IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 6, June 2022
Impact Factor: 6.252

Storysign App for Speaking and Hearing Impaired Children

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Abstract: *Stories are every children's one way of an entertainment for the time they couldn't read. Hearing stories from parents, grandparents or from teachers helps children to gradually learn different aspects of language. However there are minority children who are born with hearing impairment and don't have one of the five human sense, hearing at full extent or can't hear at all. The proposed system aims to provide an application which will narrate stories to children by taking English text as an input and generates output in the form of images, gifs and speech output. In this paper we are presenting a platform which will translate English text to Indian sign language.*

Keywords: Hearing impairment, Storysign, tokenization, Hashmap.

I. INTRODUCTION

Considering basic human growth, being able to speak and hear properly is one of the important part of it. Having impairment in speaking or hearing in early age can cause lots of trouble to learn something or even in day-to-day life. Such children with early age disability needs to be trained with other form of communication by means of sign language. The problem arises because there isn't any universal sign language for such communication and it varies over the countries. Like natural spoken languages varies over the country, there are different sign language in different countries. For example United States of America has American Sign Language (ASL), British Sign Language (BSL) is used in Britain likewise Indian Sign Language (ISL) is used in India for communication and to express our thoughts.

Most of the work that has been done in the field of sign language is to convert sign into text. There are not many Systematic and effective models that helps to translate English text into Indian Sign Language (ISL). Therefore, there are little resources that can be used. This paper focuses on, how Natural Language Processing (NLP) tools can be used to easier the English to Indian Sign Language translation task. NLP is extremely handy when dealing with spoken languages work. The Natural Language Toolkit (NLTK) can be applied to various tasks which includes tokenization, tagging, stemming, sentiment analysis etc. NLTK helps the computer to analyze, understand, and process the natural language and helps computing machines to communicate with human in their language that is high-level language.

II. LITERATURE SURVEY

They have proposed a system to recognize the sign language at word level from a video. [1] For the project they have proposed their own Word-level American Sign Language (WLASL) dataset. To create a dataset they have used two main resources. First one is multiple educational sign language websites and second source is ASL tutorial videos from YouTube.

Proposed system for educational purpose to help the children with hearing impairment in Arabic region. [2] They also have used natural language processing with NLTK tools like tokenization, stemming etc. In this system the instructor will place Arabic text as a input and will generate multimedia sign language output.

They have proposed a system similar to presented one. [3] Proposed system will take English text as input which will translate into Indian Sign Language (ISL). It have direct word to word mapping.

The proposed system is also similar to the previous mentioned one. [4] This system is focused on transfer based English text to Indian Sign Language (ISL) conversion. By means of transfer based it will apply grammar rules to provide proper translation.

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III. PROBLEM STATEMENT

Millions of children suffers hearing or speaking impairment in their early age, such children needs sign language for communication. These children have to go through a lot of inconvenience in day-to-day life. Childhood stories are the real entertainment for them when don't even know how to read and miss out all their curiosity. This project is based on an app which will take English text as input and will narrate the stories in the form of hand signs as the output. The project equivalently aims to introduce English language to the deaf-dumb children.

IV. OBJECTIVES

- To develop an app which will narrate stories to hearing and speaking impaired children.
- To translate English text into Indian Sign Language.
- To accept text and generate sign and speech output.

