Storytelling Mobile Application for Children with Hearing Impairment Using Natural Language Processing

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Abstract **- During our childhood, children's teachers, parents or grandparents read them a lot of fantastic stories. They did that for the time when we could not read. Miserably, not everyone is blessed with an ability to hear. The children with hearing impairments might not have had a chance to learn such stories at least in their childhood. This project is related to a mobile application which narrates children's stories to hearing impaired children by taking in stories in form of text as input and giving images of sign language as output. In this paper, a platform Kahani which translates written English words into Indian Sign Language is presented.**

Index Terms **- Hearing impairment, Natural language processing, Application, Storytelling, Tokenization.**

I.INTRODUCTION

Multiple computational works handling the interpretation of sign languages from and into their spoken languages are developed within the last years. A number of the present research focuses on signing recognition, some in translating text or speech into a symbol language. The Microsoft Asia group system and therefore the Virtual Sign Translator perform the two-sided translation. Huawei Story Sign app may be a story telling app for hearing impaired children, but it does not provide English to Indian signing (ISL) translation.

Unfortunately, sign languages are not same universally, or they are a mere mimic of its country's spoken counterpart. as an example, British signing is not related with the Indian one. Therefore, none or little resources are often re-used when one moves from one (sign) language to a different. However, to the simplest of our knowledge, none of those works explored how current tongue Processing (NLP) tasks are often applied to assist the interpretation process of written English into ISL, which is one among the focuses of this paper.

II. PROBLEM STATEMENT

There are many children who are hearing impaired or require signing for communication. These children need to undergo tons of trouble during education. Stories are really fun to little kids as that is the age when everything seems fascinating. This project is predicated on an app which can narrate children's stories to deaf and dumb children by taking in stories in sort of text as input and giving images of signing gestures as output.

III. ANALYSIS

The proposed is predicated on ISL (Indian Sign Language) dictionaries from different sources, like the Indian Signing Research and Training Centre (ISLRTC)initiative, and GIFs of hand gestures presented in an ISL dictionary launched by ISLRTC.

A. Objectives

1. To create an app which narrates children's stories to hearing impaired children.
2. To require in stories in sort of English text as input.
3. To giving images of signing gestures as output.

B. Scope

1. The android application will be based on java.
2. The concept of NLP is used.
3. Target audience is not limited to children with hearing impairment.

C. Challenges

1. The speech and therefore the images of gesture should be in sync.
2. The system should be ready to handle large database.
3. The system should be ready to translate the words, not having gesture, letter-by-letter.

D. Natural Language Processing (NLP)

Everything we express carries huge amounts of data. The topic we elect, our tone, our selection of words, everything adds some sort of information which will be interpreted, and value are often extracted from it. In theory, we will understand, analyze and even predict human behavior using that information. But there is a problem: one person may generate hundreds or thousands of words during a declaration, each sentence with its corresponding complexity. If you would like to scale and analyze several hundreds, thousands, or many people or declarations during a given geography, then things are unmanageable.

Data generated from conversations, declarations, or maybe tweets are samples of unstructured data. Unstructured data does not fit into the normal row and column structure of relational databases and represent the overwhelming majority of knowledge available within the actual world. It is messy and hard to manipulate. Nevertheless, because of the advances in disciplines like machine learning, an enormous revolution goes on regarding this subject. Nowadays it is not about trying to interpret text or speech supported its keywords (the quaint mechanical way), but about understanding the meaning behind those words (the cognitive way). This way, it's possible to detect figures of speech like irony or maybe perform sentiment analysis. National Language Processing or NLP may be a field of AI that provides the machines the power to read, understand and derive meaning from human languages.

Today, NLP is booming thanks to huge improvements in the access to data and increases in computational power, which are allowing practitioner to achieve meaningful results in areas like healthcare, media, finance etc.

E. Computer version and relation to NLP

Malik summarizes Computer Vision tasks in 3Rs (Malik et al. 2016): reconstruction, recognition and reorganization. Reconstruction refers to estimation of a 3D scene that gave rise to a specific visual image by incorporating information from multiple views, shading, texture, or direct depth sensors. The process leads to a 3D model, like point clouds or depth images. Making a system which sees the surrounding and give a spoken description of the gives a spoken description of the same can be used by blind people. Making systems which can convert spoken content in form of some images which may assist to an extent to people which do not possess ability of speaking and hearing.

F. Data Model

We will even be employing a data model like Naive Bayes data model to handle our datasets. Naive Bayes could also be a simple technique for constructing classifiers. There is not one algorithm for coaching such classifiers, however a

family of algorithms supported a typical principle. We might need an optimized data mining model for accurate and fast mapping of the images to the system.

IV. DESIGN

In the spare of designing of homes, clothes, jewelry or similar items, the customer can explain the requirements verbally or in written form and this description can be automatically converted to images for better visualization.

