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Wireless Voice Transmission using WIFI and Bluetooth on Android Platform

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Abstract— In this paper, we propose a Smartphone-based hearing assistive system to facilitate speech recognition for various target users, who could benefit from enhanced listening clarity in the classroom. The system consists of transmitter and receiver devices (e.g., Smartphone and Bluetooth headset) for voice transmission, and an Android mobile application that controls and connects the different devices via Bluetooth or Wi-Fi technology. The wireless transmission of voice signals between devices overcomes the reverberation and ambient noise effects in the classroom. The main functionalities of System include: 1) configurable transmitter/receiver assignment, to allow flexible designation of transmitter/receiver roles; 2) advanced noise-reduction techniques; 3) audio recording; and 4) voice-to-text conversion, to give students visual text aid. All the functions are implemented as a mobile application with an easy-to-navigate user interface. Experiments show the effectiveness of the noise-reduction schemes at low signal-to-noise ratios in terms of standard speech perception and quality indices, and show the effectiveness of System in maintaining voice-to-text conversion accuracy regardless of the distance between the speaker and listener. Future applications of System are also discussed.

Keywords: *Wireless assistive technologies, Android phone technologies, hearing assistive systems, speech recognition, e-health, m-health.*

I INTRODUCTION

Good acoustic characteristics are prerequisites to an effective and less stressful learning experience in the classroom. Information is predominantly exchanged via verbal communication in a typical classroom and therefore effective speech recognition through listening is crucial. It has been reported that listening, as opposed to reading, speaking, and writing, is the most occurred communication behaviour among college students, who spend 55.4 percent of their total communication time on listening in the classroom. The electiveness of speech recognition through listening can be measured by the listening effort, defined as the attention and cognitive resources required for an individual to perform auditory tasks. It was reported that listening effort depends on age (i.e. older adults expend more listening effort than young adults in recognizing speech in noise) as well as on hearing conditions (i.e. hearing-impaired children expend more listening effort than their normal-hearing peers in classroom learning). Furthermore, it was reported that considerable listening effort is required when listening at typical classroom signal-to-noise ratios (SNRs). Increased listening effort leads to increased listening and mental fatigue. Speech recognition is a process that occurs not only in the auditory modality but also visual modality. The role of visual in- formation is particularly prominent when the perceived SNR of the auditory speech is less favourable. Visual cues can compensate for the limitations of auditory abilities of hearing-impaired individuals by enhancing speech recognition in noise and can reduce listening effort. Speech converted to text, as a form of visual speech cues, could be beneficial for high school and college students with hearing impairment in obtaining lecture information. Subtitling the video could improve comprehension of the contents and benefit hearing-impaired and normal-hearing individuals alike. To increase student's access to educational resources and accommodate their educational needs, captioning, known as real-time speech-to-text service is also provided in class.

With modern technology advances, speech to-text services have migrated to a computer-based delivery mode where service providers produce text on a computer as the teacher speaks to an automatic speech recognition (ASR) machine. Factors that affect an individual's listening and speech recognition abilities in the classroom include the surrounding noise level, the reverberation time, and the acoustic quality of the transmitted speech. The American National Standard Institute (ANSI), in collaboration with the Acoustical Society of America, has specified an SNR of 15 dB or higher at the students ear, a reverberation time of less than 0.6 seconds, and a maximum noise level of 35 dB in an unoccupied classroom for an amiable classroom learning environment. Frequency modulation (FM) systems have been a routine clinical recommendation to improve speech recognition in noise. FM

systems include two integral parts, namely, a transmitter and a receiver. The transmitter is placed near the speaker, and the receiver is placed near the user. The speaker's speech is picked up by the transmitter's microphone and transmitted to the receiver via FM signals. The benefits of FM systems on improving SNR and poor room acoustics have been proven in many studies. With the advances of Smartphone technologies, there is a potential to implement the working principles of FM systems on Smartphone's using wireless technologies for audio streaming. Mobile Based Assistive Listening System (MoBALS) and Jacoti Lola Classroom, for example, provide Smartphone-based assistive listening solutions that promise better affordability and availability and less stigma than the commercial FM systems. Mobals and Jacoti Lola Classroom can be connected to users hearing devices via direct audio input or used alone.

