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AUDIO TO SIGN LANGUAGE USING PYTHON, DJANGO, SQLITE

[1]Nadiminti Venkateswarulu, [2]M Anusha Sri, [3]Gundoju Sai Sathwik, [4]Simhadri Sai Raju
[1]Ug scholar, [2]Assistant Professor, [3]Ug scholar, [4]Ug scholar
[1]CSE Data Science,
[1]Geethanjali College of Engineering and Technology, Hyderabad, India

Abstract : In this project article the main focus is, on discussing the importance of communication for individuals facing challenges with speaking or hearing. The emphasis is on improving interactions with mute individuals by using sign language as a form of communication. Sign language, which involves hand movements and facial expressions serves as a way to convey messages. The goal of the program is to bridge communication gaps by interpreting sign language gestures making interactions more effective for those who're not familiar with sign language. Specifically the project utilizes Indian Sign Language (ISL) techniques. Incorporates a microphone and camera for implementation purposes. ISL translation system in place spoken words are translated into sign language making communication easier for individuals. The system transforms spoken messages into text and shows ISL images or GIFs to simplify conversations between hearing and deaf individuals. The project is based on converting signals into text using speech to text APIs that cover vocabulary sizes ranging from small to large conversions. A comparative review of these technologies is carried out to assess their advantages and drawbacks. Additionally the text explores how language models can enhance the accuracy of speech to text conversion, in environments or when dealing with words.

IndexTerms : Natural Language Processing (NLP), Lemmatization, Localhost, Punkt.

INTRODUCTION

There has been an increasing interest, in developing technologies to enhance communication between individuals who're deaf or hard of hearing and those who can hear. One notable advancement is the creation of an Audio to Sign Language Converter, which translates spoken language into sign language gestures. This innovative tool has the potential to improve communication and facilitate interactions among people with varying hearing abilities.

The Audio to Sign Language Converter utilizes machine learning and computer vision techniques to analyze language and generate sign language gestures. Python, an used programming language is often employed for implementing this converter. By utilizing Python libraries and frameworks a dependable and accurate system can be developed to interpret language and produce sign language output.

Key components of the Audio to Sign Language system include:

1. Speech Recognition; The system converts spoken language into text using speech recognition techniques. Python libraries like Speech Recognition help in capturing and transcribing input.

2. Natural Language Processing (NLP); Following transcription NLP techniques are used to understand the meaning and context of the input message. Python libraries such as NLTK (Natural Language Toolkit) provide tools, for natural language processing tasks like identifying parts of speech parsing sentence structures and analyzing meanings.

When converting spoken words, into hand movements for sign language the system starts by analyzing the speech before creating the corresponding gestures. It uses computer vision techniques to detect and track body movements focusing on hand and body gestures. Python libraries are employed to process images and videos accurately to generate sign language motions.

To improve user interaction the system features a user interface developed with Python frameworks like Tkinter or PyQt in addition to Django. These frameworks empower developers to craft interfaces that enable users to input spoken language and observe sign language movements.

The Audio to Sign Language Converter shows potential in enhancing communication accessibility for individuals with hearing impairments. By leveraging Pythons array of libraries and frameworks developers can establish a system that translates spoken language into real time sign language gestures. This advancement holds promise in breaking down communication barriers and fostering inclusivity for individuals dealing with hearing challenges in areas such, as education, healthcare and social interactions.

PROPOSED SYSTEM CONFIGURATION

Our goal is to help people with hearing difficulties by introducing a technology; an audio, to sign language translator created using Python. While many projects have focused on converting sign language input into text or audio output, systems that translate audio into sign language are not as common. They offer benefits to both deaf and hearing individuals. Our system takes in input uses the Google API to transcribe the recording displays the text on screen and generates sign language using the Sign Language (ISL) generator. Each word in the sentence is matched with animations from a dictionary that represent the words with synonyms used for any words not found. Various models have been proposed recently for sign language and hand gesture recognition; however they often lack accuracy and aesthetic appeal. With an increasing number of individuals with disabilities developers are actively exploring ways for interaction between non disabled individuals.

