Voice Recognition Software for Daily Attendance

Subash Reddy Gajjala[1]*

[1] M.S, Information Technology, Valparaiso University, Valparaiso, IN, USA
*Mail id: subashreddy.gajjala@valpo.edu

Abstract

The attendance system has been known from a very long time where we used to maintain paper records as time passed we slowly switched to maintain database of attendance to track who all are attending the classes or other in terms of employees companies etc. and now due to modernization we switched from databases to biometric attendance and using facial recognition and now it is time to update and we came up with voice recognition. In this paper we introduced an attendance system that can track attendance using their voice. It is mainly used in educational institutions, financial sectors like banking, and many other corporate sectors for quick tracking of attendance and directly update the information to the database using cloud we can store huge amount of data and access from anywhere which can save lot of time and effort to do so we have used PLP[perceptual linear predictive analysis of speech] which is standard feature in python we can avoid any kinds of fraud going in it by simply maintaining a pic of the person which giving speech so it acts as proof of attendance. So each time a person takes a picture the data is stored and verified for future purposes and this information is confidential and can only be accessed by database administrators and certain authorized people only to maintain confidentiality.

Keywords— Voice Recognition, PLP[Perceptual linear Predictive analysis of speech], python speech recognition, command extraction, modeling of speech, database extraction, train data set, pattern matching, voice enhancement, encryption of speech, data privacy, cloud database backup.

1. Introduction

The number of programs that may be used on smartphones has expanded along with the rise in smartphone users. However, there isn't a smartphone application for the management attendance system tool that is integrated with the tool controlled by the personnel department and is simple to use. On the other hand, there are a number of drawbacks to the current attendance systems, including long lines in front of the machines when people arrive for work and leave, the need to monitor workers who do outside-the-office work, the cost to the company of the device and badges, and the difficulty of maintaining and repairing the equipment[1]

Some businesses also need to keep an eye on their employees who work remotely or outside the city. The finance and personnel departments need to know how many hours an employee works outside of the office in order to compute their pay. The issue is that there is no instrument available to track an employee's working hours away from the office. The majority of the time, the employee doesn't use any controls or monitors; they simply feel the paper to put down their name and the time. Consequently, a new solution would be a voice recognition and fingerprint on smartphone automatic attendance system[2]

For matching the voice during the authentication procedure, we used a minutiae and texture characteristics method. Ridge ending, bifurcation, and short ridge are the minor features. Each person has a different number of these minute traits[3]

Due to the fact that not all smartphones currently on the market come equipped with voice sensors, we also developed a voice recognition method of authentication. Random alphabet is the algorithm used to match voices. Every participant is given a template of 26 alphabet characters, which we record and store on a server. When an employee performs the authentication procedure, the five characters will be produced at random. They must be able to read the five characters on their smartphone clearly. When the frequency matches the template, the employee pass authentication process is initiated[4]

2. Materials and Methods
## 2.1 Characters of database stored voice recognition

as every human has different kind of voice there is a bug that someone may imitate one's voice and may result in fraudulent activity. In order to avoid that we choose some key words that are taken from the person and spell those clearly and we also provide login details so that he may check his attendance is proper or else he may press report so that the identity of the person remains confidential. In order to avoid these kinds of activities we provide a live camera option while taking the attendance so that we can avoid such kind of fraudulent activities.

Table 1: comparison of voices stored in database

persons	Voice 1	Voice 2	Key word acceptance	Cross verified by image	report
Person x	present	yes	yes	checked	no
Person y	yes in	yeah	yes	checked	no
Person z	hi	yes pls	no	unable	yes
Person a	there	Hi present	no	checked	yes
Person b	hi	hello	no	checked	no

So in order to avoid the confusion we have given two chances for every one and then the acceptance is given if the person voice is unclear we can check by image and if there is any kind of disturbance then it displays as unable because of some blur or lighting issues in such kind of situations the person can seek help from the administrator and rectify the corrections and if every thing is correct and you are unable to give attendance you may press report as something is wrong with the software or any kind of issues.

