

Android Application for Sign Language to Text and Speech Conversation

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Abstract - Deaf and dumb persons are facing great challenges communicating with people in society despite the fact that they are part of the society and are enrolled in the normal school system where teaching and learning take place using spoken language. This challenge calls for the need to address the problem of communication through the use of mobile technology. Developing a mobile app to enhance learning and communication is of great importance and thus the focus of this paper. Obviously most of the applications available were developed using foreign languages which is not easy to use. In this paper, we introduce the Simple Sign Language Translator Application that will help people to learn and master sign language. So this project deals with an application which will translate some common sign language gesture through image processing by detecting the hand gestures via mobile camera and convert into a text message format and send it through the social media site so the person with no knowledge of sign language gestures can also understand it and communicate with the opposite person. The proposed system will fully be based on the software and try to reduce the hardware burdens of the existing one. It will help to reduce the language barrier from the deaf and dumb community.

Keywords: Android Application, Sign Language, Image Processing, Mobile camera.

I. INTRODUCTION

Android application have shown a dramatic improvement in their functionality to a point where it is now possible to have cellular phone execute Java programs. As a result, cellular users throughout the world are now able to read and write email, browse web pages and play java games using their cellular phones. This trend has promoted as to propose the use of android application for better communication. Before SMS/MMS, deaf people rarely used mobile phones. Now texting allows deaf people remotely to communicate with both deaf and hearing parties. Mobile video chat may one day replace texting, but only for conversations between hearing callers, not for those between deaf and hearing callers. It is an application in which an image movement will repeat

everything we say in a high-pitched voice. Without dialing number, we can use this application.

This project deals an alternative for gesture detection using image processing technique between deaf people which overcomes the above technique and paves the way for the communication between deaf and normal people in their daily activities using sign language and video relay service. Video technology continues to improve and one day may be the preferred means of mobile communication among the deaf. It allows deaf, hard-of-hearing and speech impaired individuals to communicate over video or other technology with hearing people in realtime, via a sign language interpreter. The idea behind SE (Signed English) and other signing system parallel to English is the deaf people will learn English better if they are exposed.

The sign language provides video by improving small-screen mobile communication among the deaf. There are mainly three parts:

- Speech-Recognition Engine
- Database and
- Recognized Text

II. LITERATURE SURVEY

The purpose of the Literature Survey is to give the brief overview and also to establish complete information about the reference papers. The goal of Literature Survey is to completely specify the technical details related to the main project in a concise and unambiguous manner.

In different approaches have been used by different researchers for recognition of various hand gestures which were implemented in different fields [1]. The whole approaches could be divided into three broad categories,

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

All the available systems are not portable and not affordable to poor people. This paper introduces new android application which will detect the Indian sign language via

mobile camera and converts into corresponding text or voice output. Now our system provides 65% of correct predicting and we are working on improving its 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.

Sign language is used as a communication medium among deaf and dumb people to convey the message with each other [2]. In order to bridge the gap in communication among deaf, dumb community and normal community, lot of research work has been carried out to automate the process of sign language interpretation with the help of image processing and pattern recognition techniques. This paper proposes optimized approaches of implementing the famous Viola Jones algorithm with LBP (Local Binary Pattern) features for hand gesture recognition which will recognize Indian sign language gestures in a real time environment. An optimized algorithm has been implemented in the form of an android application and tested with real time data. This implemented algorithm is not a robust and real time. Hence we are using the already recorded video stored in a cloud storage which is considered to be the easiest way of interpreting the users input in relevant manner. This above algorithm does not prove its efficiency in any sort of background but our project overcomes this issue to the larger extent.

A number of developing countries continue to provide educational services to students with disabilities in "segregated" schools. Also all students, regardless of their personal circumstances, have a right of access to and participation in the education system, according to their potential and ability [3]. However, with the rapidly growing population and increasing number of people with blindness along with other disabilities, need for use of technology in the field of education has become imminent. In this project, through the use of speech technology, attempts to provide solutions for some of these issues by creating an interactive system. We took the idea of using voice over text technology from the above proposed system because on considering the deaf people, they either have speech ability or be a dumb which again depends on their birth. It will be a revolutionary change that will benefit hearing impaired people, boost their confidence and put them with regular people.

