CLASS MONITORING SYSTEM USING VOICE RECOGNITION

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Abstract

As time passes new concepts comes into existence and replaces the old methods. Voice recognition is one such concept which is present in most of the areas. But in reality, teaching organization is behind in adapting this technology. Most of the teaching organization follows the old technologies such as taking attendance in a paper sheet or uploading the attendance to server by marking attendance in excels sheet and all. All these methods which consume time and it need lots of patience for the lecturer to do the same. And also, now a day's students are more annoying and they disturb the class during the presence of lecturer. Also, they will make lots of noise in the absence of lecturer. So, our paper is based on voice recognition for class monitoring which includes student attendance and noise control. It helps the lecturer in administrating the students by taking the attendance and noise control in the class with better efficiency. This is often since sometime students will cheat with their attendance by signing on behalf of their friend who did not attend class and a greater noise if the lecturer is on leave or not able to take the class due to some constraints. In this paper, voice biometric is utilized as a medium for the organization to check their attendance and controlling the class by givingthe warning message. Cheating among the students will be avoided since like fingerprints, each voice is distinctive.

I.INTRODUCTION

In the modern world every one wish to lead smart life and every individual prefers to lead it in a secured manner. Majority of the people are addicted for smart technologies such as smart phones, smart security cameras, home automation etc. For securing personal privacy we may use different technologies but the better and the best one is biometrics.

Biometrics is physical or behavioral human characteristics that can be utilized to carefully recognize an individual.It has the capacity to make verificationfaster, easier and more secure than other technologies becausethey are considered unique to the individual. Biometrics can be categorized in to two parts. The first one is Physical biometrics which includes fingerprints, hand scan, facial recognitionetc. And the second one is Behavioral biometrics which uses behavioral characteristics such as voice signature, keystrokes etc. Biometrics mainly helps to reduce fraud activity by identifying the right person at the right time. For example, think about a workspace where proxy attendancecan be marked or else buddy punching is done. At that time biometrics technology keeps the track of the time and attendance of each employee which helps to find the frauds. So, it increases organizational efficiency by making workforce more accurate, reliable and punctual.

We are using one of these biometrics i.e. voice recognition for the class monitoring purpose. Voice recognition is nothing but recognition of the sound which mainly relies on

features influenced by vocal cord, emotional status of the person while speaking, tone, pitch etc. Voice recognition can also be called as speaker recognition which is divided in to two categories. Speaker dependent voice recognition is the first one which is influenced by candidate's particular choice characteristics.

II.METHODOLOGY

In this paper the proposed class monitoring system is simulated using MATLAB software. Speech signal is taken as input and system identifies speaker as output to mark the attendance of particular speaker in the Microsoft office Excel. The database consists of speech samples which were collected from the students using PRAAT app. Mainly speaker identification contains two phases i.e. Training phase and testing phase.
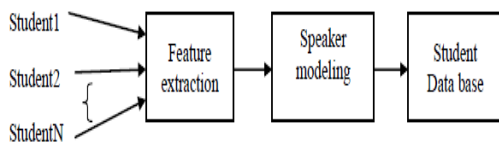

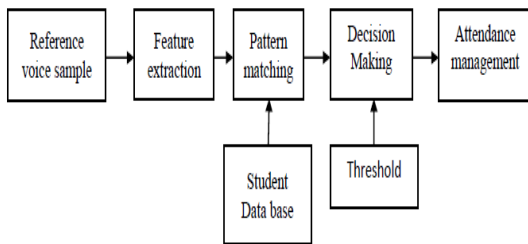**Fig1: Block diagram fortraining phase**

Fig2: Block diagram fortesting phase

The training and testing phases involves several steps: A) Collecting the voice samples, B) Feature extraction, C) pattern matching.

A. Collecting the voice samples

The voice samples of each students are collected.

B. Feature extraction

Feature extraction is used to reduce dimension of the input vector by maintai the perceptive power of the signal. Mainly features carry the characteristics of the u information regarding speech. The diffe features such as power, pitch, and vocal configuration from the speech signal can be extracted. Here we used Mel Frequency Cepstral Coefficients(MFCC) technique for speech feature extraction.

The MFCC feature extraction technique is one of the popular methods to extract the features from an audio. MFCC includes 39 features. In which 12 parameters are related to the amplitude of frequencies. It provides us the enough frequency channels to analyze the audio.

C. Pattern Matching

The easy way to recognize speaker is by comparing the voice sample of the speaker with stored data base. For the comparison purpose we use Euclidean distance method which is used to calculate the distance between reference voice samples with the stored one. If the distance calculated is minimum then the speaker is identified successfully

If points $\mathbf{p} = (p_1, p_2)$ and $\mathbf{q} = (q_1, q_2)$ then the distance is given by

$$\text{Dist}((p1,p2),(q1,q2)) = \sqrt{(p1 - q1)^2 + (p2 - q2)^2}$$

After pattern matching decision is taken based on the threshold value. Attendance of a particular student is marked when the calculated distance falls below the threshold value. If not the case attendance will not be marked on that particular date.

