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Voice Based Lift Control

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Abstract: ***The idea of this project is to develop an elevator system that accepts the destination input via external microphone, and taking the elevator to the destination accordingly. The paper providesthe analysis of the lift model controlled by voice and sensor control panel, The model is constructed by using average powered controller, it has voice recognition, programmable terminal and logical lift program, which mnnect them all. The model can be easily reprogrammed in orderto have various working regimes and thus is suitable for training students with the broad automation specialization. This system will enable the residential and commercial places to minimize the cost spent of lifts men. The modification of the welt •known DTW (Dynamic Time 'Warping) algorithm was used This device is very helpfulfor paralysis, short height gmple and physically challenged persons.***

I. INTRODUCTION

The elevator is extremely common for most places days. The employment of elevators is increasing in numerous applications like those square measu re used in carrying product and carrying folks vertically in tall buildings like offices, searching malls, and alternative skyscrapers, Withincreasing technological advancement, the need of these devices is increasing day by day. Thereforev this project focuses on designing and upgrading the existing elevator infrastructure with the inculcation of voice commands. Automatic speech recognition is a method of converting a speech signal into words using a computer. Those words are used by the microcontroller to provide an acceptable instruction to all connected devices. Along with additional assistance to differently abled people, it will ensure contacttess transfer of

This project presents the design and construction of a voice operated lift/elevator control system. This system acts as a humanmachine communication system. Speech recognition is the process of recognizing the spoken words to take the necessary actions accordingly. Users can also control the electrical devices like fan, door etc. with the help of voice recognition system, This system is extremely beneficial to those who are paralyzed, limited of stature, or severely impairedpeople and goods in elevator by accepting input with voice commands, thus its beneficial in the time of COVID -19 as well.

Commanding/controlling of the computer and applications, using speechfor handling the environment (smart house) are very promising fields, especially for disabled people, For those who have difficulties in entering data with ,etc., speech recognition is an effective alternative to alter or to combine input methods. People with tTÜtor disabilities can control various devices via speech input. One of smart house elements could be the control of a lift by voice commands. There are four main factors related with speech recognition problem: people and goods in elevator by accepting input with voice commands, thus its beneficial in the time of COVID.19 as well.

Commanding/controlling of computer and applications, using speech for handling the environment (smart house) are very promising fields, especially for disabled people. For those who leve difficulties in entering data with other input tools like keyboard, mouse. etc., speech recognition ian effective alternative to alter or to combine input methods. People with motor disabilities can control various devices via speech input. Orte of smart house elements could be the control of a lift by voicecommands. There are four main factors related with speech recognition problem:

Speaker — each voice is unique; hence creating techniques that can accurately and reliably recognize anyone's voice and any dialect of a given language is a major challenge; Coarticulation the spectral characteristics of a spoken word (or sounds within the word) vary depending on what words (or sounds) surround it;

Speaking rate and style — people speak at different rates and with different pronunciations of the same sounds, thereby making it difficult to get stable patterns for sounds or words that can be used with all speakers and speaking rates and styles;

Environmental conditions speech can be difficult to recognize in home environments (background speech from radios or TV), when spoken in a car (road noise distortions), or in noisy backgrounds (airports, train stations).

Using DTW algorithm similarity between the two MFCCs are calculated. Thus we can decide the floor insisted by the voice command of the user.

By means of USB to TTL converter, we are giving the data from PC to PIC microcontroller.

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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. According to the users voice the switching mechanism controls the DC motor through L293D (motor driver).

The clockwise and anticlockwise rotation depend upon the input floor number.lR sensor is used for detecting the floor and stopping the motor rotation. Fault indication is done by buzzer.

Input voice of the user is received by the system using the inbuilt MIC in the pc. This sound input is given to the mat lab code in pc. After receiving the input voice MFCC of the voice is found. This MFCC is compared with the previously created database in mat lab.

Each of the above factors contributes some degree of variability to the speech signal. These sources of variability must be carefully considered when z developing applications based on speech recognition technology