II EXISTING SYSTEM

All the present available systems have a very attractive and innovative interface which helps the user to understand the system in a easy way. These systems work efficiently and engineered very well by the different sources available. But the problem with available systems is that it do not notify the lecturer if student is logged off of the application and not hearing to the lecturer.

2.1 Drawbacks:

Unable to notify to lecturer if student logoff in lectures.

- Unable to take the attendance of student.
- Not able to translate text in regional languages.
- It is not time bounded.
- Unable to notify the announcements.

III PROBLEM STATEMENT

Good acoustic characteristics are prerequisites to an effective and less stressful learning experience in the classroom. Information is pre-dominantly exchanged via verbal communication in a typical classroom and therefore effective speech recognition through listening is crucial. It has been reported that listening, as opposed to reading, speaking, and writing, is the most occurred communication behaviour among college students, who spend 55.4 Percent of their total communication time on listening in the classroom. Increased listening effort leads to increased listening and mental fatigue.

IV PROPOSED SYSTEM

The proposed system, as described earlier, finds many immediate benefits in classroom learning scenarios through its key functions such as configurable transmitter/receiver assignment, advanced noise reduction, audio recording, and voice-to-text conversion. These functions collectively facilitate personalized learning for general students and students with special needs alike, by offering personalized benefits such as improved SNR of the received speech signal at the listener, easy recording of the audio lectures for future reference or playback, and reduced listening effort with visual/language aids. System distinguishes itself from most existing classroom learning enhancement approaches in that System targets specifically at students with special needs or disabilities to facilitate their learning with its broad applicability extensible to general students as well.

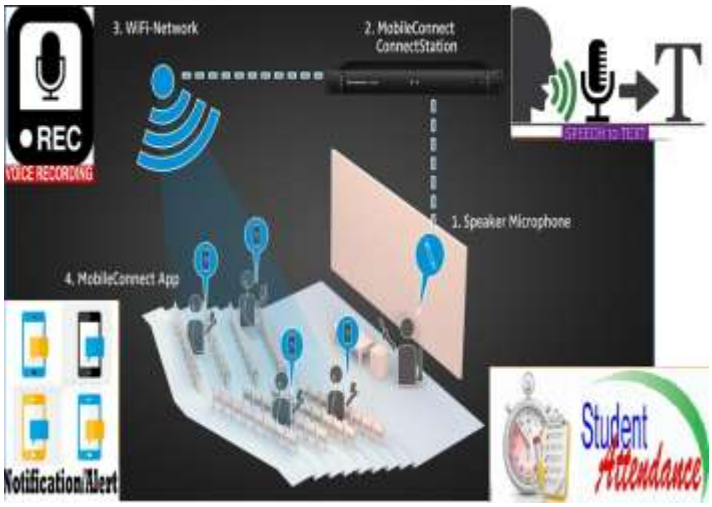


Figure 1. System Architecture

4.1 Our plan and its Advantages:

- Voice to text conversion in regional languages
- Attendance registration of student if the student is online for complete time slot of lecture.
- Notifying Faculty if student is offline while lecture is going on.
- Message notification while lectures are going on

4.2 Objectives

- The Smart Hear is a application for the students which can help the listening impaired students for clear hearing of voice so that they can improve the lecture understanding capability.
- The Smart Hear is less costing application which can be used by any common student in the class.
- To create E-learning System for students.
- It will lead to enhancement of student concentration and understanding ability.