2.2 verification of attendance
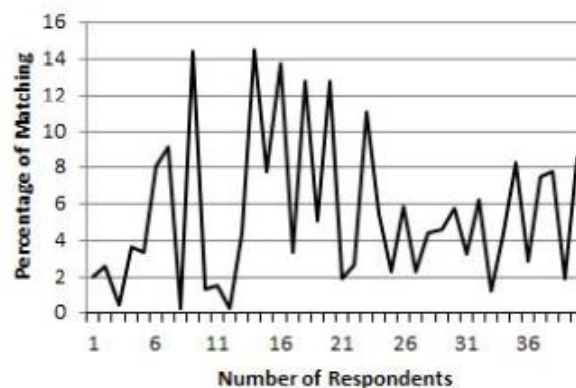
The above graph gives us the idea about how the attendance is matched and the total no of respondents as we can see on the x axis there is people who have responded and on the y axis there is percentage of matching their voice and accuracy so it is calculated based on the below percentage formula so lets see

amount of invalid voices that match 100% of the total sampling 5.88% of the invalid voices were determined from test results to be legitimate. On the smartphone, a screenshot is displayed. To take attendance, the user or employee must press the record button and utter the character L W X E D U Q A. The user will be successful in recording their attendance if their voice matches the template on the data server, as seen in the graph. Each time an employee wants to check their attendance, a different character will appear at random.

3. Experimental Setup

So as we see in the fig 1 we can see that the administrator controls both the device and the application server and they respond to him vice-versa as they share the information to the admin so the data flow will happen from the application server and after that it updates the data and after this phase the refined data is then reported and the admin is responsible for posting daily data attendance on the portal and this process is done automatically the admin just need to cross check is everything going fine and has to check daily report data and make modifications if required once everything is
posted it can be edited any time and this authority is given only to the administrator.

Fig. 1
System
Architecture
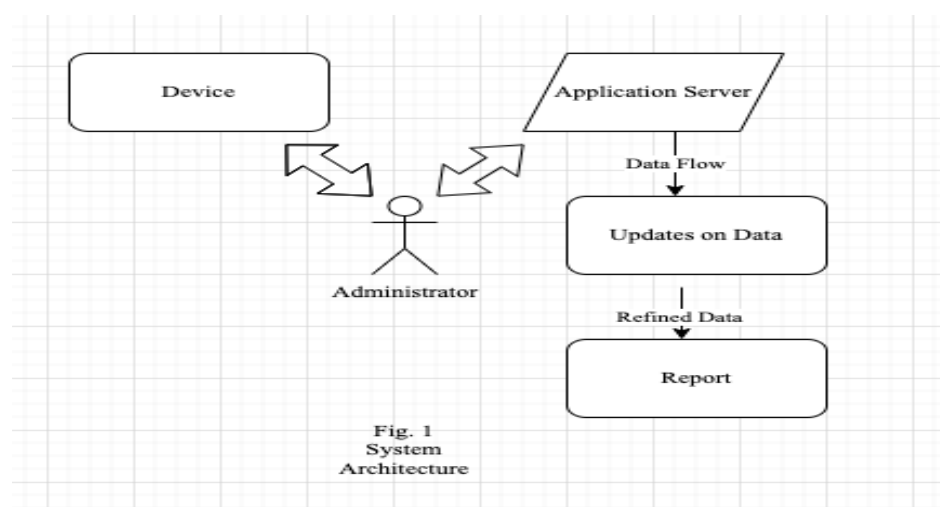
Fig.1: System Architecture

4. Results and Discussions

The results obtained in the experimental results are discussed below and we have represented it using the modern technology tool figma and have taken iphone 14 pro max design for the representation.