II. WORKING:

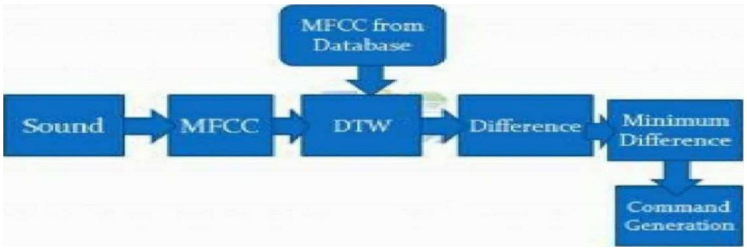
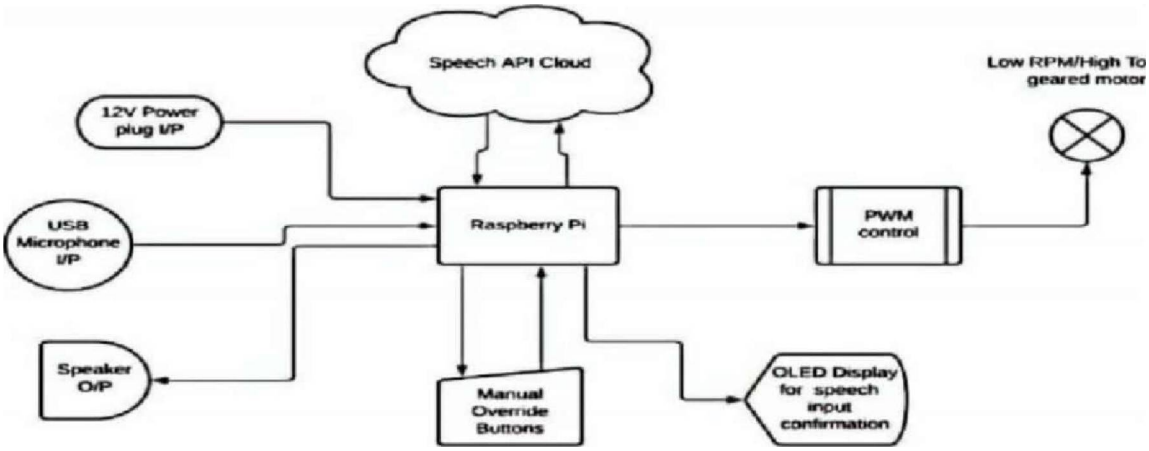


Fig -1: Block diagram

III. SYSTEM ARCHTECTURE



A. Speech API cloud

For speech recognition, python text to speech is used. However, Sphinx 4 or RASA chat bot can be used too, based on the availability of internet and the requirements. One cf the benefits of python text to speech and google voice recognition is that certain words can be censored and some words can be mapped to recognise a particular command, making it possible to give numerous voice commands.

B. Raspberry Pi

Raspberry Pi 4 Model B provides great performance for this project The performance is comparable to certain x86 PC systems. The four major parts of program are:

1) Voice input/Speech recognition
2) Elevator algorithm
3) Motor driver/speed control
4) Dista nce formula

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Being entirely programmed in Python, the object-oriented nature of python ensures that we can add new features to the existing model effortlessly. C. PWM control:

The expression "pulse width modulation" (PWM) refers to a form of digital signal- Pulse width modulation is used in a wide range of applications, including complex control circuitry. The PWM is used to implement the elevator's speed control mechanism. Changing the duty cycle in PWM allows for multiple speed levels.

IV. REQUIREMENT ANALYSIS

The experiment setup is carried out on a Raspberry Pi microcontroller and a wooden chassis which has the different hardware and software specifications as given in Table 4.1 and Table 4.2 respectively.

A. Software

Table 4.1 Software

Operating System	Linux
Programming Language	Python
Voice Assistant	Google Voice Recognition

B. Hardware

Table 4.2 Hardware

Processor	Quad core Cortex-A72 (ARM v8) 64-bit SOC @ 1.5GHz, 4 CIB RAM variant
Microphone	2.2KO + at 1KHz
Dual motor driver L289n	Double H Bridge L298N, Bounds: 46V and 2A
OLED	Standard 0.96 inch OLED

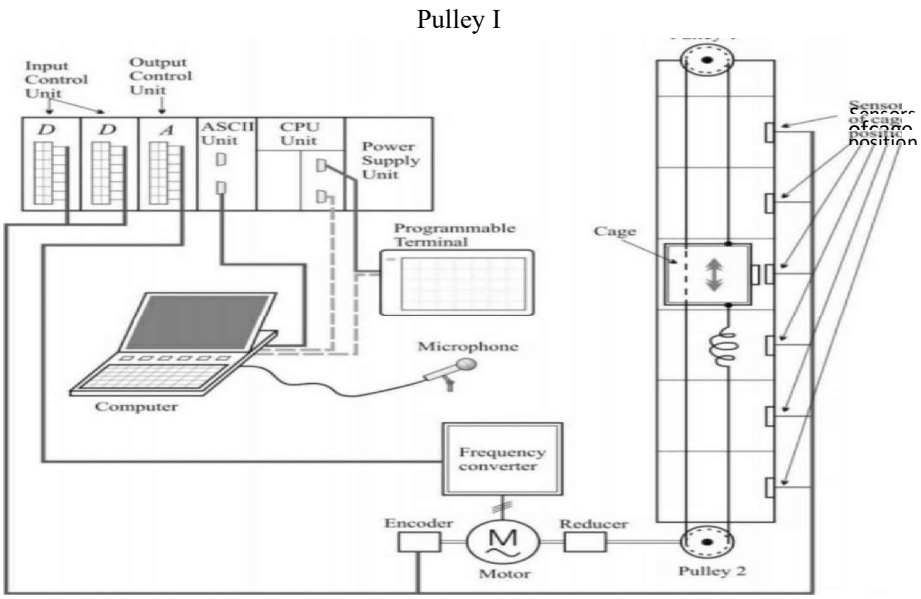


Fig. 2 — A scheme of the model of a voice-controlled lift.