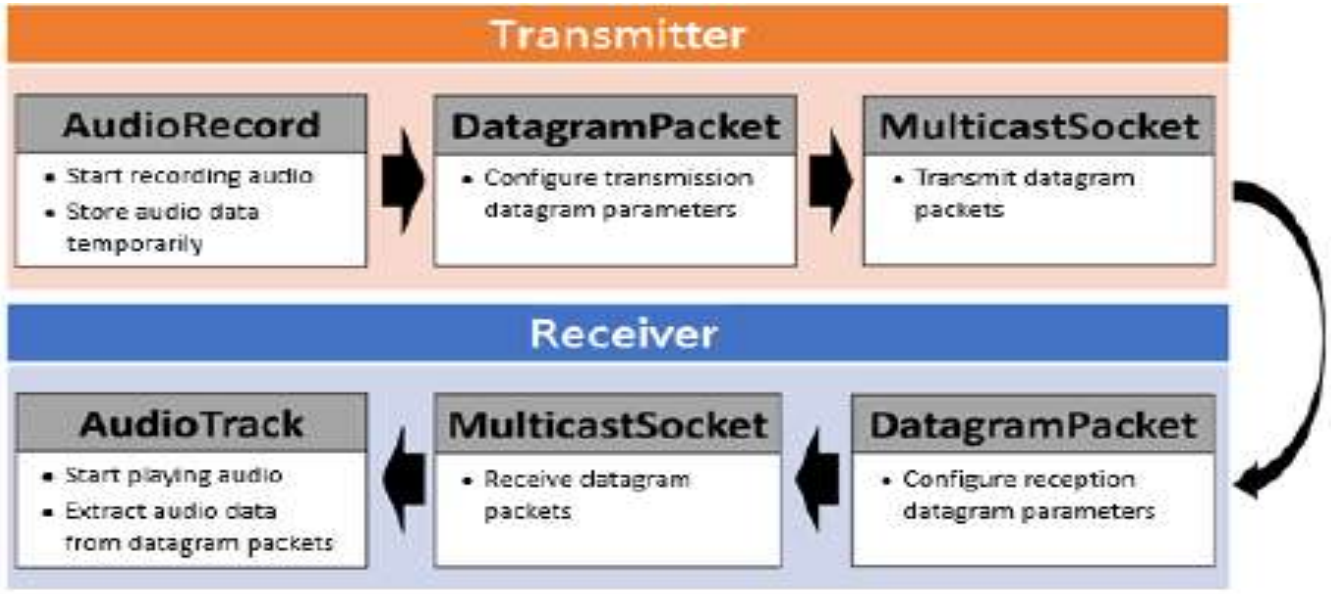
4.3 Motivation

The Smart Hear is a application for the students which can help the listening impaired students for clear hearing of voice so that they can improve the lecture understanding capability. The Smart Hear is less costing application which can be used by any common student in the class, Technology has great potential in providing access for all learners. Through the use of a variety of assistive technologies, students with disabilities can have the ability to access the general curriculum. When assistive technology is appropriately integrated into the

regular classroom, students are provided with multiple means to complete their work.

