Speech and Text to Sign Language

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Abstract: *Sign languages are known as a natural means for verbal communication of the deaf and hard of hearing people. There is no universal sign language, and almost each country has its ownnationalsignlanguageandfingerspellingalphabet.Signlanguagesusevisual-kineticcluesforhuman-to-human communication combining hand gestures with lips articulation and facial mimics. They also possess a special grammar that is quite different from that of speech-based spoken languages. Sign languages are spoken (silently) by a hundred million deaf people all over the world and the most popular are American (ASL), Chinese, Brazilian, Russian, and British Sign Languages; there are almost 140 such languages according to the Ethnologies. They do not have a natural written form, and there is a huge lack of electronic resources for them, in particular, vocabularies, audio-visual databases, automatic recognition and synthesis systems, etc. Thus, sign languages may be considered as non-written under resourced spoken languages.*

Keywords: Sign language; communication of deaf people; unwritten languages; multi-modal synthesis system; under-resourced languages

I. INTRODUCTION

Talkback project is aimed to design an application that converts the speech and text input into a sequence of sign language visuals. Speech recognition is used to convert the input audio to text and it is further translated into sign language. Natural Language Processingalgorithms are used for word segmentation and extraction of root words. Normal people will find it difficult to communicate with hearing-impaired people. To break the barrier of communication between normal and hearing-impaired people, the Speech to SignLanguage translator is used. This translator makes the interaction simpler and faster for normalpeople to convey their ideas to hearing-impaired people. The translator converts speech or textto Sign Language using Natural Language Processing algorithms. Thus, the system is used to overcome the hurdles faced by normal people to share their thoughts with hearing impaired people and it will be an ear for the hearing-impaired.

II. PROBLEM FORMULATION

The deaf are a growing population of every nation. Communication with this group of people is a problem with just one solution, that of sign language. The deaf learn to communicate withthe hearing through this dialect, if it may be called so, with a grammar and style of usage of itsown. However, the ratio of deaf people to those who can interpret sign language is one of concern, with an average of 93:1 in the US. The goal of this project is to benefit the deaf, whosign language is a prerequisite to communicate with, in the absence of interpreters who can translate to and from sign language and spoken languages. Hence, it greatly benefits the deaf who wish to lead a normal day-to-day life, performing activities like face-to-face interaction with a government employee, etc.

III. LITERATURE REVIEW

Almost 72 million of the world's population is of deaf/mute people as per the report published by the World Federation of the Deaf. Sign language is a fundamental human right for deaf people, from which it is possible to achieve all other human rights. There are over 240 sign languages for spoken language around the world. The deaf are a growing population of every nation. Communication with this group of people is a problem with just one solution, that of sign language. The deaf learn to communicate with the hearing through this dialect, if it may be called so, with a grammar and style of usage of its own. The goal of this project is to benefit the deaf, who sign language is a prerequisite to communicate with, in the absence of interpreters who can translate to and from sign language and spoken languages. In

the US, the number of deaf and hard of hearing people is estimated to be more than 8.6% out of the whole population wherein 5.6% out of them are in the age vicinity of 3 to 34 years old. The commercial market was and still working on developing software that could fill the gap between deaf and no deaf communities in the sense that it facilitates the communication amongst them and helps deaf people to improve their quality of life through translating the spoken speech to text and sign language.

IV. METHODOLOGY

Sign Language is a communication system using gestures that are interpreted visually. Many people in deaf communities around the world use sign languages as their primary means of communication. These communities include both deaf and hearing people who converse in sign language. But for many deaf people, sign language serves as their primary, or native, language Speech to Sign Language project is aimed to design an application that converts the speech and text input into a sequence of sign language visuals. Speech recognition is used to convert the input audio to text and it is further translated into sign language. Natural Language Processing algorithms are used for word segmentation and extraction of root words. It consists of a speech recognizer that converts spoken sentences into utterances and silences, and recognizes it as text- a sequence of words, and a video displaying the sign language interpretation of the spoken sentence.

The various phases of the model are as follows:

- Requirements
- Design
- Development and Coding
- Integration and Testing
- Implementation and Deployment
- Review

4.1 Technology Used

- Python
- NLYK ALGORITHM
- db sql lite
- HTML, CSS, JAVASCRIPT

V. CONCLUSION

The Talkback using DNA storage project is mainly focused to help people among us, they face problem in communication with us, as not everyone knows Sign Language. At present, sign languages are well known as a natural means for verbal communication of the deaf, hard-of-hearing people, and people who have some speaking difficulties. Sign Language is a prerequisite for hearing- impaired people to communicate with the normal people. The Speech to Sign Language Translation project is aimed to design an application that converts the speech and text input into a sequence of sign language visuals. Speech recognition is used to convert the input audio to text and it is further translated into sign language. Natural Language Processing algorithms are used for word segmentation and extraction of root words.

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