Voice Your Sign: An Android Application for Differently able People

Ms. E.Chandralekha[1] Ms.R.Deepika[2] Ms. V.Thanuja[3]
[2,3]U.G Student
[1,2,3]Department of Information and Technology
[1,2,3]Loyola Institute of Technology

Abstract— An android application for specially able people(deaf and dumb)that translate speech –to-sign and sign –to –speech conversions on smart phone with signing and outfit7.This application can be accessed without dialing number, and which can translate spoken and written text into sign language. Deaf people can gesture sign language through smart phones and that can be converted as a text to other side by using VRS which would produce audible and textual output. We propose an interaction with normal people and we bridge a gap between normal people and hearing impairment people. This application which helps to chat with hearing people with the help of ASL.

Key words: Sign-to-speech, VRS (Video Relay Service), outfit7 application, ASL (American Sign Language)

I. INTRODUCTION

Nowadays we use our mobile phones often and we do communicate with everyone in group in various social networks and they could not chat with a hearing people. The outfit 7 applications in our mobile phone which captures the gesture sign language and translate into voice. Without dialing number we can communicate with others like face to face. It does not require large amount of storage as it uses the hand speak support through online. The project prepares individuals to work as interpreter/translators facilitating and mediating communication between deaf/hard of hearing and hearing people. Accurate and appropriate transfer of a message from a source language into a target language from the point of view of style and culture. We can learn the culture and history of deaf people and we can have better understanding communication between deaf and hearing individuals.

II. RELATED WORK

In [2] sign language is used as a communication medium among deaf and dumb people to convey the message with each other. In order to bridge the gap in communication among deaf, dumb people and normal people, many development are done to automate the process of sign language interpretation with the help of the image processing and pattern recognition techniques .this proposes optimized approaches of implementing the famous viola Jones algorithm with LBP (Local Binary Pattern) features for hand gesture recognitions which will recognize Indian languages gestures in a real time environment. Optimised classifier can be obtained with less number of positive samples provided by considering the suitable number of positive samples provided by considering the suitable number of stages and 1:2ratio of positive to negative images. It has been proved through that that sign recognitions depends on mobile RAM capacity. With high RAM size more number of sign letters can be accommodated into single android application has been designed to demonstrate the implementation of viola-Jones algorithm with LBP features for hand gesture recognitions.

In [1] different approaches have been used by different researchers for recognitions of various hand gestures which were implemented in different fields.

It consists of three segments

- Hand segmentation approaches
- Features extraction approaches and
- Gesture recognition approaches.

All the available systems are not portable and not affordable to poor people. It detects the Indian sign language via mobile camera and converts into corresponding text or voice output. This application uses certain images processing techniques to compare the input with the already stored signs and requires only android phone and does not require any special markers or magic gloves on the hand of the user. This includes different sizes of gestures and different background, different orientation and angles of gestures, etc. the different illumination for different images too occurred a problem. Now our system provides an efficiency of 65% of correct predicting and we are working on efficiency. Hence we took the idea of implementing the gesture video with the help of hand speak technology which helps the deaf people to view their relevant sign language video based on the text given as input. We include the idea of providing the link to the application which helps in extracting the video. It proves its maximum efficiency.

III. EXISTING SYSTEM

Nowadays we communicate through two processes

- Communication through cellular
- Face to face communication.

A. Communication through Cellular:

It is a communication between two persons. When a caller dials the relevant text or voice messages need some database larger than the phone's given memory space. Only the person who knows the sign language can speak with them and normal hearing people cannot chat with them. Hence we need to know the sign language. People with hard of hearing could not make a clear conversation with people

B. Face to Face Communication:

In today's technology we can communicate face to face through an application called MIMIX. The MIMIX technology which can convert speech to sign conversion with a recorder. Where the recorder which record the sentence first and then converts it to a text .Hence it takes time to convert and data consumption is high when compared.