4.4 System Architecture

Figure 2. One to Many Architecture



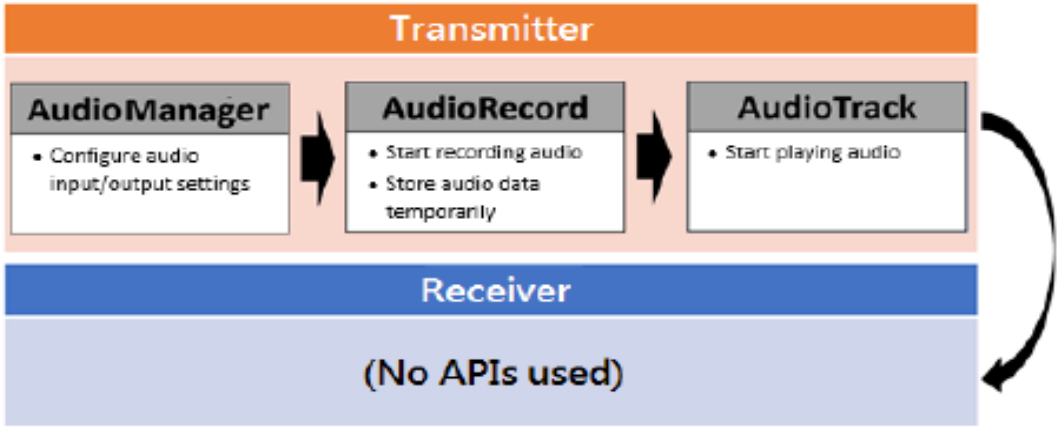


Figure 3.One to one architecture

Figure 4.Voice Recording Architecture

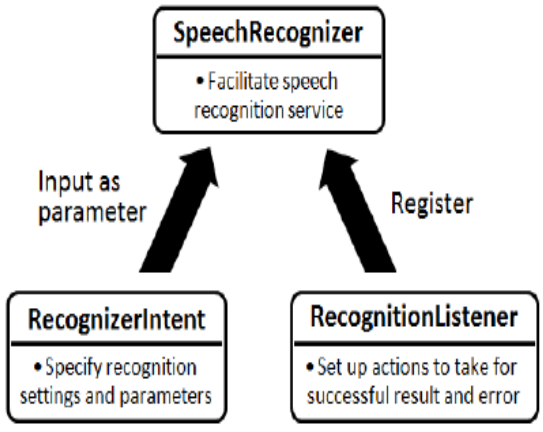


Figure 5. Voice to text translation architecture

V LITERATURE SURVEY

1."How college students spend their time communicating" Author Name- R. Emanuel et al., Member,Int. J. Listening Year - 2008

In This paper study sought to assess how college students spend their time communicating and what impact, if any, communications devices may be having on how that time is spent. Undergraduates (N=696) at four South-eastern colleges were surveyed. Results revealed that listening comprises 55.4 percent of the total average communication day Followed by reading (17.1 percent), speaking (16.1 percent), and writing (11.4 percent). Each of these communication behaviours includes some aspect of Internet use. College students spend as much time listening to media as they do engaged in interpersonal interactions. New technology is changing the way mediated communication activities are Perceived . A different paradigm of expressive, receptive, and interactive communication is offered.

2. "Deaf and hard-of-hearing students' memory of lectures with speech-to-text and interpreting/note taking services" Author Name- M. S. Stinson, L. B. Elliot, R. R. Kelly, and Y. Liu Year - 2009

In this investigation, one study examined the perceptions and motivation of 55 deaf/hard-of-hearing (DHH) high school students who used the C-Print speech-to-text service as an accommodation in one main-stream course and interpreting and note taking in a second mainstream course. A second study examined the perceptions and motivation of 88 DHH college students who used each service in a different course . Students in the two studies completed a survey that asked separate sets of questions for the speech-to-text and for the interpreting/note taking supported courses. Results indicated that students rated the printed or electronic file text, saved for the purpose of after class study as part Of the speech-to-text service, as more helpful than notes from a note take r. Deaf and Hard-Of-Hearing High School and College Students Perceptions of Speech-To-Text and Interpreting/Note Taking Services and Motivation .

3. "Bene_t of S/N enhancing devices to speech perception of children listening in a typical classroom with hearing aids or a cochlear implant" Author Name- Karen L. Anderson,Howard Goldstein,Louise Colodzin,Frank Iglehart Year - 2010

Speech perception can be improved for children with hearing loss using signal-to-noise ratio (S/N) enhancing devices. Three experiments were performed with 28 participants, age 8 to 14 years using hearing aids or a cochlear implant. Participants repeated HINT sentence lists in class-rooms with a typical level of background noise and reverberation times of either 1.1 seconds or 0.6 seconds. In addition to personal amplification, the types of devices used were a classroom sound field system, a desktop personal sound field FM system, and a personal FM system linked to hearing aids or cochlear implant. The speech perception results of the three experiments support the use of a desktop or personal FM system by children with hearing loss who are auditory learners whether a poor or acceptable level of reverberation is present Based on the results of this investigation, providing classroom sound field amplification as a means to benefit speech perception of students with mild to profound bilateral hearing loss who are successful learners in the mainstream appears to be an unjustified practice for approximately 80 percent of students with hearing loss . Approximately 20 percent of participants did benefit by least 5 field amplification over use of their personal devices alone. Performance scores of these participants indicated an additional 5scores using classroom sound field. Results indicted that 64provided easiest listening with either the personal FM or desktop FM being preferred for use by 26 of the 28 participants.