For the second part of the class monitoring system we use the same concept except MFCC and pattern matching. The block diagram for the class monitoring system is shown in Fig2. During Class monitoring the voice signal is continuously extracted and the voice features are collected.
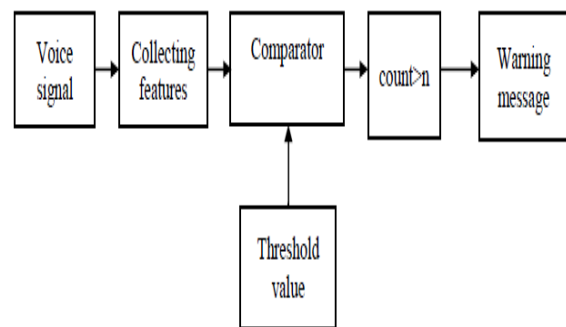

Fig3: Block diagram for class monitoring system

We are comparing one of the feature i.e. amplitude with the threshold value (amplitude value beyond one level). After comparison if it exceeds the threshold value we are going to keep the count for n number of times. If the count goes beyond n value then the system is going to warn the students by giving a audio message.

III.RESULTS

Speaker recognition is done using the feature extraction algorithm and pattern matching technique which is shown Fig4.

Fig4:Output of MFCC algorithm

After the identification of each student, attendance is automatically uploaded to the Excel sheet which helps to keep the attendance record in the system which avoids the manual method followed for taking attendance. This is shown in below figure.

Fig5: Attendance uploaded in Excel sheet

While doing the class, if students talks or disturbs the class for the long duration of time then the designed systemgives the warning message in the audio format to keep maintain silence.
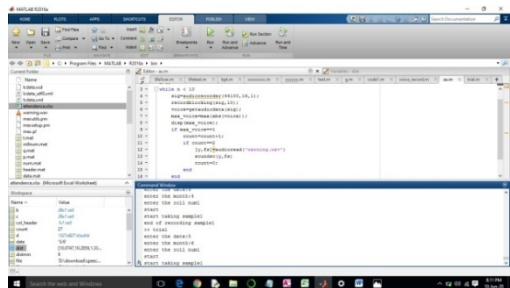

Fig6: Code written for class monitoring system

IV.CONCLUSIONS AND FUTURE WORK

In this paper, voice biometric is utilized as a medium for the organization to check their attendance and controlling the class by giving the warning message.Speaker recognition is done using the feature extraction technique with the help of MFCCalgorithm and pattern matching technique. After the identification of each student, attendance is automatically uploaded to the Excel sheet which helps to keep the attendance record in the system which avoids the manual method followed for taking attendance. While doing the class, if students talks or disturbs the class for the long duration of time then the designed system warns the students to keep quite. This helps the lecturer or the teacher to monitor the class in an easy way during the presence or in the absence of the particular lecturer/teacher.

In this paper we have proposed simple class monitoring system using voice recognition. The system is accurate in recognizing a student by his/her voice and also stores the attendance based on it. While two or more person simultaneously answering the attendance the system may not be able to mark the attendance properly. Our future work is related to more accuracy and to overcome the above problem with an efficient way. And also in case of class monitoring, we have to focus on the voice recognition of individual students while multiple students are talking. And the system must warn the student by identifying the particular student who is disturbing the class in an efficient way. If she/he ignores the warning message automatic attendance detection can be implemented in future works.

REFERENCES

[1] C.J Perera, S. Sumathipala, B.H. Sudanatha "Victim Detection Using UAV with **On-board Voice Recognition System"**, ISBN: 978-1-5386-9245-5/, IEEE,2019.

[2] Akanksha Singh Thakur, Namrata sahayam"**Speech recognition using euclidean distance**", ISSN 2250-2459, ISO 9001:2008 certified journal, March 2013.

[3] Om Prakash Prabhakar, Naveen Kumar Sahu "**Performance improvement of human voice recognition system using Gaussian mixture model**",ISSN:2319-5940, International journal of advanced research, January 2014.

[4] Hairol Nizam Mohd., Mohd.Zmzuri Ab Rashid, Zalina Kamis "**Biometric Voice Recognition in security system**", ISSN:0974-6846, Indian journal of science and technology, February 2014.

[5] J. Dhalia, Sweetlin, V.Aswini ,R.Dhanusha "**Speech Based Attendance Application Register**" ,ISBN:978-1-4673-9802-2/,IEEE,2016

[6] Anjali Bala, Abhijith kumar, Nidhika Birla "**Voice command recognition system based on MFCC and DTW**", International journal of Engineering science and Technology,7335-7342, 2010

[7] Gulmira K.Berdibaeva, Oleg N. Bodin, Kasymbek A "**Pre-processing voice signals for voice recognition systems**" 18th International conference micro/nano technologies and electron devices EDM.