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VoiceNotes - Android Based Smart Classroom

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Abstract—***Todays life changes rapidly due to the technological development in every field. Smartphone are the one of the technology which affects the human life most. This paper discuss the way through which smartphones are used for smart learning in educational life of any student. This paper presents the method of taking notes using speech recognition. Even though a lot of research has been made in the field of speech recognition, but due to the noisy environments there is a significant degradation in the performance of the speech recognition system. It also provides the smart notification system through which notices will be send to the teachers, students and parents. The system decides who should receive an incoming notification; on which devices the notification will be send; and best way to notify the incoming notification. The current application and use of all this technology also discuss with their future scope.***

Key words— **VoiceNotes, Speech Recognition, ASR, Attendance, Notification** *(key words)*

1. INTRODUCTION

Smartphones have become integral part of students in higher education. The latest development created a new area known as smart learning. Computers are replacing by the smartphones that fit into pocket and can be carry anywhere. With development of the VoiceNotes application the students prefer to use smartphones as technology supported educational tool.

The idea behind this paper is to study various methods and techniques for speech recognition, smart notification, attendance and report generation. In this various functionality of different modules are integrated into single application. It gives student access to notes with the help of speech to text conversion system. The attendance module provides a one of the solution for manual attendance, which is the overhead for teachers also. Because in manual system student may cheat during attendance.

The speech to text conversion system is the ability of smartphone to identify the words which is the spoken language and translate it into readable form that is in the form of text. Attendance management is a system which maintain the records of either presence or absence of the students in the class. Notification system is a combination if hardware and software that provides a means of delivering message to a set of recipients.

VoiceNotes is design because notes dictation in classroom is difficult. Considering semester duration, student might miss any important notice due to unawareness, chances of false marking of attendance is more due to more paper work and manual attendance entry, evaluation and report generation is tedious and time consuming job. Timely updates to parent is not possible. With the VoiceNotes teacher can upload notes, time tables, assignment on server. Server will broadcast it to the registered students so that it is easily accessible using smartphones. VoiceNotes enable students to learn anywhere, anytime according to their conveniences. VoiceNotes makes students to be active, responsive while their academic.

Smartphones are based on operating systems like Blackberry, iOS and Android. To design VoiceNotes smartphones with Android Operating System are choose because penetration rate of an Android OS is 70%. It is open source and free ware. VoiceNotes is compatible with all Android versions ranging from jellybean 4.2 to onward, so that students who can't afford to buy cost smartphones also use it. Institutes located in remote, rural areas can also use this system.

2. RELATED WORK

In educational field Android technology used for various services. Many useful applications for student were developed in android. In this section, related research on the different modules that combine in the proposed system are discuss.

2.1 Speech Recognition System

Speech recognition reduces the difficulties and problems caused by other communication methods. In the VoiceNotes speech recognition used for lecture transcription. There are lots of speech to text conversion system creates so far. Research has greatly increased by developing various methods and algorithm for different application.

In [2], Md. Safaet Hossain *et al* describe a method to convert speech to text in real time. "Real Time Speech to Text" can be define as accurate conversion of words that represents uttered words instantly after speaking. However, the transfer must be very fast and correct to be understandable. This system directly acquires and convert speech to text. In this technique the project is build using Microsoft Visual Studio. But speech SDK 5.0 was added for direct conversion.

Even though great progress has been made in Automatic Speech Recognition (ASR), significant performance degradation still exist in noisy environments. In [5], Yanmin Qian *et al* described CNN for robust speech recognition. Recently very deep convolutional neural networks (CNNs) have been successfully applied to computer vision and speech recognition task. This architecture is further developed to improve accuracy for noise robust speech recognition.

In [6], A. N. Yakhnev *et al* proposed method to increase accuracy of speech recognition in noisy environment. Proposed algorithm based on formants information. Achieved improvements compare to MFCC-PLP baseline for speech in noisy environments. MFCC (Mel Frequency Cepstral Coefficients) features are commonly used in ASR system. The MFCC is main source of information about speech waveform for GMM.

2.2 Attendance Management System

In this, a review of few related system and different method in recording student's attendance are as follows:

An RFID based system was developed by Vishal Bhalla *et al* in [1], to record student attendance during class hour as the students enter the class. In this RFID reader system requires each classroom to be installed with a RFID reader that is connected to a computer. The RFID reader will be used to capture the student information through the student's card.

Another project was also using RFID technology developed by Ankita Agrawal *et al* in [8]. However this system requires an RFID reader to mount at center of each classroom. Both system have same limitations which is the additional hardware cost to install the RFID devices.