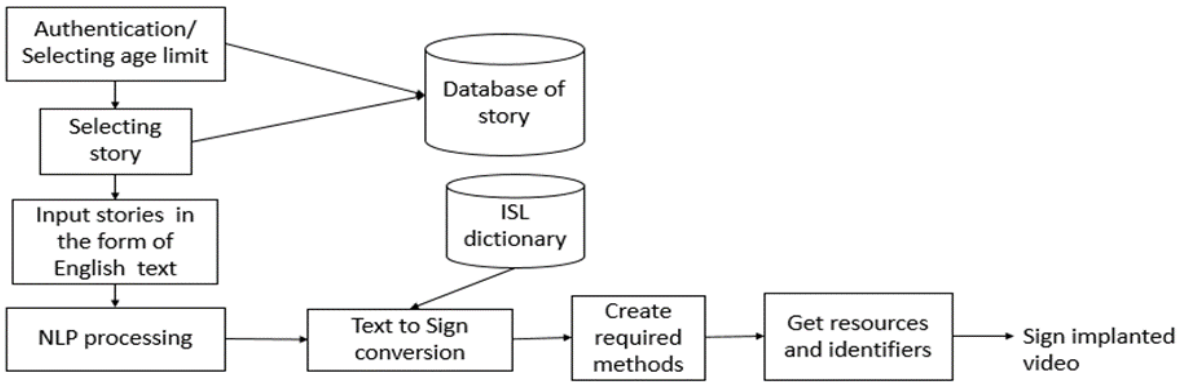

Fig.1: System Architecture

A. Description of Model Images

Computer vision can be trained to identify subtler problems and see the images in more details comparing to human specialists. Converting sign language to speech or text to help hearing impaired people and ensure their better integration into society. Making a system which sees the surrounding and give a spoken description of the gives a spoken description of the same can be used by blind people. Making systems which can convert spoken content in form of some images which may assist to an extent to people which do not possess ability of speaking and hearing.

Module 1: Uploading various stories in the application as videos

Most tongue systems are non-interactive, within the sense that the predictions come solely from a model. In fact, many production NLP models are deeply embedded within the Transform step of an Extract, Transform, and cargo (ETL) processing pipeline. In some situations, it would be helpful for a person's to be involved within the loop of creating predictions. An example of an interactive MT interface from Lilt Inc., during which models and humans are jointly involved in prediction making within the so -called "mixed-initiative models". Interactive systems are difficult to engineer but are able to do very high accuracies by bringing a person into the loop.

Module 2: Creation of Sign Language for the Existing Stories

In this paper we represent a multiple computational works dealing with the translation of sign languages from and into their spoken languages have been developed in the last years. Some of the current research focuses on sign language recognition, some in translating text or speech into a sign language. The Microsoft Asia group system and therefore the Virtual Sign Translator perform the two-sided translation. Huawei Story Sign app may be a story telling app for hearing impaired children, but it does not provide English to Indian signing (ISL) translation. Unfortunately, sign languages are not same universally, or they are a mere mimic of its country's spoken counterpart. For instance, British signing is not related with the Indian one. Therefore, none or little resources are often re-used when one moves from one (sign) language to a different. However, to the simplest of our knowledge, none of those works explored how current tongue Processing (NLP) tasks are often applied to assist the interpretation process of written English into ISL, which is one among the focuses of this paper.

Module 3: Creation of Animated Video

It is the process of converting long strings of text into smaller pieces or tokens, hence the name-Tokenization. Suppose we have a string like, "Tokenize this sentence for the testing purposes." In this case, after tokenization is processed the sentence would look like, {"Tokenize", "this", "sentence", "for", "the", "testing", "purpose", "."} This would be an example of- word tokenization we can perform characterized tokenization similarly.

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C. Text to Sign Language Conversion

Following algorithm is used for text to sign conversion:

1. Input three arrays: one for tokenized sentences, other for tokenized words and one for stop words and words with no sign.
2. Declare three global variables, i.e., i, j and k; where i is for array of words, j is for array of sentences and k is for array of stop words and words with no signs.
3. Initialize i=0, j=0 and k=0.
4. Import android TextToSpeech TTS API.
5. Create Speak method with inputs string array and index.
6. If speak button press encountered, then call speak method.
7. All words get stored in HashMap function in queue format.
8. Provide each word with a unique ID.
9. Return speech output.
10. Create OnStart method with input unique ID
11. Get resources.
12. Get identifier.
13. Match thSe ID with the location id from the folder which contains the signs.

14. Return OnStart method output: This gives sign output of the word according to the TTS and highlighted word.
15. End.

V. RESULT

We can select the age limit for the children Which is shown in Fig.2. We can select the story from the list of stories which is shown in Fig.3. Finally, this is our story telling page in where the hearing-impaired children can see the story animation and subtitles thus our app is successfully running which is shown in Fig.4

Fig.2: Age group selection page

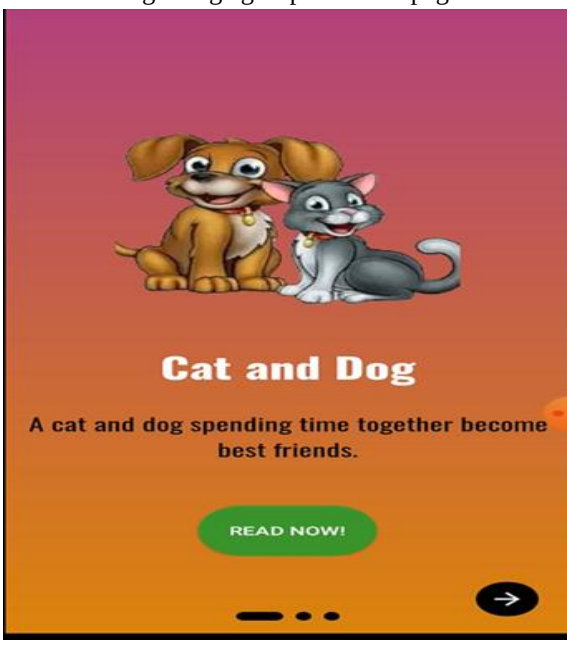

Fig.3: Story selection page

Fig.4: Story page

VI. CONCLUSION

we have successfully implemented whatever was planned within the proposed. This is often an innovative project supported an app which can narrate children's stories to hearing impaired children by taking in stories in sort of text as input and giving images of Indian signing gestures and speech as output. During this paper we present a platform, which translates written English into Indian signing. In future, the proposed system is often used at railway stations, bus stations, for education etc.

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