Interface of the application

So we have designed it very simple manner we have the look end of voice picture and a note saying hello and then we have signup for new persons and login for registered persons and then the back end is managed by mongo database where it records every login data and reports to the administrator.

Figure 1 user interface

so if the speech is recognized it displays tick mark and if not negative symbol in red and if the process is successful it shows upload to db successful and if not failed and error message stating try again and after all the steps it says success and if you want it takes to home page when login and signup page.

Delivering of command

so the delivering of command is based on the subject so when ever the given commands are spoke by the individual they are enhanced internally by the voice recognition tool and from that the given command is extracted as text from the machine learning algorithm and from that it performs the internal operations using Perceptual linear Predictive analysis of speech algorithm so the commands are extracted and the trial is performed which leads to modeling of text the recorded speech looks like a cipher text as in encryption algorithm and from that it looks for the matching of speech if everything is matched it displays as tick mark if the data is false it displays as cross sign which indicates the speech is not matched else it failed to recognize.
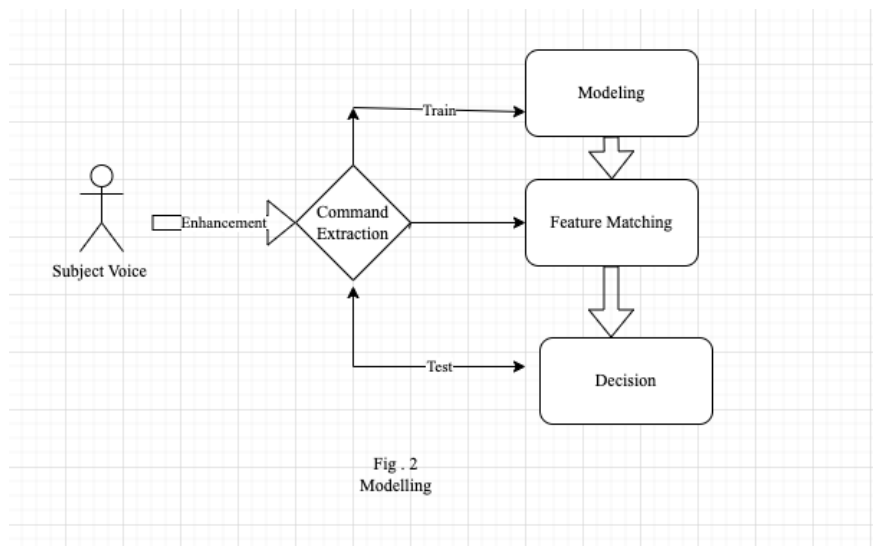
Fig . 2
Modelling

Fig.2: Modelling


Fig 3.
Working of
Project
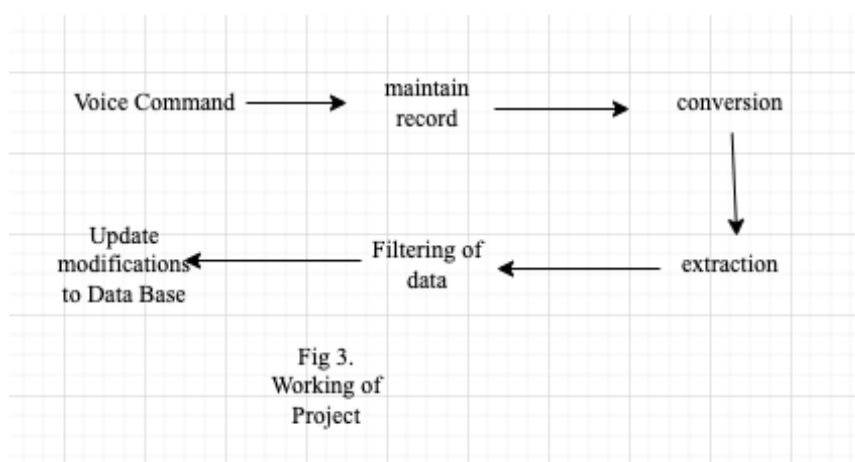
Fig.3: Working of Project

Fig.3 shows the variation of stages after extraction of voice so the recorded voices are maintained as records and are converted to cipher like script used when ever required based on cipher text algorithm the data is encrypted and the speech is extracted when required then when ever the correct key word matches with the person data it catches the keyword and the camera is alerted to take a photo of the person then if everything goes fine the data is stored in the database else persons has the facility to report then the admin looks for changes and makes modification to the database.