V. IMPLEMENTATION DETAILS

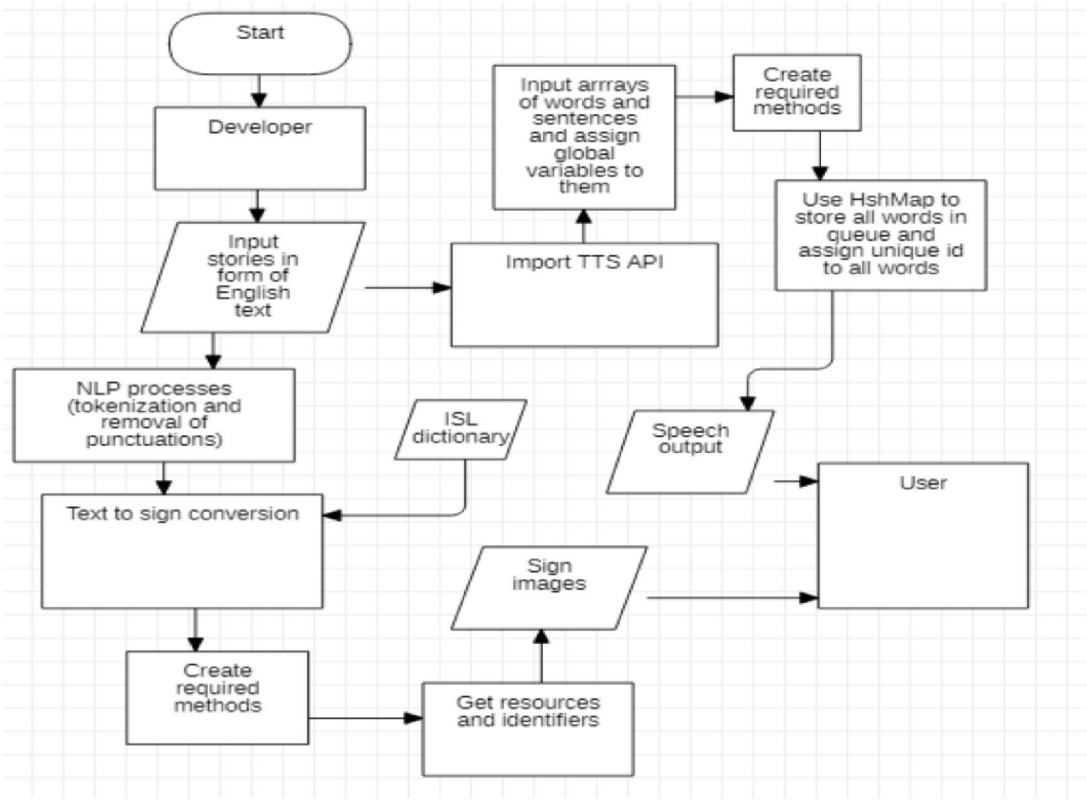

Figure: System Architecture

5.1 Modules

Proposed system comprised of 4 modules which will pass data from one module to another module. Those 4 modules are as follows:

A. Tokenization and Punctuation Removal

In this module the given input text will spilt into a separate word known as tokens by using Tokenization algorithm. Tokenization algorithm is used to split the text into words to provide word to word translation of text into sign language. Punctuations are also removed using this algorithm. This module will store all the token into a file and then it will pass it to the next two modules simultaneously as an input.

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B. Text to Speech Conversion

The second module is text to speech conversion. In this module the given text will be converted into audio via speaker. In this step we have assigned unique ID to the tokenized words. For this conversion Text-to-speech APIs is used. Text to speech makes an android device read the text and convert it to audio out via the speaker. Android Text to speech supports multiple languages. TTS is a simple but powerful feature. It can also be effectively used in mobile APPs dedicated to visually impaired people. Text to speech conversion can be done by using speech APIs like Google speech API or can be imported from Android Studio's inbuilt TTS function. HashMap algorithm is used for text to speech conversion.

