ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS | Volume VIII Issue V May 2023

Smart Translation for physically challenged people

Prateek B Alavandi*, Rajasekaran G, Akshay Gujjal, S K Shishir Prasad

Department Computer Science Engineering, Atme College of Engineering Mysuru

**Corresponding Author*

DOI: https://doi.org/10.51584/IJRIAS.2023.8512

Received: 15 May 2023; Revised: 21 May 2023; Accepted: 25 May 2023; Published: 18 June 2023

Abstract: Hand gestures are one of the nonverbal communication methods used in sign language. It is most typically used by deaf and hard of hearing persons who have hearing or speech impairments. difficulties communicating with one another or with regular people folks. Several sign language systems have been created byThere are numerous producers all throughout the world, but they are neither versatile nor adaptable.end-user-friendly in terms of price Our project's goal is to create a communication system for deaf people. This project is divided into two sections. (1) It translates an audio message into sign language, and (2) it translates images/video into text/speech. The first category we'll look at takes audio as input, turns the audio recorded message into text, and displays predetermined Indian Sign Language visuals or GIFs. The use of this technique facilitates communication between hearing and deaf persons. In the second category, we will gather photographs and train images with CNN and present the results.

I. Introduction

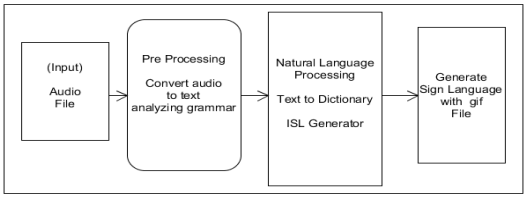
For deaf-dumb people, sign language is a vital means of communication. Each gesture in sign language has a specific meaning. As a result, complex meanings can be explained by combining various basic elements. Sign language is a gesture-based language used by deaf and dumb people to communicate. It is essentially a nonverbal language that is typically used by deaf and dumb people to communicate more effectively with one another or with normal people. Sign language has its own set of rules and grammar to help you express yourself effectively. There are two primary approaches to sign language recognition: image-based and sensor-based. However, a lot of research is being done on image-based approaches because they have the advantage of not requiring the wear of complex devices such as hand gloves and helmets etc.

The goal of this project is to improve communication with people who have hearing impairments and use sign language to express themselves. At first glance, a sign language converter appears to be a difficult task. Sign language is said to be the mother tongue of deaf people. This includes hand movements, arm or body movements, and facial expressions. There are 135 different types of sign languages in the world. American Sign Language, Indian Sign Language, British Sign Language, and many others are among them. In this project, we are utilising Indian Sign Language. This system enables the deaf community to participate in activities that normal people do, such as daily interaction and information access. This application accepts speech as input, converts it to text, and then displays images in Indian Sign Language. • Speech that is used as input. • Google Speech API is used to recognise the speech. • The text is then pre-processed using natural language processing (NLP) (Natural Language Processing). • Finally, machine translation based on dictionaries is performed.

II. Methodology

This project is divided into two sections. (1) It translates an audio message into sign language, and

In the audio to sign language conversion we are going to consider audio as input and displaying the gif file as output. In this project we are going to collect the datasets of gif file. Gui is developed for taking Audio as input to our project. The audio is Converted to text using microphone. The generated text are need to be split and store it in dictionary file. With help of Dependency parser sentence and obtaining relationship between words. Each obtained words are considered as text. Text Pre-processing is done using NLP. Dictionary based Machine Translations of input sentence using ISL grammar rules Generation of Sign language with GIF file.



(2) it translates images/video into text/speech.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS | Volume VIII Issue V May 2023

In this approach we are going to collect the deaf and dumb people Indian sign language datasets. Applying Pre-Processing Techniques (resize, noise remove, grayconversion) for the collected datasets. Splitting the data into train and test. Applying Cnn Algorithms for training datasets. For the trained model we are going to Build Model and store in system. The model we have built we are going to pass video as input to the model and recognising the language based on the user hand movement.

Collection datasets:

- We are going to collect datasets for the prediction from the kaggle.com
- The data sets consists of many Classess

Data Pre-Processing:

- In data pre-processing we are going to perform some image pre-processing techniques on the selected data
- Image Resize
- And Splitting data into train and test

Data Modelling:

- The splitted train data are passed as input to the CNN algorithm, which helps in training.
- The trained image data evaluated by passing test data to the algorithm
- Accuracy is calculatee

Build Model:

- Once the data is trained and if it showing the accuracy rate as high, then we need to build model file

Input Video:

- We are going to pass input as image or video
- Videos are converted into frames
- Each frames are passed as input to the build model
- Model going to detect the sign images

CNN Algorithms:

Convolutional Neural Networks have the following layers:

- Convolutional
- ReLU Layer
- Pooling
- Fully Connected Layer

Step1: Convolution Layer:

- Convolutional neural networks apply a filter to an input to create a feature map that summarizes the presence of detected features in the input.

