

AUDIO TO SIGN LANGUAGE TRANSLATOR

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Abstract - An Audio to Sign Translator is a software that converts spoken language into sign language, allowing individuals to communicate more easily with a person who are deaf or hard of hearing. The software use speech recognition technology to analyze speech and generate the corresponding signs in real-time. The translated sign language can be displayed on a screen or projected onto a surface ,and can also be transmitted to a remote location via the internet .The goal of an Audio to Sign Language Translator is to improve communication accessibility and bridge the gap between normal person and deaf or head of hearing.

Index Terms – Natural Language Processing (NLP), Natural Language Toolkit (NLTK), Porter Stemming Algorithm (PSA), Unified Modelling Language (UML), Data Flow Diagram (DFD), Part of Speech (POS)

I. INTRODUCTION

An audio to sign language translator is a software that converts spoken language into sign language. The goal of such a translator is to make communication easier for people who are deaf or hard of hearing, as well as for those who are not fluent in sign language. There are different approaches to building an audio to sign language translator. It's important to note that there is no universally accepted sign languages and it's important to consider the local context and culture. Despite these challenges, the development of audio to sign language translators has the potential to greatly improve communication for people who are deaf or hard of hearing, and to help break down barriers between people who speak different languages. 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 lack of hearing peoples that they can easily express their thoughts or can easily communicate with other people. The different sign languages used by different communities are: America uses American Sign Language, Britain sign language is used by Britain, India uses Indian sign language etc. For expressing thoughts and discussing with each other. Oral communication and body language is used by Indian sign language to convey thoughts, feelings and ideas. ISL is classified into two classes: automatic and non-automatic 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.

II. LITERATURE SURVEY

“**Audio to Sign Language Translation**” year of publication on April 2020 by Ankita Harkude and Sarika Namade.

In this paper, this application takes speech as input, convert it into text and then display Indian sign language an images. Output for a given English text is produced by generating its equivalent sign language duplication [3].

“**Audio to Sign Language translator using python**” Year of Publication on March 2020 by J. Sathya Priya and E. Ghanishka.

In this paper, the project is based on converting the audio to signals receiver to text using speech to text API. This was meant to be a prototype to check the feasibility of recognizing sign language and the text will be converted to sign images [4].

“**Speech to Indian Sign Language Translator**” Year of Publication on December 2021 by Hemang Monga and Jatin Bhutani.

In this paper, the audio is taken as a input and playing it using YouTube IFrame API, with the help of tokenization concept [5].

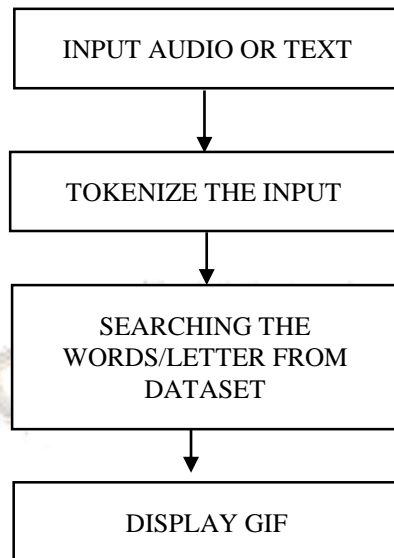
III. Existing System

Although sign language is used across the world to transit the gap of communication for hearing or speech impaired which depend mostly on sign language for day to day communication, but there are not efficient models that convert text to Indian sign language. There is a lack of precise and effective audio visual support for oral communication. While significant progress has already been made in computer recognition of sign languages of other countries but a very limited work has been done in ISL mechanization. Work done so far in this field been much more focused on American Sign Language (ASL) or British sign language (BSL), but for Indian sign language, systems that have been developed are very few.

