



# Project Presentation on

Hindi To Indian Sign Language: Rule-Based Video Translation System Along  
With Synonym Substitution and fingerspelling

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# Problem Statement

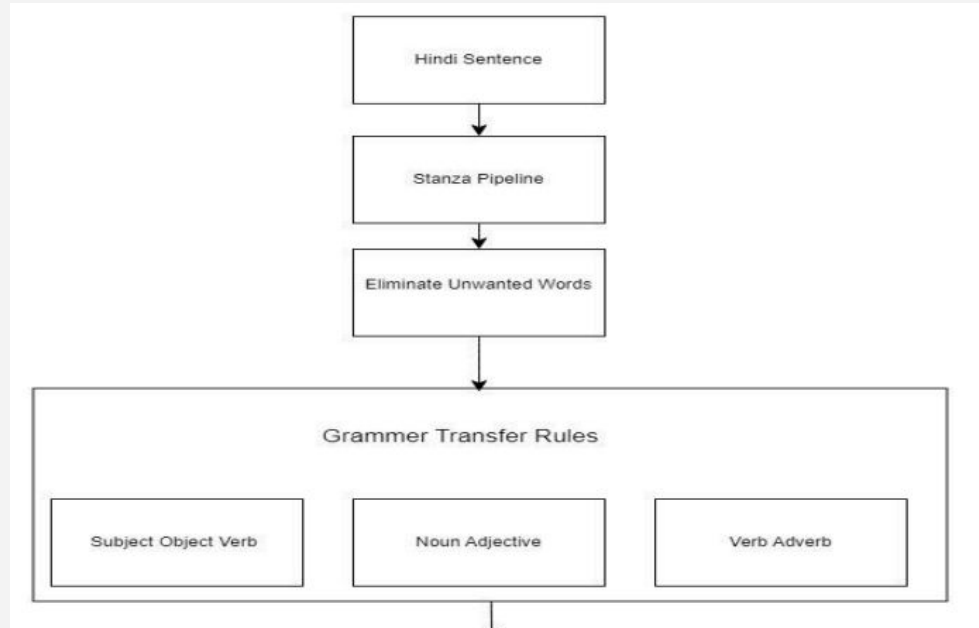
1. Some Stats
  - a. India is home to approximately 63 million people of the deaf
  - b. Comparable to total population of France and Italy
2. Need of ISL based system-
  - a. Used as Communication Medium between deaf peoples
  - b. Used as teaching medium to teach in schools
  - c. Severe shortage of ISL interpreters in India
  - d. Very Less Work is done compared to ASL
3. Nearly 10000 words in ISL now



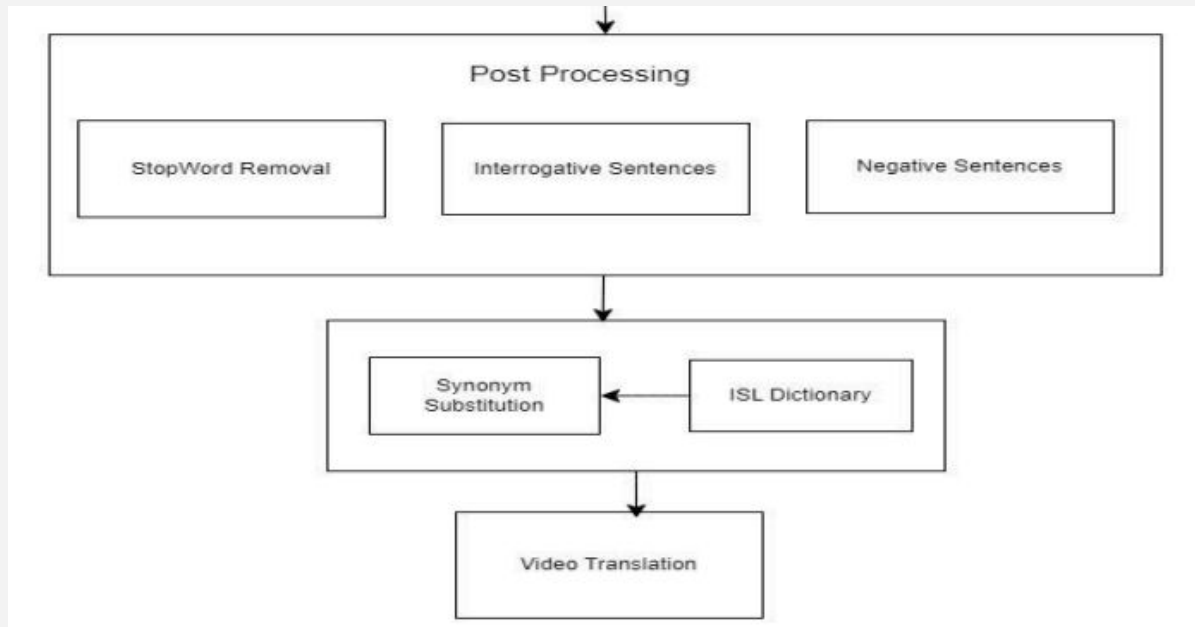
## DataSet for ISL Translation

- Own Crafted Hindi Letters Videos
- Own Crafted English Crafted Videos
- Assembled Hindi Sentences Dataset crafted from ChatGPT and Kaggle for testing
- Indian Sign Language ISLRTC

# Overall Architecture of the Proposed System



# Overall Architecture of the Proposed System





## Grammar Transfer Rules

Grammar Rule	Transformation	Example
VERB(root) SUBJECT OBJECT	SUB OBJ VERB	तुम पुस्तक पढ़ते हो। → तुम पुस्तक पढ़ते
VERB(any) → ADV (advmod)	VERB ADV	मैं जल्दी आऊँगा। → मैं आऊँगा जल्दी
NOUN(any) → ADJ(amod)	NOUN ADJ	सीता चमकता तारा है। → सीता तारा चमकता



# POST Processing

1. StopWord Removal:
  - a. Initially we took 300+ stopwords from Internet
  - b. Filter these stopwords by trial and testing
  - c. Finally only 72 words remained as stopwords
2. Interrogative Sentences
3. Negative Cases





# Synonym Substitution

1. Word is Proper Noun then FingerSpell it
2. Hindi Word in ISL Dictionary
3. Synonym of Hindi Word in ISL Dictionary
4. English Word in ISL Dictionary
5. Lemmatized English Word in ISL Dictionary (LEMMATIZER SPACY is used)
6. Synonym of English Word in ISL Dictionary
7. Finger Spelling



## Results

CATEGORIES (Number of Sentences)	ADV + ADJ (13)	ONE SUB+ VERB (20)	SUB + OBJ+ VERB (19)	VERB +ADV (15)	ONE VERB ONE ADJ (20)	SUB OBJ ADJ (14)	SUB+ OBJ+ ADV (10)	INTERROGATIVE SENTENCES (20)	NEGATIVE SENTENCES (19)	RANSOM SENTENCES FROM KAGGLE( 67)
Accuracy (%)	76.92	100	100	93.33	90.0	85.71	100	100	94.73	86.56
No. of Finger Spells Required	8	3	1	5	4	3	7	12	6	16



# Learning from the Project

1. Dependency Parser (NLTK Spacy Stanza)
2. Lemmatizer for Hindi is not good (Spark)
3. ISL grammar rules
4. ISL is not rich in words compared to ASL(American Sign Language)
5. Synonym Substitution for Hindi
6. Minimize FingerSpelling
7. Translation from English to Hindi is very slow
8. Translation of words from hindi to english is not fully accurate



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