In [9], Pallavi Vermal *et al* where the system promotes fingerprint based student attendance recording system with GSM utilization.by verifying student fingerprint strict attendance verification and recording is done. This system sends a weekly attendance report to the student guardian via GSM.

In [10], S. Kardy *et al* present a remote iris acknowledgment attendance administration system which is planned an actualize using the Daugman's calculation. This system utilizes the iris acknowledgment for conformation and RF wireless technique. Both these systems uses biometric qualities which make them great against fake data.

2.3 Notification System

Notification system provides a means of delivering messages to a set of recipients. Such a system is important aspect for the modern web applications. When documents are shared users must be notified. A notification is message you can display to user outside of application normal UI. To see the details of notification, the user opens the notification drawer. Many methods are available for the notification system as follows:

In [3], Prasun Dewan *et al* describe the active notification system. In some modern system notification automatically generate a side effect of checking-in version.

In [11], Sih-Ting Zeng *et al* describe the Personal Emergency Notification Application Design for Mobile Devices. In this application, the position function of GPS and an easy used interface capable for sending emergency notification messages or phone calls are included.

In [12], Saurabh Malgaonkar *et al* proposed multipurpose Android Based Mobile Notifier. In this various techniques and methods used for pushing or notification of messages using various Android Connectivity methodologies on Android devices & application. The concept of Google cloud Messaging, C2DM & Xtify is explained in brief with procedure, application and working.

As all this techniques discussed have their own merits and demerits they are still in used in different applications independently to support as educational tools. The VoiceNotes is combining all this modules into single system which will aid students in their curriculum. The VoiceNotes is basically Android application running on Android based smartphones so the students can easily access it through the mobiles.

3. ARCHITECTURE OF THE PROPOSED SYSTEM

Following Fig-1 shows architecture of the VoiceNotes.

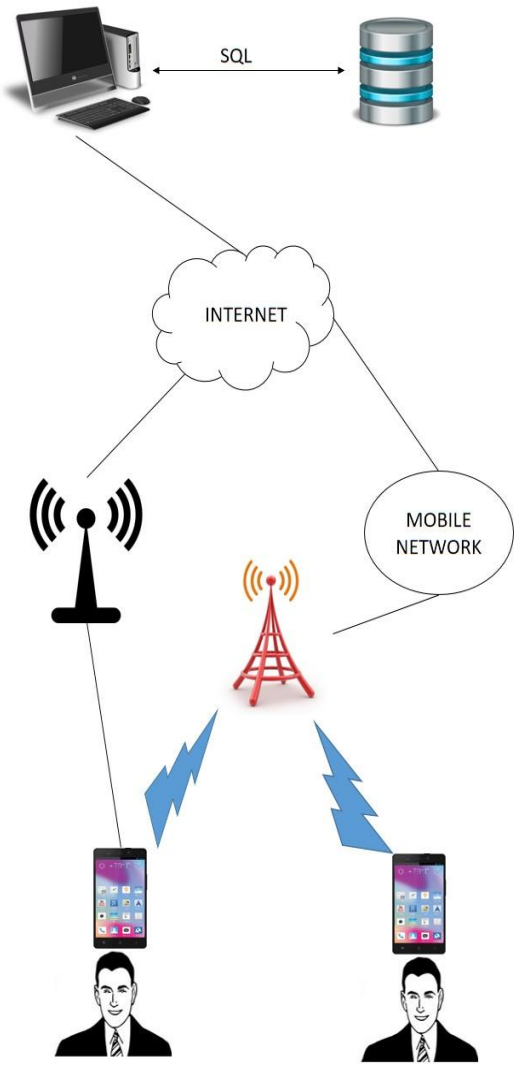

Fig-1: Architecture of System

As shown in Fig-1, student and teacher can get connected with server in different ways. They can use Wi-Fi, mobile networks to connect to server, where internet is the backbone of communication.

Initially admin will maintain database for the overall system. The student and teacher will get register with system firstly. The details like subject, class, semester etc. store in database while registration.

3.1 Client Side

The student can access the notes which are made by speech to text conversion module. Also VoiceNotes provides notifications of updates for student which are related to the college notices or university notices like exam dates, academic calendar of college and university, extra lecture etc.

Teachers record the lectures in class room while teaching, this can be recorded by using the microphone. Then transfer to the administrator who will be going to convert it into the text format using the speech recognition system. After this all the files will be uploaded to the server, through which all the users in client side can access it using the internet.