VI SYSTEM IMPLEMENTATION

1) *Configurable transmitter/receiver assignment:*
   For the one-to-many transmission mode, any Smartphone may be configured as the transmitter while the other Smartphone's in the same WiFi network as the receivers. For the one-to-one transmission mode, either the Smartphone or the Bluetooth device may be configured as the transmitter whiles the other as the receiver.
2) *Advanced noise-reduction techniques:*
   The advanced noise-reduction algorithms computed on the Smartphone mitigate the surrounding noise that is often present in the classroom and improve the perceived audio quality.
3) *Audio recording:*
   This function allows students to record the lectures or discussions and play back the audio later when needed.
4) *Voice-to-text conversion:*
   This function gives students visual text aid, which is particularly useful during small group discussions.

VII WORKFLOW OF SYSTEM

7.1 Activity Diagram

Activity diagram is basically a flow chart to represent the flow form one activity to another activity. The activity can be described as an operation of the system. So the control flow is drawn from one operation to another. This flow can be sequential, branched or concurrent. Activity diagrams deals with all type of flow control by using different elements like fork, join etc. Application 1 . Modelling work flow by using activities . 2 . Modelling business requirements. 3. High level understanding of the systems functionalities. 4.Investigate business requirements at a later stage.

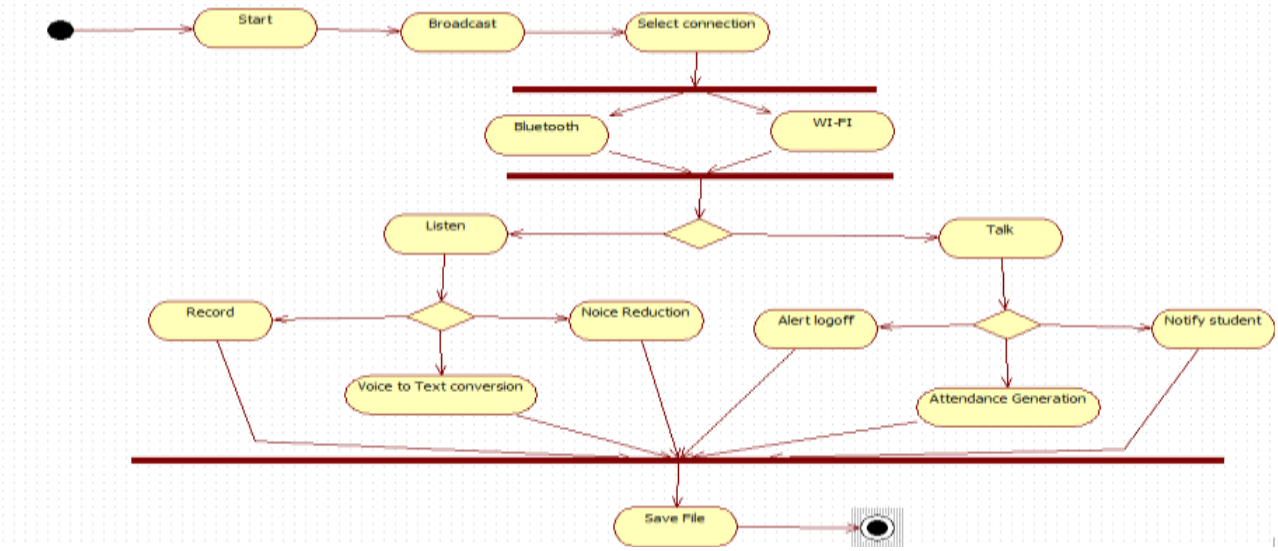


Figure 6. Activity Diagram

7.2 Use Case Diagram

The relationships between and among the actors and the use cases. Name: A clear verb/noun or actor/verb/noun descriptor that communicates the scope of the use case. Actors:- A list of the types of users who can engage in the activities described in the use case. Actor names should not correspond to job titles. Preconditions: - Anything the solution can assume to be true when the use case begins. Basic Flow :-The set of steps the actors take to accomplish the goal of the use case. A clear description of what the system does in response to each user action. Post Conditions:-Anything that must be true when the use case is complete.

