

Virtual Translator Android Application

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Abstract - The deaf and dumb people are without any doubt very comfortable while communicating with people who are like them but face difficulties while communicating with other normal people if the other person is ignorant of sign language. As a result, communication barrier as well as social barrier takes place which doesn't provide equal rights to the deaf and dumb person. To overcome this problem we are presenting an Android application which enables communication between a deaf & dumb person and a normal person who does not understand sign language. The app is a half-duplex type communicator which provides suitable mediator to translate the hand gestures of deaf and dumb person into audio form which can be easily understood by normal person and vice versa.

Key Words: Sign language; Android app; Google TTS API; MATLAB; DRLBP; Image processing; Gestures;

1. INTRODUCTION

The deaf and dumb people have to face issues as they try to adjust the demands of living in the social environment. These people are largely dependent on family as they acquire economical as well as emotional support from them. The person with disability also receives emotional support and encouragement from relatives and friends.

They face challenges not only due to their disability to hear but also in trying to fit into a society that has a hostile attitude towards them. This increases their problems and threatens their very existence as humans. Educational, employment, psychological, and social issues are faced by them. Amongst these, the most difficult one is the problem to communicate with people who do not have any kind of hearing problem, which is why sometimes they lose their confidence and often appear to be in depressed mood considering that they cannot have normal sound system for listening.

To help overcome their communication barrier, we built an Android application that enables easy communication between the deaf and normal persons. The system mainly consists of two modules; step one is to draw out Indian Sign Language (ISL) gestures from real-time captured image and mapping it with relevant text. Accordingly, step two will be taking input as natural language and map it with relevant Indian Sign Language gestures' images from the dataset.

1.1 TECHNICAL DESCRIPTION

Image to text translation will be done with help of MATLAB. It is a high level language which consists of Image Processing toolbox which supports a wide range of digital image processing operations such as Co-relation based approach, DRLBP algorithm, RGB-to-Grey Conversion, Region of interest, linear filtering, etc. The other way round, natural language (in form of audio) is mapped with equivalent Indian Sign Language gestures by conversion of speech to text, further mapping the text to relevant animated gestures from the database. Google TTS API and the dataset of sign language images is used and stored on XAMPP Server.

1.2 RELATED WORKS

- i. Dr. Y. Srinivas Rao and Ibrahim Patel presented an automated converter in cue symbol generation for hearing impaired. They proposed a medium for the conversion of speech signal to visual cue symbols by automatically synthesizing the input speech signal to cue symbols for visual representation.
- ii. Anbarasi Rajamohan, Hemavathy R., Dhanalakshmi presented a Deaf-Mute Communication converter where for each single gesture, the flex sensor working for a glove produced a proportional change in resistance and accelerometer measured the movement of palm.
- iii. Kavita Pawale and group proposed an Image Processing Based Language Converter for Deaf and Dumb People where, a webcam is placed before the physically impaired individual. Physically impaired individual will wear colored rings in the fingers. When that person draws out the gestures of the alphabets with hands, the web camera will capture the exact positions of the rings and perform image processing using color recognition to determine the co-ordinates of the colors. Captured co-ordinates will be mapped with the one already saved and accordingly exact alphabet will be detected. Further, the generated sentence is translated into speech.

