Speech to ISL Translator

Swati Sangya, Juilee Sonalkar, Kritika Shahi, Ravi Prakash

Department of Computer Science, K.C. College Of Engineering and Management Studies and Research, Thane, Maharashtra, India

Abstract

Communication plays a critical role for people and is regarded as a skill in life. Having this important aspect of life and surroundings in mind, we present our project article, which focuses primarily on supporting patients with pain or silent speech. Our research work leads to improved contact with the deaf and the mute. Each sign language uses sign patterns visually conveyed to express the true meaning. The combination of hand gestures and/or motions of arm and body is called Sign Language and the Dictionary. It is the combination of hands and facial expressions. Our program project is able to understand signals in sign language. These symbols may be used to interact with hearing aids. Our article suggests a program that allows common people to interact effectively with others that are hard to understand. In this case, we are implementing the Indian Sign Language (ISL) method by using a microphone and a camera. Translation of the voice into Indian sign language system by the ISL translation system is possible. The ISL translation framework uses a microphone to get pictures (from ordinary people) or continuous video clips, which the application interprets.

1. INTRODUCTION

Sign language is a language that consists of signs made with hands and other movements, facial expressions and postures of body, which is primarily used by people who are deaf or hard hearing people so that they can easily express their thoughts or can easily communicate with other people. Sign language is very important a far the deaf people are concerned for their emotional, social and linguistic growth. First language for the deaf people is sign language which get proceeded bilingually with the education of national sign language as well as national written or spoken language. There are different communities of deaf people all around the world therefore the sign language for these communities will be different. The different sign languages used by different communities are: America uses American Sign Language, Britain sign language is used by Britain, similarly, India uses Indian sign language etc. for expressing thoughts and communicating with each other. Manual communication and body language is used by Indian sign language to convey thoughts, feelings and ideas. ISL is classified into two classes: manual and non-manual signs. One handed and two handed are part of manual sign where the information is being conveyed by the signer using his/her hands to make the sign.

2. RELATED WORKS ON TRANSLATION

A movement made using part of body, especially using hands, arms, face, head to express meaningful information or emotions is known as gesture. Gesture recognition is valuable in applications that involves human machine interaction. Tools used to survey gesture recognition is Hidden Markov models (HMMs), particle filtering and condensation model and finite state machine (FSM).The sign language translation system converts speech to sign. Speech recognizer is used for decoding the spoken voice into word sequence and to converts that word sequence into sequence of signs a natural language translator is used.

2.1. Speech to Sign Translation

Speech is taken as an input by a normal person using a microphone of a cellular phone or computer. For voice signal to be of good quality it will be sent for voice removal. With the help of a trained voice database, voice to text conversion takes place i.e. voice is converted into text by text recognition module. Meanings and symbols are found by comparing the database and converted text and then the sign symbols are displayed with text to hard hearing person.
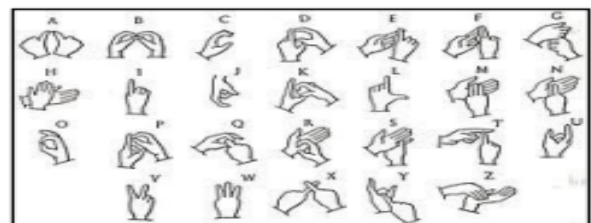

Figure 1: Indian Sign Language Alphabet Series

2.2. Noise Removal

Noise removal is the process of removing the unwanted noise or any absurd noise from the input data which is in takes in terms of speech. Different types of noise removal techniques are Filtering technique, spectral restoration and many more. Modulation detection and synchrony detection are the two noise removal techniques. Since the speech from the user or the normal person is taken using a microphone of computer or a cellular phone clarity of sound may not be guaranteed therefore it is sent to the noise removal.

3. DATABASE AND DOMAIN

The project is domain specific and comprises preinstalled objects that add to being compact and accessible both for deaf-mute and regular people.The framework of ISL Translator is, therefore, very useful every day because it widely supports the trends and assists them in interacting with a ton of facilities. When discussing implementations, a professional has earlier translated the original database into ISE when an ISL encoding was created. The recently identified 416 pairs have already been randomly split into two different sets: 266 for training and 150 for study. It has contributed to the creation of a new dictionary based on these two sets and is currently used to describe and understand it.