For the past several decades, designers have processed speech for a wide variety of applications ranging from mobile communications to automatic reading machines [4]. Speech has not been used much in the field of electronics and computers due to the complexity and variety of speech signals

and sounds. Our speech-to-text system directly acquires and converts speech to text. It can supplement other larger systems, giving users a different choice for data entry. A speech-to-text system can also improve system accessibility by providing data entry options for blind, deaf, or physically handicapped users. Voice SMS is an application developed in this work that allows a user to record and convert spoken messages into SMS text message. User can send messages to the entered phone number. Speech recognition for Voice uses a technique based on hidden Markov models (HMM - Hidden Markov Model). It is currently the most successful and most flexible approach to speech recognition. Using the speech recognizer, which works over the Internet, allows much faster data processing.

Text-to-speech (TTS) convention [5] transforms linguistic information stored as data or text into speech. It is widely used in audio reading devices for blind people now a day. In the last few years however, the use of text-to-speech conversion technology has grown far beyond the disabled community to become a major adjunct to the rapidly growing use of digital voice storage for voice mail and voice response systems. This paper presents a method to design a Text to Speech conversion module by the use of Matlab by simple matrix operations.

III. RESULTS AND DISCUSSION

A) Motivation

In accordance with recent statistics, 70 million people spent their life being mute is an inability to speak, often caused by a speech. This is a matter of regret for those peoples who can't express them self in words through their speech. Even it's hard for them to manage their day to day activities. They also find it challenging to communicate with other people using their sign languages. This application will help the mute society by providing a better and more convenient means of life by communicating with other people. Our main motive is to build a product that will help the mute community to live their life with more ease. So being in the digital world each one of us uses a smart phone in their day to day life, so why not use this smart phone as a tool for communication for the mute community as well. So in our project we are developing an android application that uses image processing for translating the sign languages to text/audio.

Proposed System:

The proposed system architecture has been shown in Fig. 1. This system will be built for the normal people those which will be communicating with deaf & dumb community. Users need to hold their android phone's camera pointing towards the disabled person and start the video. The trained model at

the backend will process the frames of video and recognize the hand gesture made by the disabled person. Further the semantic of signs will be converted to Speech/Voice.

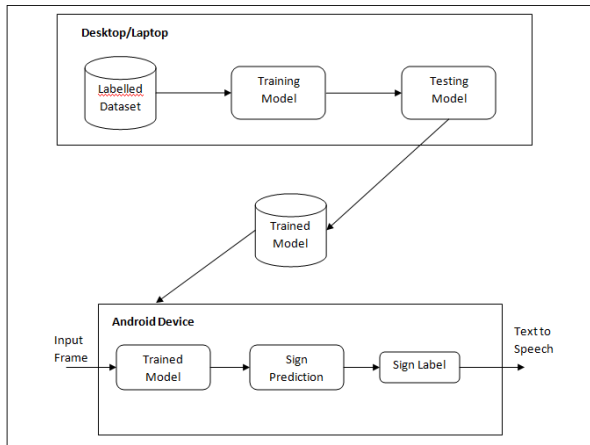


Figure 1: Proposed System

The purpose of this project is to develop an android mobile application that uses gesture recognition to understand American Sign Language. The android application should use image processing techniques to distinguish the hand from the background and then identify the fingertips to determine the gestures. The recognition is limited to only static features and hence is only used for detecting static American Sign Language alphabets. The android application should understand the gestures and show it in text form.

The project has the following main tasks:

- Research about different Image Processing techniques
- Extract skin colored pixels and convert every frame to binary image
- Extract hand pixels from rest of the hand by extracting the largest contour
- Identify fingertips and centre of the hand from the largest contour
- Using the distances between the fingers and centroid, recognize the gesture
- Display the gesture in textual form to show which alphabet is shown as a gesture
- Convert text into audio form

IV. CONCLUSION

Sign Language Translator will act as strong bridge of communication between normal people and deaf & Community. This application will lead people to instantly interpret the sign language without any need third person. This application will help society to communicate the deaf & dumb community and generate a bond between them. We are focusing that this application will help to interact with deaf

and dumb person at places such as Shops, Hospitals, Police headquarters etc. Further implementation of our system will enable text and audio support with gesture recognition.

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