The teacher can fetch the list of student of class for which the attendance to be recorded for such a list the details need to provide like course, branch, class, semester, etc. After fetching the list, teacher can record student status in the database and at the end of it the total present and absent student are calculated and then display.

This data will be updated on the regular basis as it uploaded to main server and maintain by the admin. While after the upload of on to the server no change will be make in it and the data for one class can be upload at once during the time period of that class. If the teacher try it twice it will be not update and the first uploaded data will be consider as a final update of that class. Due to this the more transparency will be provided to the system.

Addition to all above mentioned modules the VoiceNotes also includes the parent notification module. Through this parent can be able to see the attendance and academic records of their parents. Only registered parents are allowed for such tasks. This will help to improve the overall performance of the students because; their parents are totally aware about the academic performance of their children. The VoiceNotes also notify the respective parents if the attendance of the student is less than the threshold value.

3.2 Server side

MYSQL database is use at the server side for purpose of demonstration of this application XAMPP server is been used with PHP admin panel. The server will store the data in database and the pseudo code is as follows

- Insert data into database
- Retrieve list of student
- Retrieve lectures notes
- Attendance details mark on GUI
- Notify to user on updates
- Details of user also modified

On server side only admin is responsible and allowed for the updating and adding the necessary information in the database of the VoiceNotes application. Each time admin logged in the system he/she can add/update the information regarding the attendance, reports, notices and notes for the students. Admin is responsible for maintaining the records of student's attendance and academic reports, notes sharing and notice sharing.

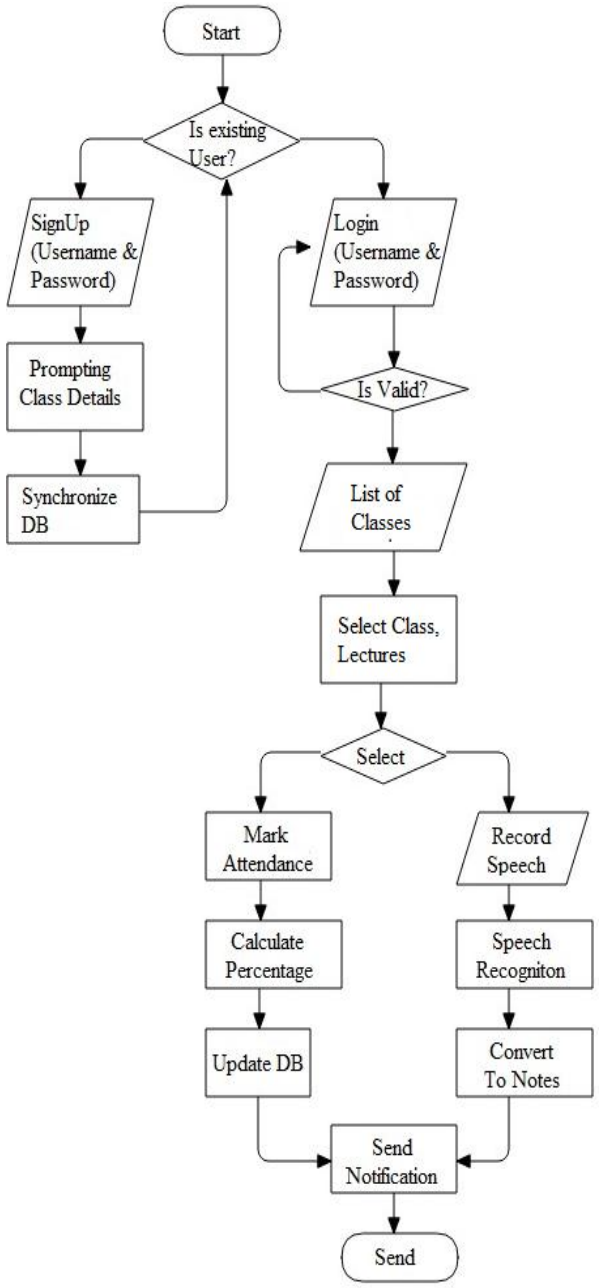

Fig-2: Flowchart of the system

4. CONCLUSION

This paper introduces a system for the overall improvement of the college. It includes analysis of systems like speech to text conversion system for notes making, smart attendance and smart notification system. Compared to the traditional methods the VoiceNotes is more effective and less time consuming. In addition to superior performance the proposed model has many more advantages such as campus connectivity, total security using authorization. Using the proposed model students can easily acquire the notes of the lectures. This help students because if any student may not present in the classroom due to some reasons he will get the notes and his academics will not affect. The VoiceNotes is also useful for the teachers by taking the attendance and sending the notification to students as well as to the parents.

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