Current systems typically require text input. Then convert it into sign language displayed as images resulting in user interaction options, customization capabilities and overall user friendliness. In contrast our project aims to create a system that can listen to users by accepting both text inputs for conversion, into sign language.

This method is user friendly and easy to understand, for those who may have difficulty reading or have needs. The system takes words. Converts them into written text using NLTK (Natural Language Toolkit) then applies NLP (Natural Language Processing) techniques to analyze and comprehend the text by breaking it down into smaller parts to find corresponding sign language animations. Of presenting images as before the system now shows sign language animations in MP4 format creating a lifelike experience for users. Our proposed system has the benefit of handling both spoken and written inputs displaying animations for words that were not part of the training data. It operates quickly reliably and significantly enhances user experience with sign language animations. By bridging the communication barrier between those with hearing abilities and those who are hearing impaired our system ensures access for all by showcasing animations, than static images.

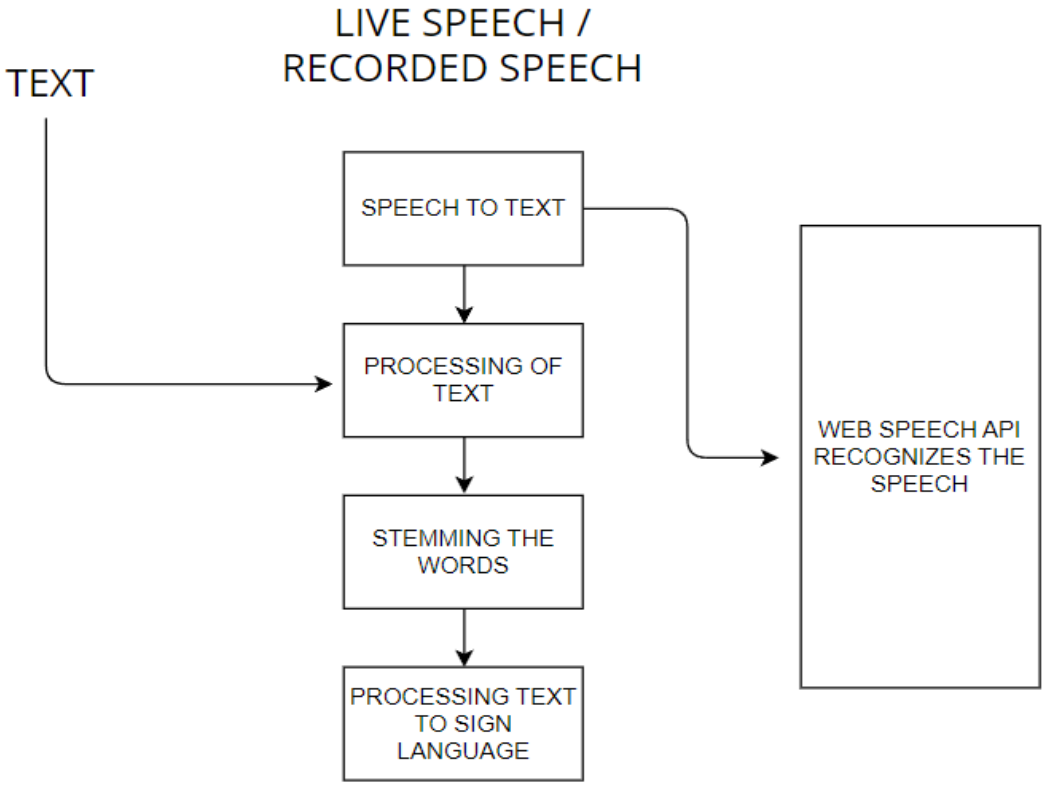

Fig.1 Block Diagram of proposed system

A block diagram is a diagram, in the Unified Modeling Language (UML) that illustrates the framework and makeup of a system or part. It offers an overview by dividing the system into interconnected blocks or sections each representing a function or aspect. These blocks are usually shown as boxes with lines showing how they are connected and interact. Block diagrams act as a tool to grasp the structure of a system, its parts and how they relate to each other playing a role in system planning, evaluation and communication, with stakeholders.