3.1. Rule Based Text to Sign

And now the voice in the form of text is acknowledged. Here we will use a module of voice-to-text conversion which now gives text output. The technique based on the rule can be used to provide text-to-sign output. This step dictates the relationship between the text and the sign. An expert hand defines the relation between signs and words in this case. The translation analysis is performed individually in a bottom-up approach by starting from each word and expanding the research to the neighborhood background terms or already-formed signs (nominated blocks generally). The bottom-up extension consists of finding some unique combinations of words and/or signs (blocks) that create another symbol and thus a sequence of images that is a sentence of the translated output.The module provides a set of 153 rules for translation.
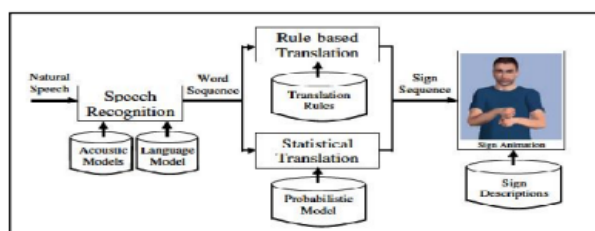

Figure 2: Speech into ISL Translation

4. METHODOLOGY

We propose a framework that supports ISL translator speech in this paper. Since the dumb / mute group finds it hard to connect with people and their world in any way possible, this program should support them. This article addresses an issue with communication the next day and thus suggests a program that helps the community in interpreting the sign language using a laptop microphone or a multimedia solution in smart cell phones. This paper contains information about the communication.

Audio to Indian Sign Language Translator is a proposed software system implemented using python programming language, machine learning, artificial intelligence and natural language processing.

Audio input using python PyAudio module.

The audio which has been recorded with the help of Pyaudio it is then converted using speech recognizing library or we can use the Google speech API (application program interface)

Dependency parser helps in recognizing the grammar or analyzing the grammatical structure of a particular sentence ,it helps in establishing relationship between words and the words which modify those words.

Text divider then divides the text using natural language processing which removes uncertainty or disambiguate input sentence to produce machine representation language.

With the help of data sets available we can now generate the output as a video.

5. SIGN CONVERSION MEASURE

The translation module holds one confidence value for each sign on generating: the value loiters between the 0.0 (lowest confidence) and 1.0 (highest confidence) values. The speech recognizer helps to gain sign confidence that is ultimately measured by word trust. An internal procedure is performed to measure the trust, coded inside exclusive language Interpreter executing rules of the translation module. In complex cases, confidence in the created signs depends on weighted combinations of confidence in the mix of words / internal / final signs. For the terms or principles considered in the law, this sort of combination will consider different weights. The expert decides certain weights when coding the law.

6. OCCURANCE OF DELAYS

The pause between the spoken utterance and hence the animation of the sign sequence is one of the most important things to remember during a speech to signing translation scheme. One This delay is around 1–2 s and the interaction slows down. In order to minimize this delay, the speech recognition system has been updated to record partial results of recognition every 100ms .Such partial tests are

translated into partial sequences of signs which are animated without having to attend until the top of the pronunciation. Our program achieves a 40 per cent delay reduction without impacting the efficiency of the interpretation process.

7. CONCLUSION

Deaf people use sign language as their first conversation language or people that take birth in deaf families. transcription becomes their second priority. These people like better to access information in sort of signing only. Providing information in sort of video clips is extremely expensive so sign animation may be a promising approach. Therefore during this project, we've tried to develop a system that might be helpful for the disabled people having communication difficulties with hard hearing and speaking for expressing themselves clearly and simply. Our model successfully converts the whole audio input sentence or word into text using speech-to-text API then using the semantics of tongue Processing to breakdown the text into smaller understandable pieces which need Machine Learning as a neighbourhood . Finally Data sets of predefined signing are used because the input in order that the software can use AI to display the converted audio into the signing for more development on this track are often done because the ISL dictionary remains small and wishes to grow eventually on process performance.

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