Step2: ReLU Layer

In this layer, we remove every negative value from the filtered images and replaces them with zeros.It is happening to avoid the values from adding up to zero.

Rectified Linear unit (ReLU) transform functions only activates a node if the input is above a certain quantity. While the data is below zero, the output is zero, but when the information rises above a threshold. It has a linear relationship with the dependent variable.

Step3: Pooling Layer

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS | Volume VIII Issue V May 2023

In the layer, we shrink the image stack into a smaller size. Pooling is done after passing by the activation layer. We do by implementing the following 4 steps:

- Pick a window size (often 2 or 3)
- Pick a stride (usually 2)
- Walk your Window across your filtered images
- From each Window, take the maximum value

Step4: Fully Connected Layer

The last layer in the network is fully connected, meaning that neurons of preceding layers are connected to every neuron in subsequent layers.This mimics high-level reasoning where all possible pathways from the input to output are considered.Then, take the shrunk image and put into the single list, so we have got after passing through two layers of convolution relo and pooling and then converting it into a single file or a vector.

III. Experimental Results and Discussion

The framework is intended to perceive the hand motions made by the dumb people. The proposed framework is basic and the subject isn't needed to wear any gloves or any electromechanical gadget. The speech is eared by the system and is converted into alphabets. And accordingly the hand gesture is made visible for deaf peoples.eg: Riya is passed as a speech to system. The system coverts it to alphabet like R, I, Y, A where system matches the signs in database and provides output. We have achieved the accuracy of 98%.

IV. Conclusion:

The proposed web application seeks to develop a translating mechanism or automation that includes a parser element that converts the incoming speech data or English text to a phrase structure grammar representation, which is then used by another module that contains Indi Sign language grammatical format. This is accomplished through the means of removing stop-words from the reordered input format. Because Indian sign language does not provide word inflections, stemming and lemmatization are used to turn words into their root form. Following sentence filtration, all words are tested against the words in the database, which is represented as a dictionary comprising video representations of each word. If the words are missing from the database, the algorithm will then look for its related synonym and replace it with that term.In many ways, the proposed system is more innovative and efficient than existing systems, because Existing methods can only convert words directly into Indi sign language, and they were not as efficient as this system, whereas this in the actual world, the system tries to translate these phrases into Indian sign language grammatical order. Because this is a web-based programmed, it is straightforward to access and use. This technology is platform agnostic and more versatile to use, and it transforms phrases to sign language in real time.

References

1. "Machine learning model for sign language interpretation using webcam images," 2014 International Conference on Circuits, Systems, Communication and Information Technology Applications (CSCITA), 2014, pp. 317-321, doi: 10.1109/CSCITA.2014.6839279.
2. A translator for American sign language to text and speech," 2016 IEEE 5th Global Conference on Consumer Electronics, 2016, pp. 1-2, doi: 10.1109/GCCE.2016.7800427.
3. Morphological Analysis of Speech Translation into Indonesian Sign Language System (SIBI) on Android Platform," 2019 International Conference on Advanced Computer Science and information Systems (ICACSIS), 2019, pp. 205-210, doi: 10.1109/ICACSIS47736.2019.8980000
4. An Improved Sign Language Translation Model with Explainable Adaptations for Processing Long Sign Sentences Computational Intelligence and Neuroscience Volume 2020, Article ID 8816125, 11 pages https://doi.org/10.1155/2020/8816125
5. Convolutional Neural Network based Bidirectional Sign Language Translation System," 2020 Third International Conference on Smart Systems and Inventive Technology (ICSSIT), 2020, pp. 769-775, doi: 10.1109/ICSSIT48917.2020.9214272
6. Application for Iraqi sign language translation on Android system", International Journal of Electrical and Computer Engineering (IJECE)Vol.10, No.5, October2020, pp. 5227~5234ISSN: 2088-8708, pp5227-5234
7. Electronic Glove: A Teaching AID for the Hearing Impaired", International Journal of Electrical and Computer Engineering (IJECE)Vol.8, No.4, August2018, pp. 2290~2298ISSN: 2088-8708, pp2290-2298
8. Recommendation app to communicate with hearing-impaired communities", International Journal of Electrical and Computer Engineering (IJECE)Vol.9, No.6, December2019, pp. 5512~5518ISSN: 2088-8708, pp5512-5518