IV. Proposed System

Few projects have been done to generate a system that is based on the above concepts listed in the existing approaches and accumulation to Indian sign language. Thus we propose to develop an Indian sign language based on text or speech based translation. The success of this system will depend on the conversion of text to Indian sign language display its lexical and syntactic knowledge. Our aim is to help people suffering from the problem of deafening. In this it takes audio as input, display the text on screen and finally it gives GIF as a input. All the words in the sentence are then checked against the words in the dataset containing videos and GIFs representing the words. If the words are not found, it splits the words into an individual latter and show the corresponding videos/clips which are predefined in the system.

In this section we will discuss about our project. Our system consists of four main steps: input audio or text, tokenizing the input, searching the words/latter form dataset and display videos/clips.



V. Methodology

Text Input

User given text as an input and converted into Indian sign language.

Speech Recognition

The speech is received as an input from the microphone of our system. This project is done using the Python package PyAudio. PyAudio that is used to record audio on a variety of platforms. The audio we received is converted into text using Google Speech Recognizer API.

Pre-processing of Text

The filler words which are used to fill the gap in the sentence are apparently lesser- meaning words. They provide less context to the sentence. There are around 30+ filler words in the English Language which hardly makes sense in the sentence. So, the system removes the filler words from the sentence and makes it more meaningful. By removing these words, the system will save time.

Porter Stemming Algorithm

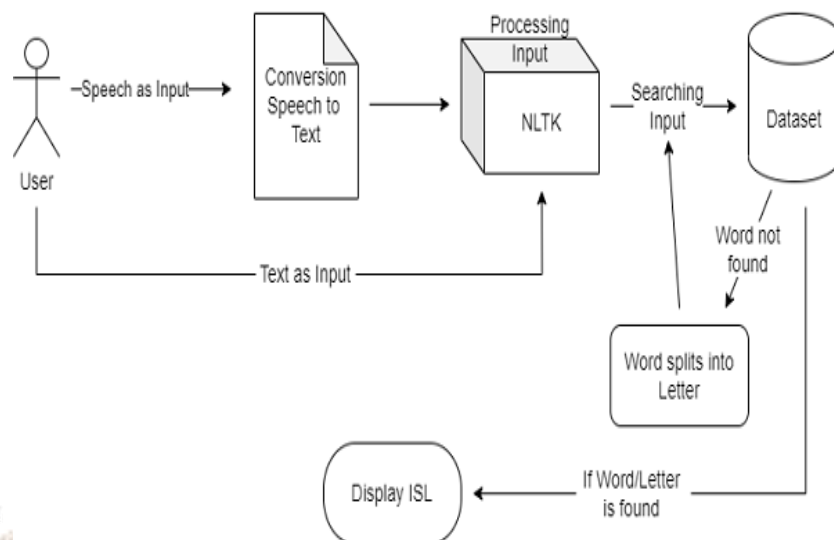
Porter Stemming algorithm provides a basic approach to combine that may work well in practice. Porter Stemming algorithm is one of the Natural Language Processing techniques. It is mainly used for data mining and to collect information. It generates best results than any other stemming algorithms. It has less error rate. The system removes the acceptable and flexible endings of the English words. The system use Porter stemming Algorithm to remove the commonly used suffixes and prefixes of the words and find the root word or original word. For example, the Porter stemming algorithm reduces the words “unhappy”, “happily” to the root word “happy”. Because of this stemming algorithm, we are able to reduce the time complexity for searching the sign language for the given word.

Text to Sign Language

The system emphasize through every word in the processed text sentence which is received from the previous steps and searches the corresponding sign language GIF in the local system. If the word is found, the system shows the output as a GIF. If the word is not found in the local system, then it splits the sentence into letters or words, according to letters the sign GIF will play.

