speed is high than SSR is suitable, if switching speed is slow than RELAY is used.
- Relay life decreases as number of usage time increases, but in SSR there is no change.
- For driving RELAY, current or power required is more comparatively to SSR.
- For switching SSR requires 15amp, whereas RELAY needs (30amp,50amp,90amp) as per requirement.

IV. CONCLUSION

In this proposed work, an internet based voice operated lift control system that can be controlled upon user authentication. It is proposed. The proposed system using iot has experimentally proven to work by connecting effortless appliances to it. The designed system instigates a process according to the user's requirement. The android based smart app communicates with ESP8266 with Blynk app and voice operated relays.



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