IV. PROPOSED SYSTEM

Our proposed system which paves a way for deaf and dumb. This project supports automatic translation. It consist two

parts hardware and software. The hardware which requires phone and speaker and the software which mainly consists of Outfit-7.Outfit-7 is an application for the smart phones where this software which converts everything in a high pitched voice. This project which bridges the gap between hearing impairment people and normal people. This application which uses ASL (American sign Language). All letters are signed using the right hand which is raised with the palm facing towards the viewer

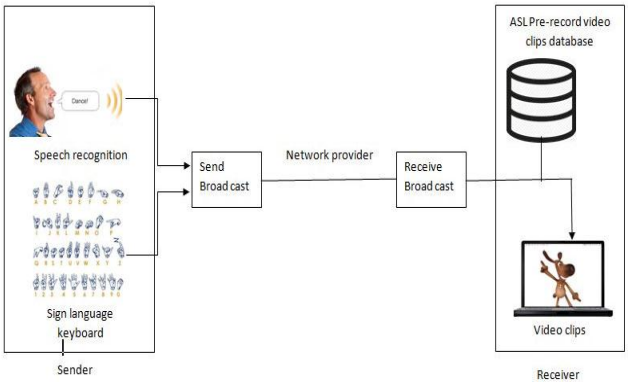

Fig. 1: Architecture Diagram

This application which converts the sign language into text or speech so that the person who doesn't know the sign language can communicate easily

A. Hand Sign & Recognition:

$$Y_{avg=} \sum Y_{i,j}$$

Where j_{ij}=0.3R+0.6G+0.1B should be normalized to the range (0,255) and i,j are the indices of the pixel. According to Y_{avg} the algorithm can determine the compensate image.

Fig. 2: Hand spelling

B. Hand Gesture and Interpreter:

Sign language interpreter is responsible for helping hearing impaired people and making understandable of what is being said in a variety of situation. Like as we need a interpreter in a office meeting in a court room or at a presidential speech. Interpreters may be used in one to one situations so they might use technology to provide services from remote locations.

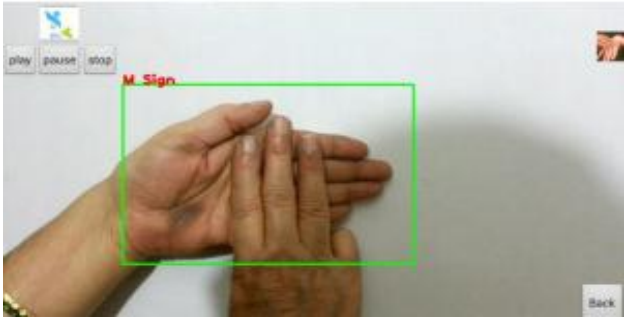

Fig. 3: Hand gesture

C. Speech Recognition:

A gestural form of human communication exists for the deaf in the form of sign language. A sign language which uses manual communication and body language to convey meaning, as opposed and the sound patterns are conveyed aucostically [8]. This can involve simultaneously combining hand shapes orientation and movement of the hands, arms and body or facial expressions to fluidly express a speaker's thought. They share many similarities with spoken languages where ever group of deaf people exist sign languages develop [4] signing is also done by persons who can hear but cannot speak physically. While they utilize space for grammar in a way that spoken languages do not exhibit the same linguistic properties of sign language and hence use the same language faculty as do spoken languages. Sign languages are independent of spoken languages and follow their own path of development.

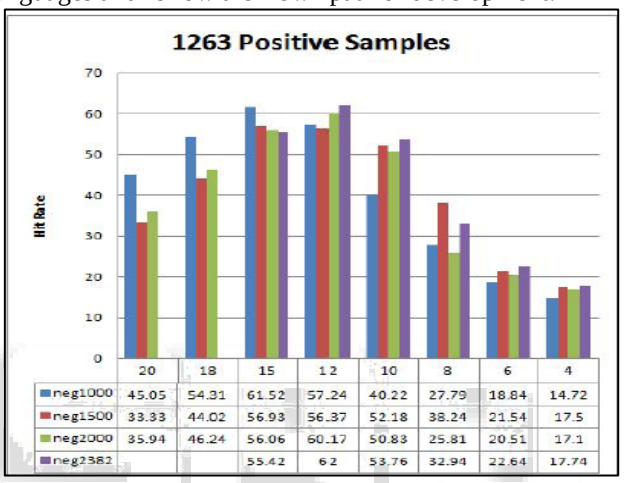

Fig. 4: Positive samples of sign recognitions

D. Access ASL Dictionary:

ASL is a system of manual communication that strives to be an exact representation of English vocabulary and grammar. It's a one of a number of such systems used in English-speaking countries. Most of the countries which uses ASL. The four components of signs are hand shake (static or dynamic), orientation (the direction of the palm), location (where the sign is performed in the body), and movements. ASL is complete unique language meaning that it not only has its own vocabulary but its own grammar that differs from spoken English.

