

Indian Sign Language

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1 Introduction

In India, the number of people with hearing and speech impairment is estimated to be 18 million. In order to articulate and express their thoughts sign language which consists of hand gestures and facial expressions are used as a medium. The Indian Sign Language (ISL) is commonly used and is sought to be standardized in India. However the number of certified ISL interpreters stands at 339 as of 2021-22.

The aim of this project is to create an application that bridges the communication gap and increases the ease of communication between non-ISL users and the hearing impaired through digital sign language interpretation.

2 Data Analysis and Observations

The ISL dictionary provided by the Indian Sign Language Research and Training Centre consists of 10000 videos grouped into sections such as legal terms, medical terms, academic terms, everyday terms, technical terms and so on.

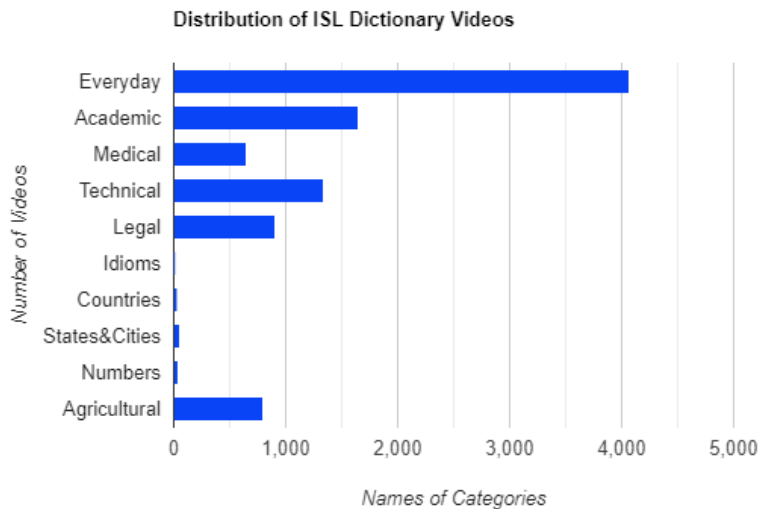


Figure 1: ISLRTC Dictionary

- Each video title provides word it must be annotated with.
- The description for each word contains a range of emotions in order to convey its meaning.
- A single emotion cannot be used to label a video as a whole.

3 Progress

- Created a database and annotated each video to form a digital repository of the ISL dictionary. This was done using YouTube DL.
- The base code for video captioning using a Bi-LSTM model has been developed.
- We researched about further algorithms in order to incorporate the effect of expressions in addition to hand gestures, We identified SlowFast algorithm to be suitable for this. It is a video specific algorithm that uses Dual mode CNN - high-definition CNN (Fast pathway) to analyze the broader aspects of the video content while running in parallel a fast, low-definition CNN (Slow pathway) whose goal is to analyze the fine-grained content of a video. The dual-path approach enables the algorithm to capture both the nuanced static gestures in sign language and the rapid changes.

4 Upcoming

- Finetuning Bi-LSTM model.
- Implementation of SlowFast algorithm.
- Comparative analysis of results.

5 References

- islrtc.ac.in
- github.com/ytdl-org
- github.com/facebookresearch/SlowFast