



Vidyavardhini's College of Engineering & Technology
Department of Computer Science and Engineering (Data Science)
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Audio/Text To Sign Language Translator

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Abstract :

This paper proposes an audio-to-sign language translator that aims to improve communication between the deaf and hard-of-hearing communities and the rest of society. The problem addressed in this paper is the lack of accessibility to spoken language for deaf individuals. The definition of the proposed system is a machine learning model that translates spoken language into sign language through a video output. Sign Language consists of hand movements and arm and body motions. Our method enables ordinary individuals to engage effectively with those who are difficult to understand. The methodology of this project includes collecting and preprocessing a large dataset of spoken and sign language samples using natural language processing and NLTK. Finally, the argumentation of this paper is that the proposed system can help bridge the communication gap between the deaf and hearing communities and promote inclusivity and accessibility in society.



Methodology :

Data Collection: The first step in developing a text-to-sign language translator is to gather data. This involves collecting text and corresponding sign language translations from a variety of sources, including books, websites, and videos. The data should be diverse and representative of the sign language being translated.

Data Preprocessing: To make the collected data suitable for a machine learning model, preprocessing is required. To do this, the data must be cleaned, and get rid of any useless info, and the text must be tokenized into individual words. The data for each sign language phrase has to be preprocessed by determining the appropriate gestures or stances.

Model Development: The next step is to develop a machine learning model that can translate text to sign language. There are several different approaches that can be used, including rule-based systems.

Model Training: Once the model is developed, it needs to be trained on the preprocessed data. This involves feeding the model pairs of text and sign language translations and adjusting the model parameters to minimize the translation errors.

Deployment: Finally, the model can be deployed in a production environment. This involves integrating the model into a user interface, such as a mobile app or website, and making it accessible to users.



Technical Terms :

- 1. Rule-based approach :** A rule-based approach in machine learning involves using a predefined set of explicit rules and conditions to make decisions or perform tasks, typically without relying on learning from data. It is a deterministic method that relies on human-crafted rules to guide system behavior or decision-making.
- 2. NLTK :** NLTK, or the Natural Language Toolkit, is a widely used Python library for natural language processing and text analysis. It provides a wide range of tools, resources, and algorithms for working with human language data, making it a valuable resource for tasks like text processing, text classification, and language understanding. Researchers and developers often use NLTK for various NLP applications, thanks to its comprehensive functionality and ease of use.
- 3. Tokenization :** The process of breaking down text into smaller units called tokens, which can be words, subwords, or characters, to facilitate language model processing.
- 4. Stemming :** Stemming is a text processing technique used in natural language processing to reduce words to their root or base form, which can involve removing prefixes or suffixes. It is employed to improve text analysis by simplifying words to a common form for more accurate information retrieval and analysis. For example, "jumping" and "jumps" stem from "jump."



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5. Lemmatization : Lemmatization is a text analysis technique in natural language processing that reduces words to their base or dictionary form, called a lemma. Unlike stemming, lemmatization considers the word's meaning and context, ensuring that the resulting word is a valid word found in the language's dictionary. For example, "running" is lemmatized to "run," which preserves the word's core meaning.