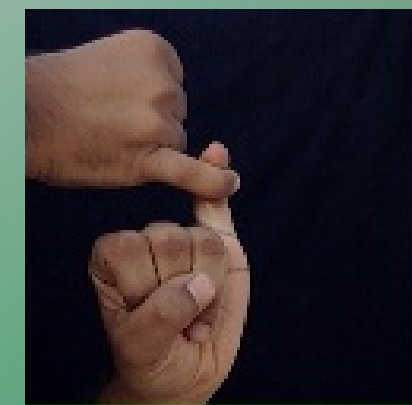


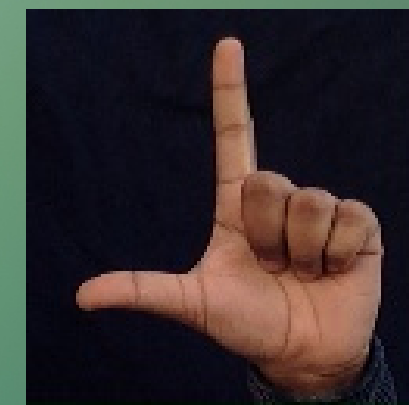
Real-Time Indian Sign Language Recognition using hand gestures and text/voice generation



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ABSTRACT

- Communication with a person with hearing impairment is always a great challenge.
- Disabled people with hearing loss use sign language as a means of communicating with others.
- Hand gestures are one of the ways that sign language users can communicate non-verbally.
- Many people around the world have developed different sign language to communicate in their native language.
- In this paper, we present a system for recognizing Indian Sign Language (ISL) based on hand gestures and generate the speech output for the recognized text.
- The purpose of this work is to develop a system that can recognize hand gestures in real time using computer vision and then we train the model to create the appropriate character, words, or sentences for the identified sign.
- In order to enhance communication between the person with hearing impairment and the blind, this technology also offers voice output for the created text.
- Additionally, this system offers the text to sign language generation paradigm, which permits two-way communication without the use of a translator.

BACKGROUND OF THE STUDY

- Sign language is a manual communication used primarily by people with hearing disabilities.
- Since most people are not familiar with sign language, it is getting harder and harder for hearing-impaired people to communicate without a translator, which makes them feel isolated.
- To overcome this issue, we proposed a system with the help of Indian sign language (ISL), this proposed model tries to fill a communication gap between hearing and hearing impaired persons.
- This Indian Sign Language Recognition (ISLR) system helps to translate the sign language using hand gesture in real time and translate them into corresponding text and also generate speech to bridge the communication gap between hearing impaired and the blind persons.

LITERATURE REVIEW

Author, Paper Title & Journal Name, Year	Methods/Technique/Algorithm	Dataset, Advantages/Applications	Limitations
Bambang KrismonoTriwijoyo, Lalu YudaRahmaniKarnaen, Ahmat Adil, Deep Learning Approach For Sign Language Recognition, Journal Ilmiah Teknik ElektroKomputer dan Informatika(JITEKI), Jan-2023	Seven-layer Convolutional Neural Network(CNN)	ASL dataset,accuracy-99%,image processing using background correction improved model performance	Performance of model is strongly influenced by the specification of web cam and lighting system.
Dushyant Kumar Singh, 3D-CNN based Dynamic Gesture Recognition for Indian Sign Language Modeling, 5th International Conference on AI in Computational Linguistics, 2021	3D Convolutional Neural Network	20 ISL words,accuracy-88%, helps in reducing problems faced while communicating with deaf and dumb people.	Model trained for only 20 words, absence of speech generation, low accuracy

LITERATURE REVIEW - CONT...

Author, Paper Title & Journal Name, Year	Methods/Technique/Algorithm	Dataset, Advantages/Applications	Limitations
Amrita Thakur, PujanBudhathoki, SarmilaUpreti, Shirish Shrestha, Subarna Shakya, Real time sign language recognition and speech generation, Journal of innovative image processing, 2020	CNN, VGG-16 model	ASL dataset,accuracy-99.65%,can be used as learning tool for beginners	Lack of generating basic words
Rachana Patil1, Vivek Patil1, Abhishek Bahuguna1, and Mr. Gaurav Datkhile1, Indian sign language recognition using convolutional neural network, ITM Web of Conferences, 2021	Computer Vision techniques such as gray-scale, dilation and mask operation, CNN	ISL dataset(1-10 digits), accuracy-95%, used for effective human machine interaction	Dataset consists of only digits and the model is trained only for recognizing digits.