E. VRS (Video Relay Service):

It allows communicating over video or other technology with hearing people in real time via a signing language interpreter. This video interpreting service that use device like web cameras like sign language.

This equipment must provide "video and audio connectivity"

Are separately telephones lines can be used for audio. This hand gesture interpretations which interpreters the hearing people voice through the telephone and renders the message to sign language, via front/back camera, which the deaf person views on the video display. In turn when the deaf participates sign to the camera, interpreter view this from their screen and speak the aural interpretation into a telephone from the hearing people.

F. Sign Recognition:

American Sign Language (ASL) is the predominant sign language of deaf communities in the United States; ASL signs have a number of components, including hand movement of the face and torso as well as the hands. ASL is not a form of pantomime, but it does play a larger role in ASL than in spoken languages. ASL language grammar is unrelated to that of English. ASL has a spectual marking, and has a productive system of forming agglutinative classifiers.

The pattern of representation exhibits each letter of English Alphabet in its hand signs. These alphabets are used by the user to communicate with the normal people as messaging services. When the deaf user sends the message to the hearing party, it is received as text messages on the other side.

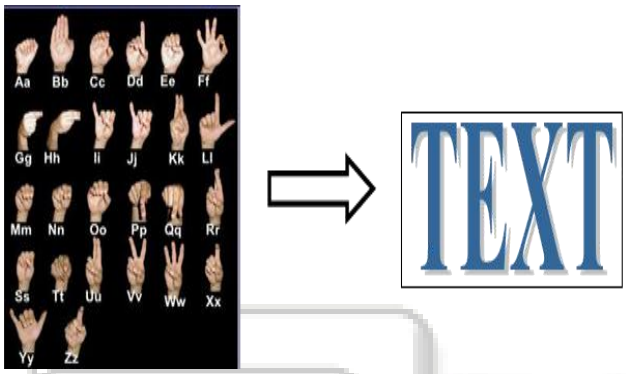

Fig. 5: conversion of sign into text

G. Signed English (SE):

The signed English uses two kinds of gestures.

- Sign words and
- Sign markers

Each sign word stands for a separate word in a Standard English in directory. The sign words are sign in a same ordered as words appear in an English sentence. When this does not represent in mind, the manual alphabet can be used to finger spell the word. Mainly most of the sign English are taken from ASL.

Fig. 6: Sign Language Representation

H. Advantages:

- It does not require open recorder each time like MIMIX.
- Without dialing to the person we can chat.
- It does not require large amount of data storage.
- It sends a predefined video clips to the hearing impairment people
- It avoids the interpreter.
- It helps to learn the sign language.

I. Tables:

S.No	Algorithm	Efficency
1	Viola	50%
2	Mimx	65%
3	Outfit	91.6%

Table 1: For Comparing Efficiency

Where the first algorithm is by viola Jones in which efficiency is 50% when compared to the latest algorithms and the updated algorithm of the previous version is MIMIX in which the MIMX application gave a 65% efficiency and a had a great place and the update version of MIMIX is Outfit-7 which stood a highest place in efficiency and gave a greater performance when compared to the rest.

Recognized Gesture	Unrecognized Gesture
5500	500

Table 2: For Success and Failure Gestures

There are nearly 6000 ASL video clips in the ASL dictionary in which nearly 5500 video are recognized correctly and approximately 500 video clips are not recognized.

V. Conclusion & Future Work

By using this application deaf person can easily interact with normal person anywhere, and normal people can also use this application for mobile sign translation using VRS and by using UTF-7 we can communicate in daily activities without dialing number.UTF-7 communication can be made without dialing number. It can be converted from sign to speech and speech and sign and it does not require recorder. The people who are hard of hearing can also use this application without the video output.

In future important journals include MIMIX, OUTFIT -7, VRS on speech and audio processing computer speech and language. It involves both speech recognition and transfer components. By using this application deaf people can communicate with normal people anywhere. It also includes the following criteria:

- Automatic Translation
- Automotive speech Recognition
- Speech-to-sign Transmission.

In future it may can also have smiley's in their conversation and also with animated emotions so that they can understand the smiley as well.

Deaf and dumb people should educate well and through these applications people should learn English as well as their sign language and hence they can send mail and get use of other services.

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