Fig.3 SignUp page

Fig.4 Login Page

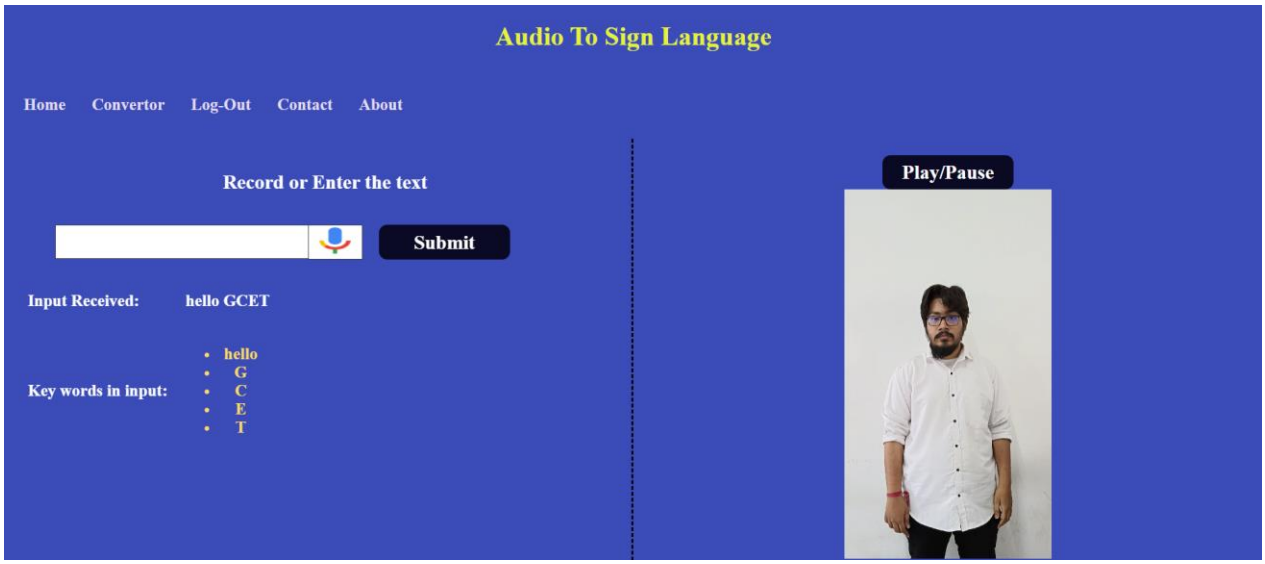

Fig.5 Converter Screen

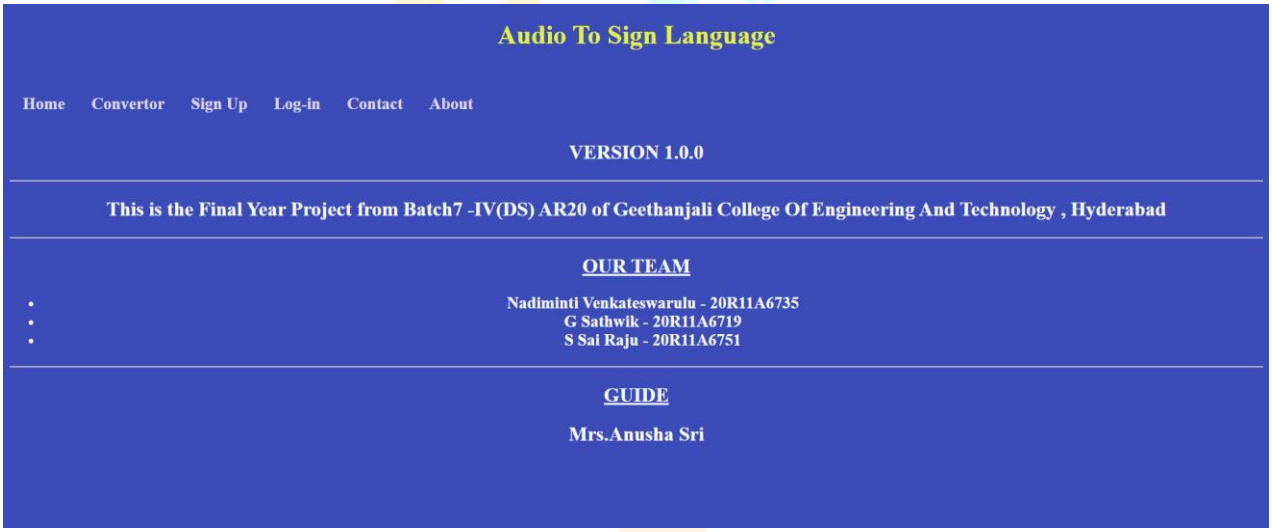

Fig.5 About

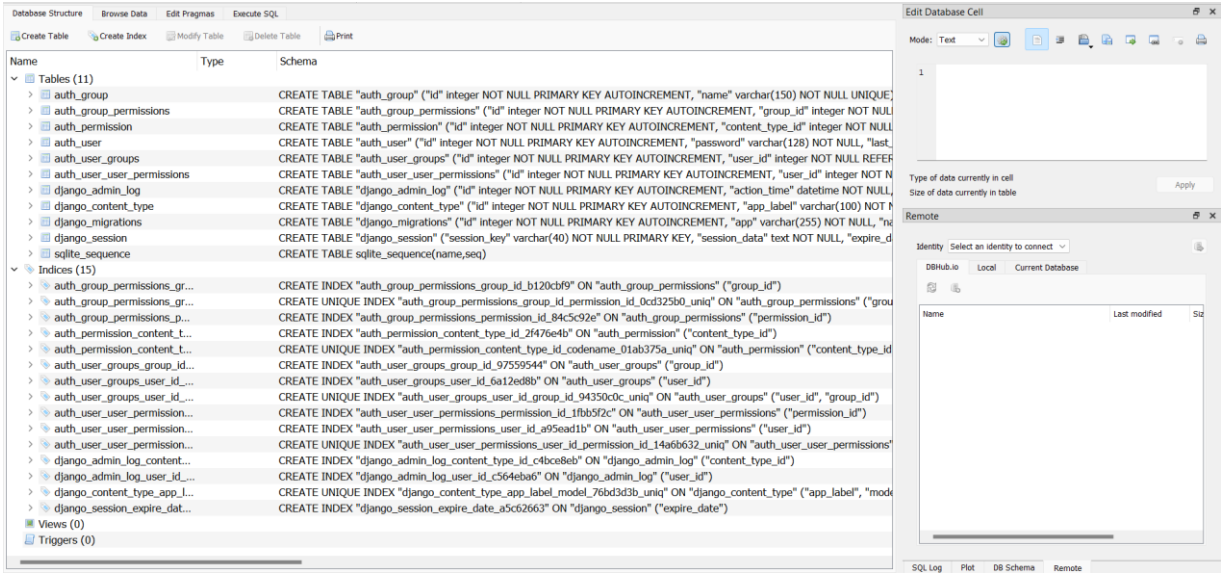

Fig.6 Table Schemas

CONCLUSION

This new program effectively uses technology to help people, with disabilities communicate better promoting inclusivity and empowerment. By using the web speech API it can accommodate input methods to suit user preferences. Additionally by

including video output for sign language it improves understanding and clarity for users. Its flexibility makes it beneficial in environments enhancing learning experiences for students with disabilities. When used in spaces and government platforms it encourages access and inclusivity contributing to a more united society. Essentially this program showcases how technology can positively impact accessibility and communication, for everyone regardless of their abilities or obstacles.

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