PROPOSED MODEL

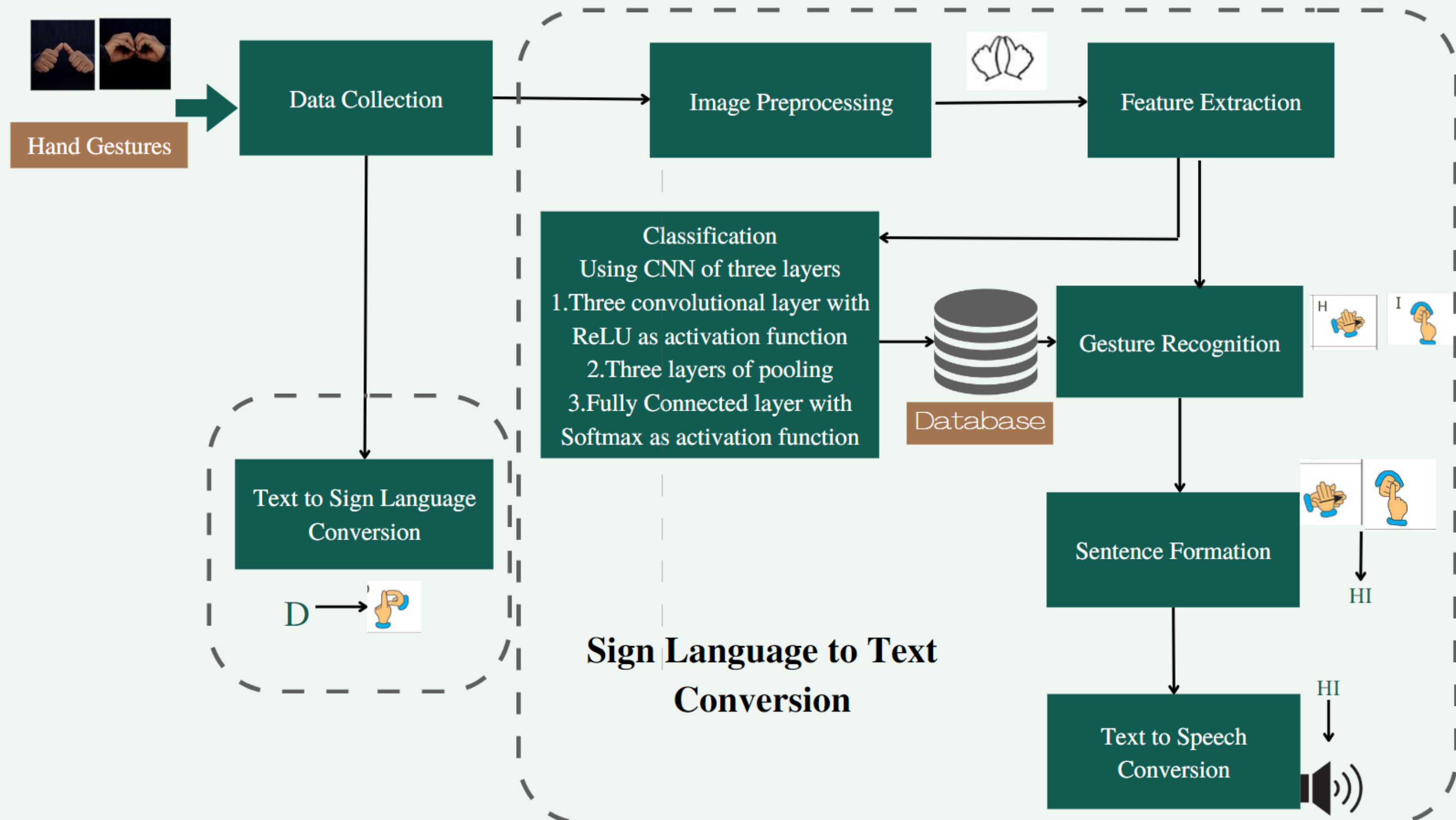
PROPOSED WORK

- The proposed sign language recognition system is for Indian sign language which uses double handed gesture.
- This proposed system can generate characters, words and sentences.
- This ISLR(Indian Sign Language Recognition) system includes speech generation.
- This proposed system allows two way communication system(sign to text and text to sign).
- The proposed system uses all alphabetical characters and digits for Indian sign language recognition.

NOVELTRY IN PROPOSED WORK

- This proposed system includes two way communication for Indian sign language system.
- It also includes generation of words and sentences.
- It also includes speech output for generated sentence.

SYSTEM ARCHITECTURE



MODULES

Sign to Text

- 1.The proposed project begins with data collection. We created our own dataset, which contains 7200 images of hand gestures from digits 0 to 9 and alphabets A to Z.
- 2.Next, the raw images are pre-processed using gray scale and Gaussian blur filter to extract the features.
- 3.Then the pre-processed images are trained using the proposed CNN based model that consists of three layers of convolution layer, max pooling layer and a fully connected to extract the high level and low level features to classify the images of hand gestures.
- 4.The gesture is then recognized by capturing the hand in real time with OpenCV, pre-processing it, and loading it into the model for prediction.
- 5.Then the predicted gesture is displayed and sentence is formed by finger spelling method.
- 6.Then speech is generated for the recognized sentence.

Text to Sign

- 1.Data is collected for hand gestures of digits and alphabets and saved in folder along with their label.
- 2.A system is developed using tkinter that display the text box for the user to give input.
- 3.Finally the images of hand gestures is displayed for the given input along with voice output.

CONCLUSION AND FUTURE WORK

These experiments for Indian Sign Language Recognition proves the effectiveness of the proposed model for recognizing ISL gestures and generating spoken output from the recognized gestures and the feature of text to sign language conversion.

However, there is still a need for further research to improve the accuracy and robustness of these systems, as well as to develop more advanced speech generation systems for sign language recognition.

While current ISL recognition systems focus primarily on hand gesture recognition and conversion of text to sign language, there is potential to integrate other modalities, such as real time handwritten text to sign language conversion to improve the ISLR System. Future research could explore the use of multi-modal recognition systems that combine hand gesture recognition with other modalities.

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THANK YOU