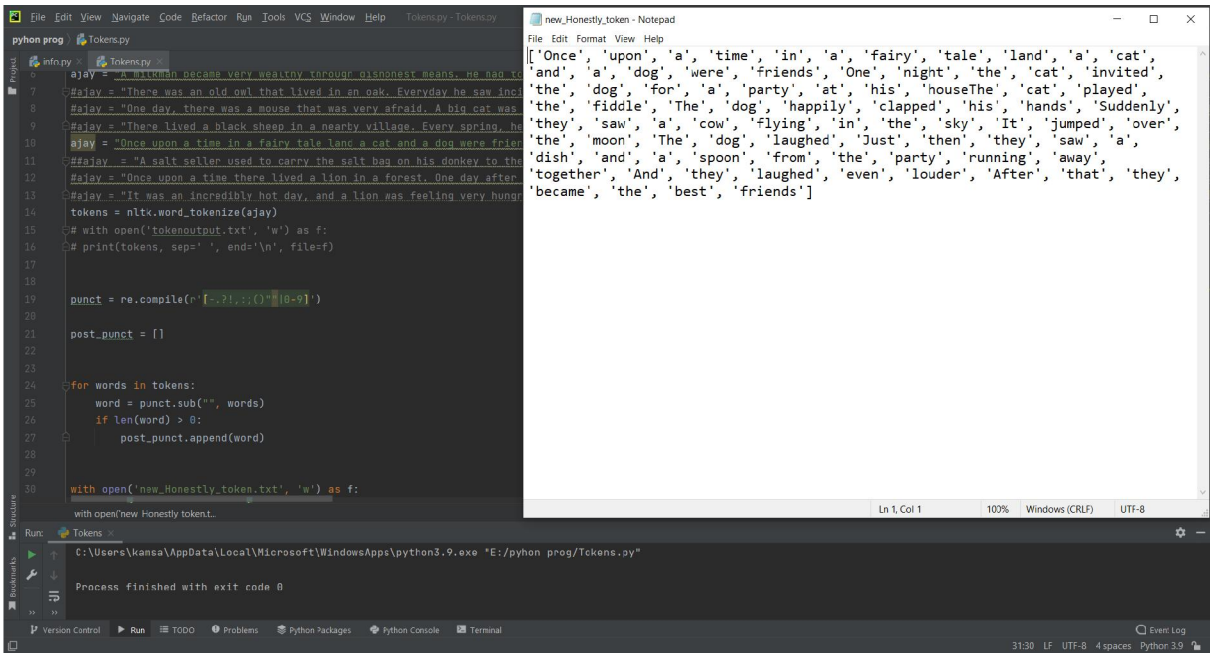
C. Text to Sign Language Conversion:-

In the third module Text-to-sign language conversion will proceed. When the process is in this stage unique ID of the tokens will be matched to the file location of hand sign of required word using necessary methods. We have tried synchronize word to Hand sign display with utmost accuracy.

D. Alphabetization of Words

Some words don't have sign languages. Such words are to be shown using sign language letter-by-letter. For this we will convert such word string to character array and will follow the same text-to-sign conversion process.

VI. RESULT



Tokenization Algorithm

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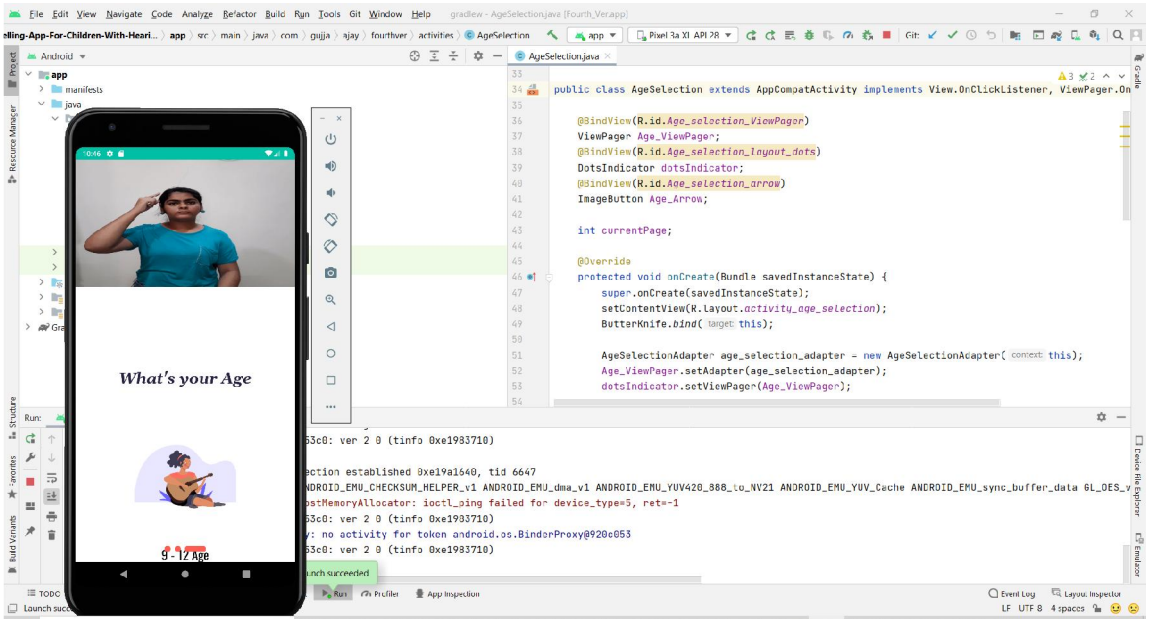

Age Group Selection

VII. CONCLUSION

We have successfully presented what we planned. We have proposed an innovative project that will narrate stories to deaf-dumb children via sign language using images, gifs and videos. The system will accept English text as a input and will generate Indian Sign Language (ISL) output along with speech output. The word with no feed sign language will show letter by letter sign language translation. It is an innovative project which will help the disabled early age children to have their first entertainment in the form of stories.

With evolving Indian Sign Language dictionary this project can be modified further to handle greater datasets. This system can be used public places like bus stations and railway stations to guide the disabled passenger.

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