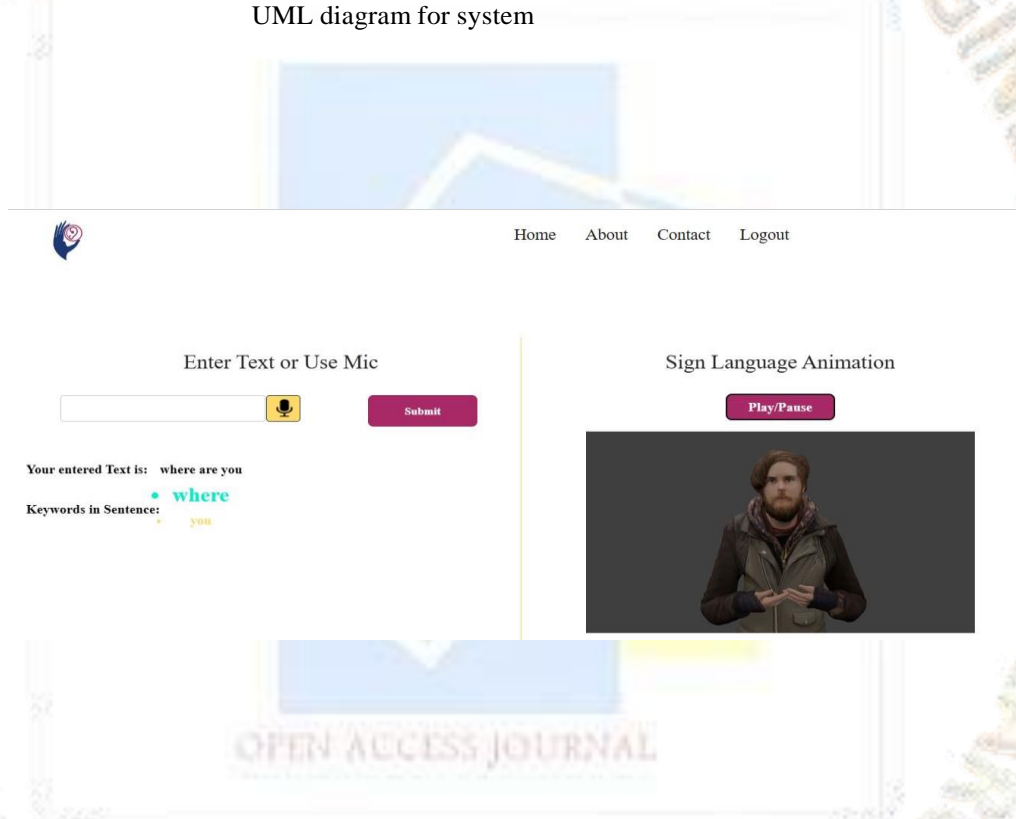
VI. Design Details:

UML diagram



UML diagram for system

VII. Result



VIII. Conclusion

In conclusion, an Audio to Sign Language Translator is a software that converts spoken language into sign language, allowing individuals to communicate easily with a person who are deaf or hard of hearing. The proposed system uses a combination of speech recognition, natural language processing, and to analyze speech input and generate the corresponding sign language output. The system will have a simple and interactive user interface and will be in English language translator. The proposed system has the potential to improve communication accessibility and bridge the gap between hearing and non-hearing individuals. It can be used in a various sector such as educational institutions, workplaces, and public spaces to facilitate communication between hearing and non-hearing individuals. Deaf people understand sign language only but when normal (non-deaf) people wants to communicate with deaf peoples then they have to face many problems, So this system will work as communication between normal people and deaf peoples, it converts the audio or speech into sign language which is understandable by deaf peoples. Sign language translator is very useful in different fields, from industrial aspects to the institute level also in commercial sides and anywhere anyone can take advantage of the system in order to communicate with each other. It makes communication between a normal person and deaf person easier.

IX. References

- [1] <https://www.geeksforgeeks.org/>
- [2] <https://ieeexplore.ieee.org/>
- [3] A. Harkude, "Audio to sign language translation for deaf people", (IJEIT), ISSUE 10 April 2020.
- [4] J. Sathya Priya, "Audio to sign language translator using python", (IJSEAS), ISSUE 6 June 2020.
- [5] Hemang Monga, Jatin Bhutani, "Speech to Indian Sign Language Translator", (IJSEAS), ISSUE December 2021.

