

MAJOR PROJECT 2
MID SEM REPORT
On
TITLE
AUDIO TO SIGN LANGUAGE TRANSLATOR
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Specialization in
Oil And Gas Informatics
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1 Project Title

AUDIO TO SIGN LANGUAGE TRANSLATOR

Abstract

This report presents a MOBILE-BASED SIGN LANGUAGE TRANSLATION DEVICE for automatic translation of Indian sign language into speech in English to assist the hearing and/or speech impaired people to communicate with hearing people. It could be used as a translator for people that do not understand sign language, avoiding by this way the intervention of an intermediate person and allow communication using their natural way of speaking.

The sign language gesture images are acquired using the inbuilt camera of the mobile phone; vision analysis functions are performed in the operating system and provide speech output through the inbuilt audio device thereby minimizing hardware requirements and expense. The experienced lag time between the sign language and the translation is little because of parallel processing. This allows for almost instantaneous recognition from finger and hand movements to translation. This is able to recognize one handed sign representations of alphabets (A-Z) and numbers (0-9). The results are found to be highly consistent, reproducible, with fairly high precision and accuracy.

- **KEYWORD** :- Mobile-based sign language, vision, audio, device, instantaneous recognition.

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2 Introduction

To improve the communication with the people who have hearing difficulties by using any sign language to express themselves. At the first sight, as an idea, it is difficult to make a sign language converter. After detailed research about sign language linguistics, it is figured out about 240 sign languages exist for spoken languages in the world. To show how tough it is to work with any sign language, the general information about sign languages is given briefly.

Sign Language (SL) is the natural way of communication of hearing and/or speech-impaired people. A sign is a movement of one or both hands, accompanied with facial expression, which corresponds to a specific meaning. Although the deaf, hard of hearing and hearing signers can communicate without problems amongst themselves, there is a serious challenge for the deaf community trying to integrate into educational, social and work environments. The overall goal of this project is to develop a new vision based technology for recognizing and translating continuous sign language to text. To paper presents a mobile interactive application program for automatic translation of Indian sign language into speech in English to assist the hearing and/or speech impaired people to communicate with hearing people. This sign language translator should be able to translate alphabets (A-Z) and numbers (0-9).

Although facial expressions add important information to the emotional aspect of the sign; but in this project work they are excluded from the area of interest, since its analysis complicates the already difficult problem. Our system aims at listening to deaf, which means that it could be used as a translator between deaf and people that do not understand sign language, avoiding by this way the intervention of an intermediate person. Both deaf and people that do not have hearing problems would communicate using their natural way of speaking.

3 Background Study

- In this Paper [1]Taner Arsan Pattern Matching for Automatic Sign Language Translation System using LabVIEW, International Conference on Intelligent and Advanced Systems 2007 : This paper presents an automatic sign language translator, which is able to translate Malaysian sign language using pattern-matching algorithm. The sign language translator is a vision-based system where the image of the sign is captured by a camera, processed and translated into English by the computer. This sign language translator is able to recognize alphabets (A-Z), numbers (0-9), finger spelling, words (13 words) and sentences.
- In this paper [2] Hastie & Daniel and Nasereddin 'Using Multiple Sensors for Mobile Sign Language Recognition', ETH-Swiss Federal Institute of Technology Wearable Computing Laboratory 8092 Zurich, Switzerland g@ife.ee.ethz.ch : We build upon a constrained, lab-based sign language recognition system with a goal of making it a mobile associative technology. We examine using multiple sensors for disambiguation of data to improve recognition accuracy. Our experiment compares the result of training a small gesture vocabulary using noisy vision data, accelerometer data and both data sets combined.
- In this paper [3] Sign language is a visual language that is used by deaf people as their mother tongue. Unlike acoustically conveyed sound patterns, sign language uses body language and manual communication to fluidly convey the thoughts of a person. It is achieved by simultaneously combining hand shapes, orientation and movement of the hands, arms or body, and facial expressions.
- In this paper [4] In recent years, research has progressed steadily in regard to the use of computers to recognize and render sign language. Technology is rapidly changing and improving the way the world operates. Barriers for people who are hard hearing are diminishing as projects of the past two decades have unfolded. Through the use of image processing, artificial intelligence and pattern matching techniques, researchers are striving to develop hardware and software that will impact the way hard hearing individuals communicate and learn. Using sign language hard speaking and hearing people could communicate among them and with normal people. Now-a-days voice calling-chatting and many facilities are offered for communication. Hard speaking and hearing peoples couldn't use these facilities effectively or fully. These people find difficulty in communicating with normal people. Our paper discusses solution to this problem and proposed a system for translation of sign language using mic in laptops or multimedia smart mobile phones.