V. CONCLUSION

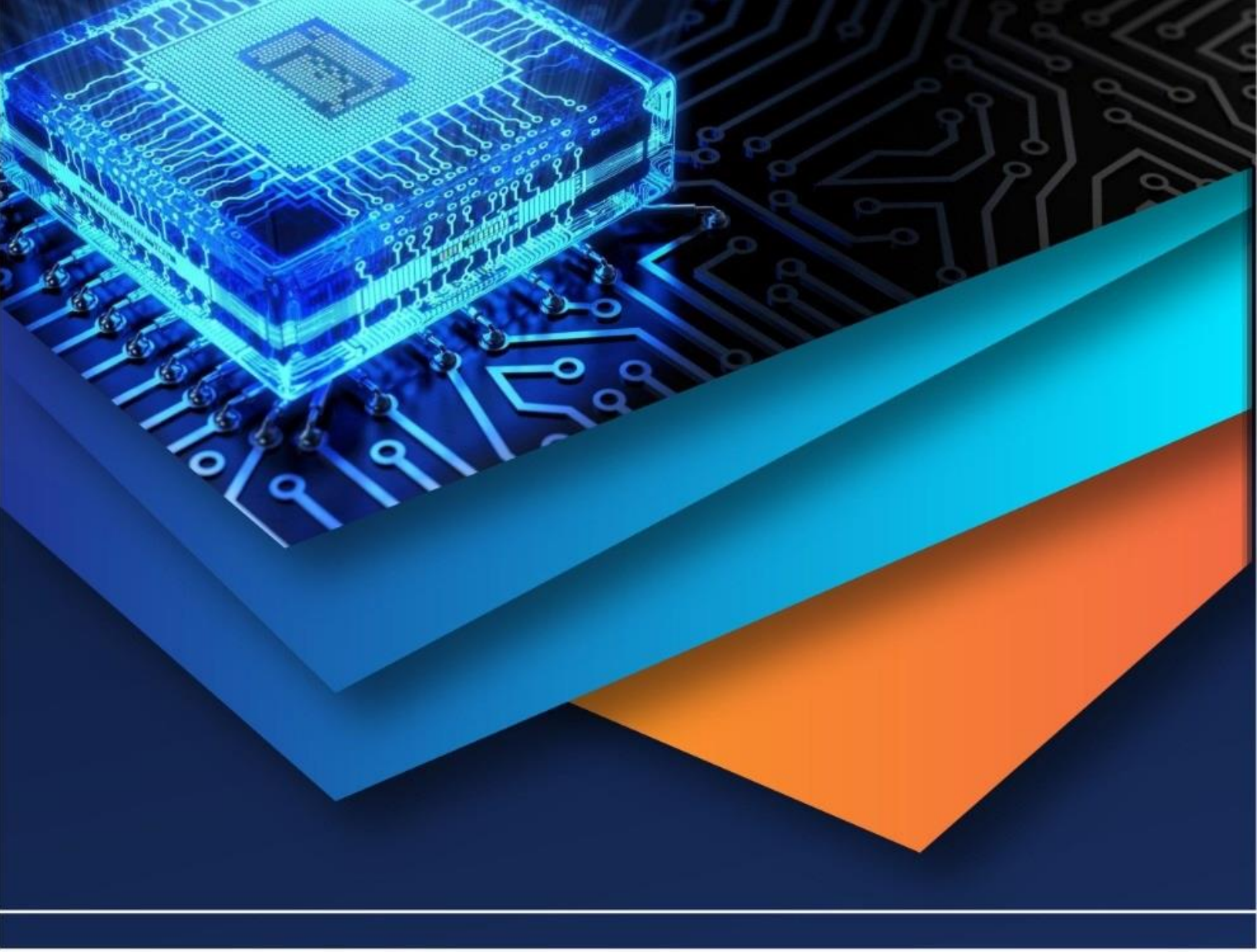
1) Voice recognition system have been out on the market for some time they have not yet fully developed to their full potential. In this paper we used it potentially and reliably
2) Voice controlled systems are especially useful for disabled people. Speaker dependent projection based recognition algorithm ensures a sufficiently good recognition accuracy of voice commands. It can be improved by increasing the amount of references and by selecting acoustically different voice commands. References can be collected from many speakers and averaged. The presented recognition algorithm in such way can be transformed into the "multispeaker independent" one
3) The model of a voice-controlled lift is universal and it enables to realize regimes of real working lift by using up-to-date means
4) A voice recognition program and its connection with the controller can supply a sufficient amount of commands necessary for the lift control

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