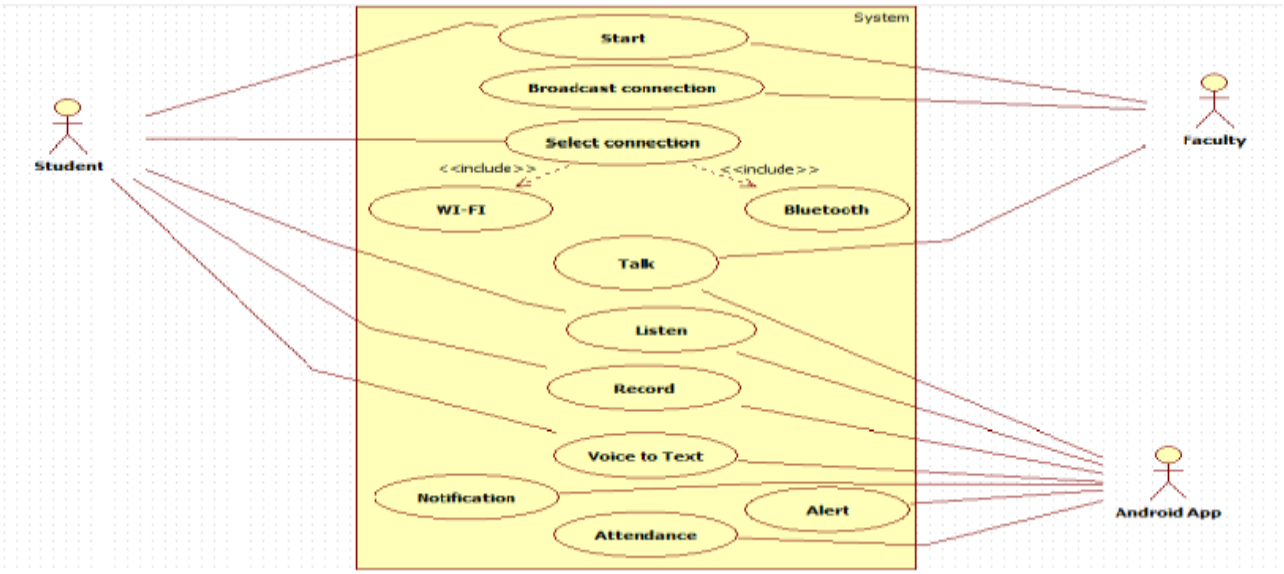


Figure 7: Use case diagram

VIII CONCLUSION

Carpooling system is very effective means to reduce pollution and the congestion of vehicles in cities. It also provides an eco-friendly way to travel. It also provides an opportunity to meet new people. As today most people prefer private vehicle to travel due to delay caused in public transport system and luxuries provided by private vehicles. Pre-registration ensures that only identified people get into the vehicle so that trust can be established. The people registered are allotted specific days on which they should take their private vehicle, so that no inconvenience is caused to its registered passengers for daily commute. Thus the proposed carpooling system will be effective in reducing environment pollution. It will also provide a security to citizens. It will give the accurate pick-up time.

IX FUTURE SCOPE

- It will be user-friendly for blind & lack of knowledge people.

- It can be use as a online application.
- It can be a new technology for e-learning.

REFERENCES

[1] F. H. Bess and B. W. Hornsby, Commentary: Listening can be exhaust-ingfatigue in children and adults with hearing loss, Ear Hearing, vol. 35, no.6, pp. 592599, Nov./Dec. 2014.

[2] O. A. Lopez, E. A. amd Costa, and D. V. Ferrari, Development and technical validation of the mobile based assistive
listening system: A Smartphone based remote microphone, Amer. J. Audiol., vol. 25, pp. 288294, Oct. 2016

[3] N. Koohi, D. Vickers, J. Warren, D. Werring, and D.-E. Bamiou, Longterm use bene_ts of personal frequency-Modulated systems for speech in noise perception in patients with stroke with auditory processing de_cits: A non-Randomised controlled trial study, BMJ Open, vol. 7, no. 4, p. e013003,2017.

[4] J. L. Desjardins and K. A. Doherty, Age-related changes in listening effort for various types of masker noises, Ear Hearing, vol. 34, no. 3, pp. 261272, May/Jun.2013