SIGN LANGUAGE CONVERTER

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Abstract: This Paper's objective is about providing ease who have hearing problems. This research paper solves the constraint and acts as the bridge between normal people and especially abled (hearing problem) for the sake of communication. Motion capture system and voice recognition system are used for the implementation of the same. Motion capture system will be used and the gestures will get converted into text format and there will be a voice over for that text. In similar act voice recognition system will get converted into text and a gif or a video will be shown for the command.

*Keywords***:** Sign language converter, machine learning, voice recognition, natural language processing, motion capture, motioned image, artificial intelligence.

I. Introduction

Aim of this paper is enabling the especially able user to communicate with the aid of technology, which uses the gestures or movement of hands to express them; speeches for their expressions will be there with the help of this system. As the study says 240 sign languages exist for spoken language around the globe. Although different origins use their own specific sign language.

This project will convert audio signal to text using different technology. Then NLP (Natural language processing) will be used to convert the text into small pieces. For the input predefined data sets of sign language are used according to the geographical location.

On the other end motion capture system will detect the gesture format and whichever data set it gets matched with, will provide the voice over for the system.

II. Sign language

Especially abled people use sign language for the communication process; they use physical gestures and facial expression, movement of body parts to convey their sayings.
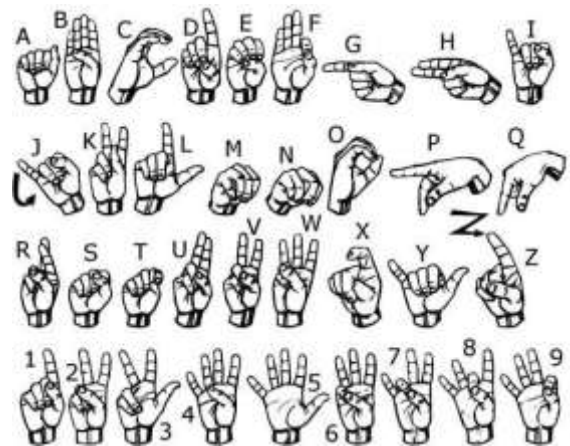

Fig1. American Sign Language (ASL)

The idea of this project evolves from the phonology. Human speech possess physical sounds and phonology is the science considerate about it, the pieces or the elements which are supposed to be taken into account for communication are called phonemes, like hand movements. Certain parameters are there for this process some of which are:

1. Configuration
2. Orientation of the hand
3. Position
4. Motion
5. Contact point
6. Plane
7. Non manual components.

III. Technical specification

As the project is regarding the conversion of sound signals into linguistic communication and the other way around the method concerned within the system uses artificial intelligence, machine learning, natural language processing, Python modules or Google API.

Artificial Intelligence:

It is simply empowering the machines to do some tasks that are only possible with human mind like comprehension and understanding things only with their references.

Machine learning:

It is like the assistant feature for artificial intelligence which has the feature of learning or gathering useful information for the task execution without being separately programmed. With the persistent execution of programs it can store useful information and can act with that as human being.

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Natural language processing:

Natural language process may be a branch of AI that deals with the interaction between computers and human.

IV. Methodology

Three basic elements of methodology are:
1. Dataset
2. Performance capture procedure
3. Voice recognition procedure

4.1 Dataset:

Dataset consists of the Words meant for speech recognition, .gif extensions image (moving image) and motions.

4.1.1 Words Meant for Recognition of speech:

For recognition process 50 words are considered. In which there are thirteen personal pronouns, three question words, five adjectives, 14 verbs, twelve nouns and three affirmative.

4.1.2 Gif Extensions Image:

In this part, .gif images are used to display on the screen to show the proper meaning of the text. For example, if the user wants to say "I am a doctor", the system will display given images.

fig2. "I am"

4.1.3 Gesture:

This system will capture motions and convert them to text. For instance, if the user wants to mention "I am good", gesture will be:

Fig4. "I am"

Fig5. "Good"

4.2 Performance Capture Procedure:

In this step motion capture system observe the gesture format and whichever dataset it get matched with can offer its text, then this text is used to provide voice over the system so that other user can understand.

4.3 Voice recognition procedure:

In voice recognition procedure audio signal is regenerate into pictures. First, the user records the voice then python modules square measure used for the conversion of audio signal to text then this text is split into smaller items mistreatment language process (NLP), then this can be provided as associate input to such as datasets and so it's matched with correct .gif pictures then those .gif pictures square measure displayed over the system in order that the opposite user can perceive.

V. Conclusion

This system will be used to act as an interpreter between an especially abled person (person with the hearing problem) and an ordinary person.

The program has two parts. The first part is the conversion of voice signals into sign language. It converts the voice signal into text. Then natural language processing takes that text and converts it into small pieces. For the input predefined datasets of sign language are used.

The second part is the conversion of sign language into voice signal for that motion capture system is used which detects the gesture format and whichever dataset it get matched with, will provide the voiceover for the system.

This project accesses the broad use of sign languages and an enhancement for the people who are challenged. Some of the areas where it will be most useful are education institutions, hospitals, colleges, airports, social service agencies, briefly almost everywhere.

When there will be a working implementation of the project it will be somewhat possible for two people with different languages to communicate, at least on a basic level.

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