4 Problem Statement

Since deaf people are usually deprived of normal communication with other people, they have to rely on an interpreter or some visual communication. Now the interpreter cannot be available always, so this project can help eliminate the dependency on the interpreter.

5 Objectives

- To provide information access and services to deaf people in Indian sign language.
- To develop a scalable project which can be extended to capture whole vocabulary of ISL through manual and non-manual signs

6 Methodology

- Audio input on a Personal Digital Assistant(PDA) using python PyAudio module.
- Conversion of audio to text using Google Speech API.
- Dependency parser for analysing grammatical structure of the sentence and establishing relationship between words.
- ISL Generator: ISL of input sentence using ISL grammar rules.
- Generation of Sign language with signing Avatar.

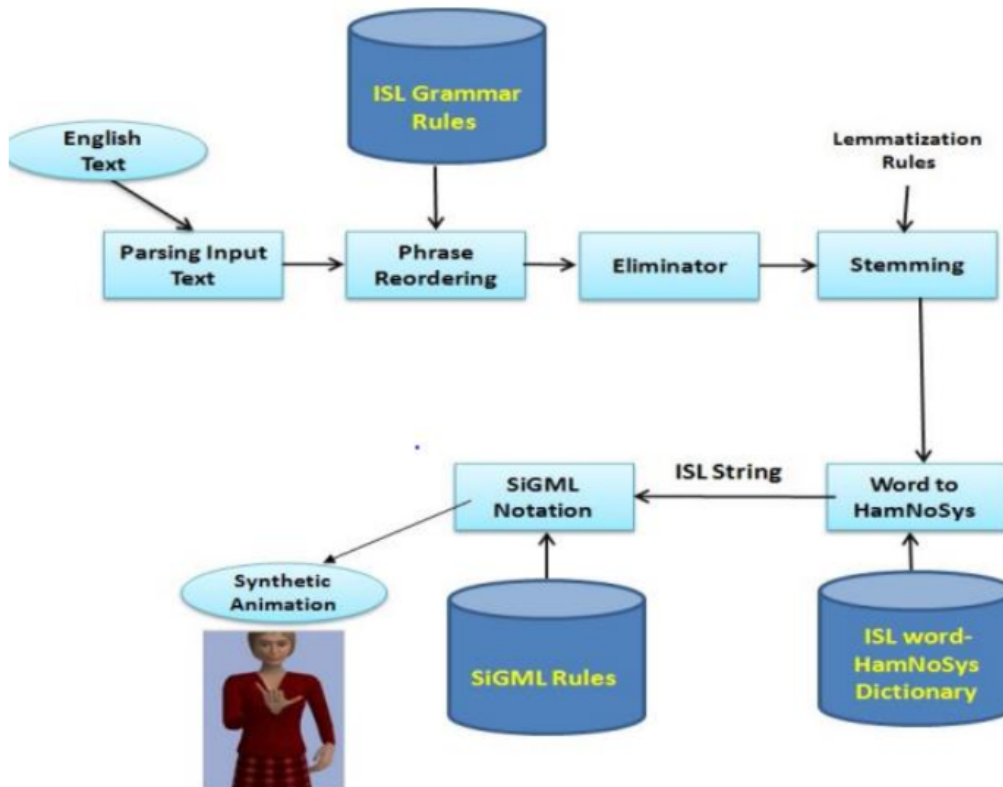


Figure 1: Workflow

6.1 Process Flow

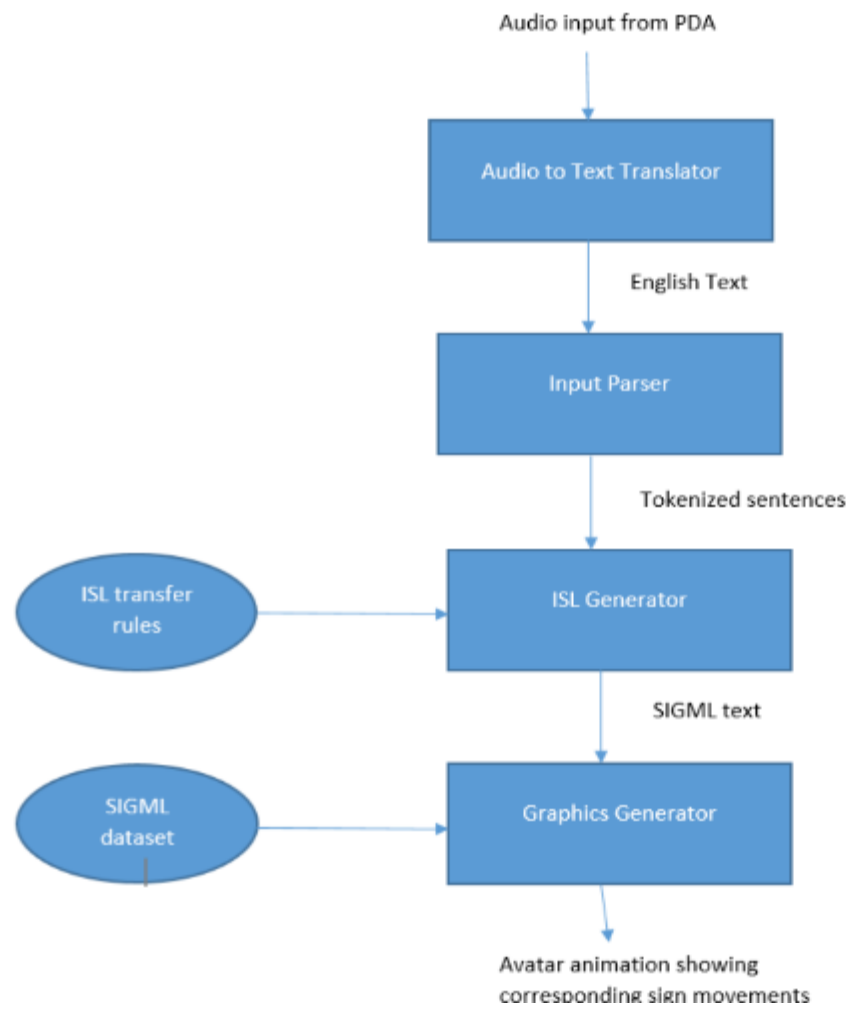


Figure 2: Process Flow

7 Implementation

7.1 Output Screen

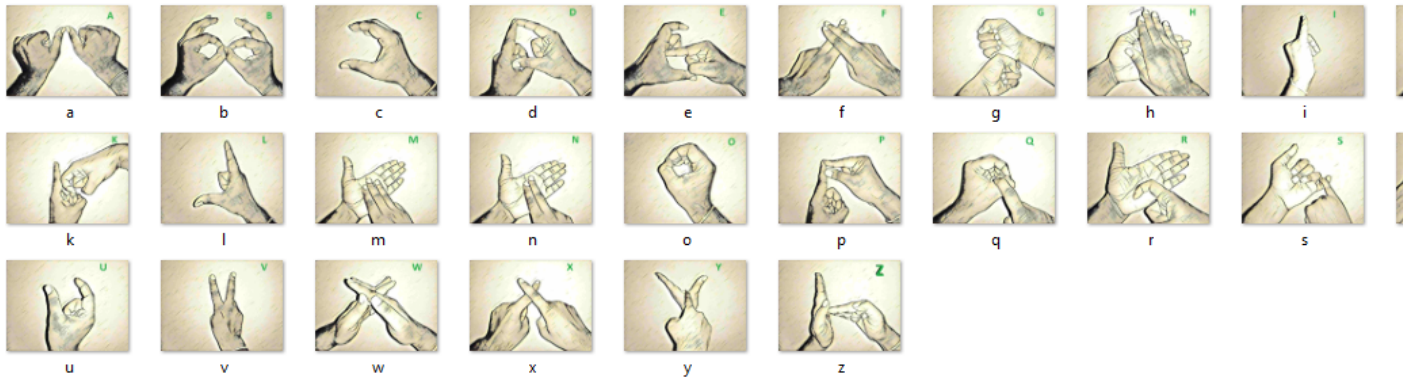


Figure 3: Alphabet Representation

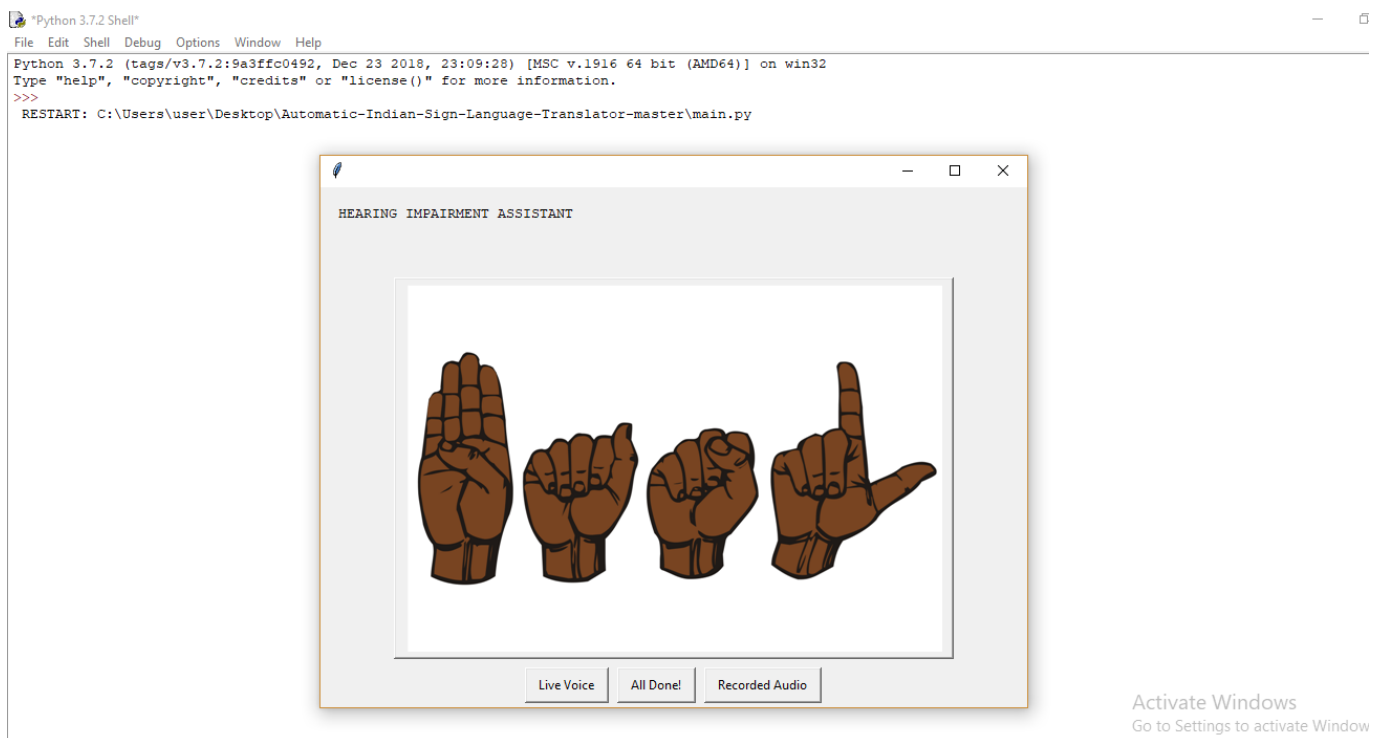


Figure 4: Hearing imapirment Assistant

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