Working of Perceptual linear Predictive method

Fig.4 shows the working of application so it is designed based on perceptual linear predictive method so based on that the voice of persons has different frequencies and decibels so it is hard to find who's voice is that so in order to avoid that confusion we have used the perceptual method. By using this method one can easily handle or recognize voice so this method is combination of machine learning and encryption of cipher algorithm so according to this the application stores the voice and once it gets recognized it enlarges and converts it into text then the text is recognized and are converted into patterns so once the patterns are recognized and verifies it gets approved and send to admin if not it displays as try again or not recognized and this entire activity can only be viewed by admin for verification purposes..

Fig 4:
Algorithm
for voice
Recognition
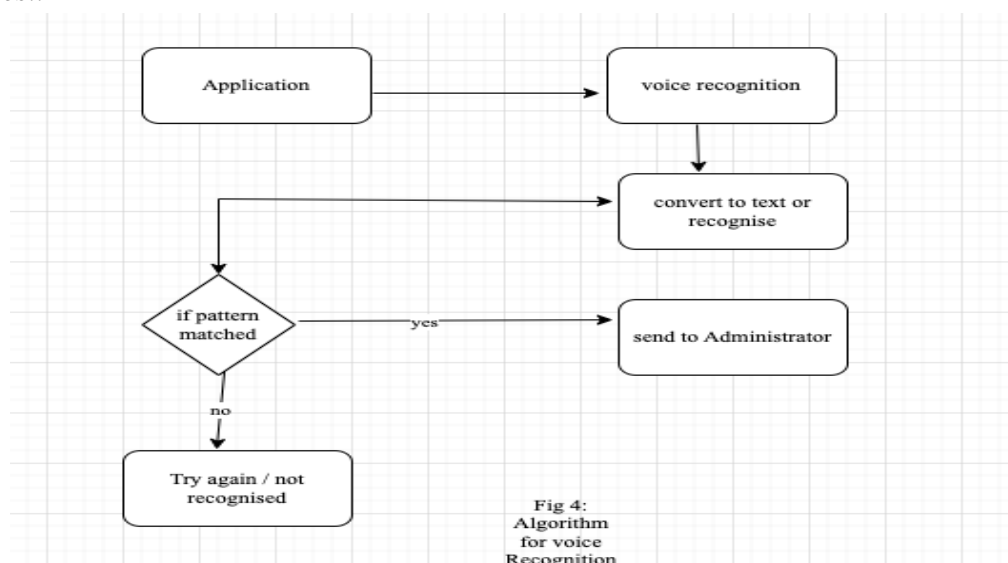
Fig.4: Algorithm for Voice Recognition

4. **Conclusions**

The following conclusions were made based on the results obtained from the experimental investigations of voice recognition and a test taken from our class members for proper working of software and the results are very good so we observed

- By taking a picture we can easily recognize the person face though there might be fraudulent activity going on while speech recognition. or failed to recognize voice.
- By giving administrative rights to the admin we can stop attendance from duplication and report option for people who have difficulty while giving attendance and this problem can be solved by proper maintenance and in presence of admin.

- User friendly application is very useful and simple to use and every one are given credentials so that they can check their attendance in the form of graph, pie chart and even in percentage so it will be very helpful. If they think their attendance is not validated they can press report so that admin can check and get back to them.
- There is no need to wait in line for the company's electronic attendance device or manual system because everyone has an Android-based mobile device that can be mounted with an absences application..

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