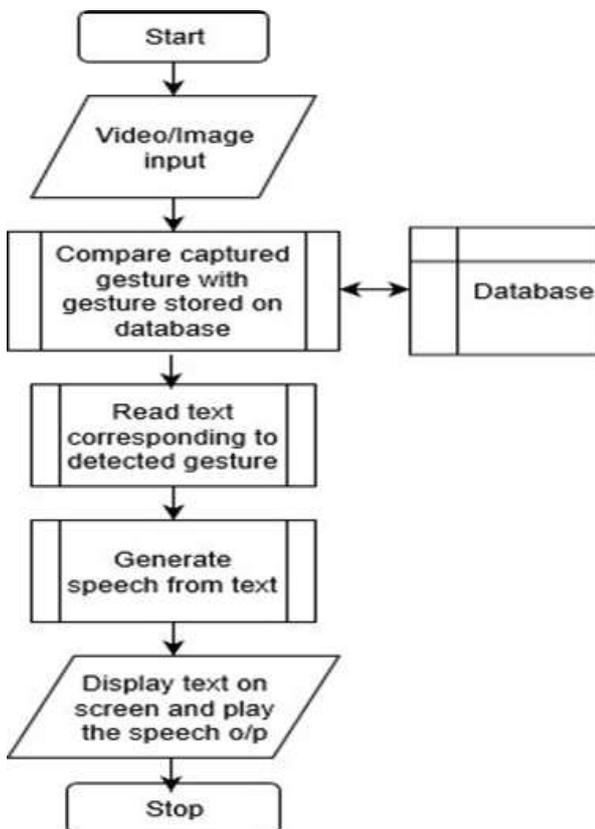
2. PROPOSED SYSTEM



Fig -1: Main activity on Android

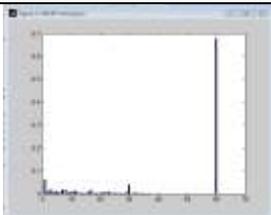
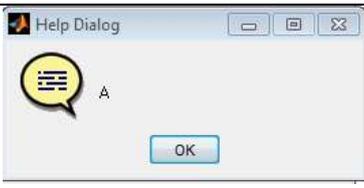
The system consists of two modules:

i. Gesture to Text Conversion



Flow Chart -1: Gesture to text conversion

Table -1: Snapshots of MALAB's processing on laptop

Accepting gesture image as input	
After RGB to Gray conversion	
After application of DRLBP algorithm	
Creation of histogram after DRLBP calculations	
Text output for given gesture (forwarded to Android)	

Take input image.

Convert to gray scale image "gray thresh" & "im2bw".

Filter image and remove pixels/objects less than 30 pixels.

Load template character.

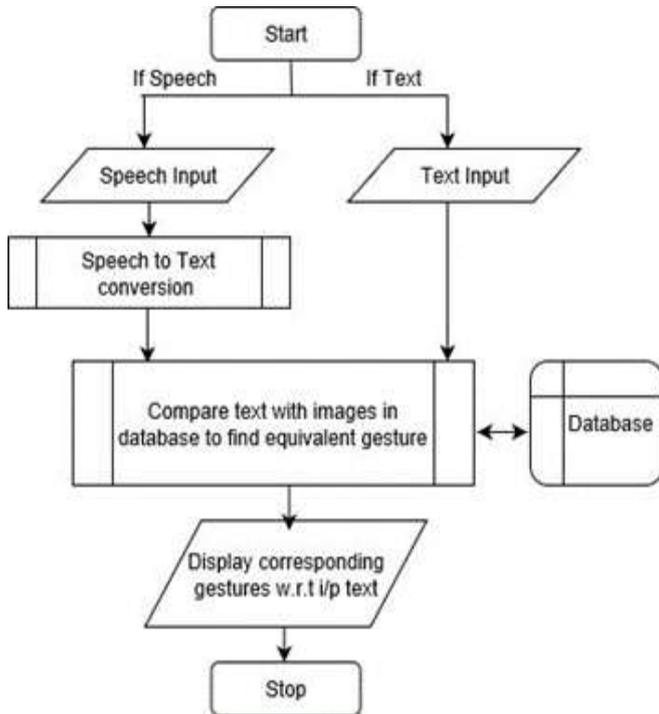
Feature extracted by DRLBP method for both, dataset and query image.

Classify character using minimum difference method.

Recognize letter using read letter and write write into text.

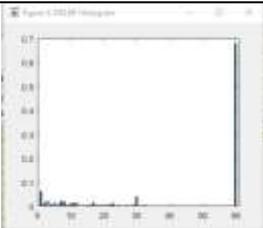
Check if line is finished then move to next line.

ii. **Speech to Gesture Conversion**



Flow Chart -2: Speech to gesture conversion

Table -2: Snapshots of MALAB’s processing on laptop

Accepting text as input	
After RGB to Gray conversion	
After application of DRLBP algorithm	
Creation of histogram after DRLBP calculations	

In the backend, the speech input will be streamed to server; there voice will be converted to text.

The text which comes from Speech is converted into String Format.

The characters in the string are fetched individually.

Each single character fetched will give an equivalent gesture image from.

3. FUTURE ENHANCEMENTS

Future Scope for our project will be that we can use a Server to store the database on it and thus will appear to the people using this app online thereby reducing the disk size of the app and enabling to translate bigger words and statements with increased speed.

4. CONCLUSIONS

- The main aim of our project is to provide a helping hand to the deaf and dumb people.
- Communication is a key which not only unlocks the lock to every question but it also helps to bind a mutual healthy relationship between each other.

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