REAL-TIME SIGN LANGUAGE RECOGNITION FOR ENHANCED COMMUNICATION

Team No. 1
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Introduction

- Deaf and Dumb people face a lot of problems in their daily lives and interactions. Communication is the only medium by which we can share our thoughts or convey the message but for a person with disability (deaf and dumb) faces difficulty in communication with normal person.

- Speech impaired people use hand signs and gestures to communicate. Normal people face difficulty in understanding their language. Hence there is a need of a system which recognizes the different signs, gestures and conveys the information to the normal people.

Literature

Author(s)	Method	Advantages	Disadvantages
Juhi Ekbote, Mahasweta Joshi (2017)	Shape descriptors, Scale Invariant Feature Transform, Histogram of Oriented Gradients, ANN, SVM	This research paper aims at developing automatic recognition system for ISL numerals(0-9).	The SIFT and HOG, Shape descriptors will not capture the crucial features and details in the complex signs, compared to CNN
MohitaJaiswal,VaidehiSharma,Abhishek Sharma,Sandeep Saini,Raghuvir Tomar (2020)	An Efficient Binarized Neural Network	Using this architecture achieves an overall accuracy of 98.8% which is higher than other existing methods.	This system misclassifies some signs of M, N, E because of their similar kind of shapes, and also, the proposed BNN architecture is limited to a small no of classes of gestures.

Literature

Author(s)	Method	Advantages	Disadvantages
T Raghuveera, R Deepthi, R Mangalashri, and R Akshaya (2020)	Histogram of Oriented Gradients and Local Binary Patterns, Support Vector Machine.	The average recognition accuracy was improved up to 71.85% with this method. The system achieved 100% accuracy for a few signs.	The system doesn't consider the environment of gestures, leading to incorrect translations on many gestures.
Razieh Rastgoo, Kourosh Kiani, Sergio Escalera (2020)	Single Shot Detector (SSD), Convolutional Neural Network (CNN), and Long Short Term Memory (LSTM)	In case of an uncontrolled environment such as rapid hand motions,it provided fast processing.	Using more data, the accuracy of detection can be improved.

Problem Statement

- Speech impaired people use hand signs and gestures to communicate. Normal people face difficulty in understanding their language.

Objective

- To bridge the gap between the physically challenged people and normal people, So for this we are going to create a model which will give accuracy of 90-100%.

Proposed Method

- Our proposed system is real-time sign language recognition system for enhanced communication, which uses the convolution neural network which recognizes various hand gestures by capturing video and converting it into frames.
- Then those hand pixels are segmented and the image which is obtained sent for comparision to the trained model.
- The hand gestures are of Indian Sign Language, the model is trained on the ISL.
- Thus our system is more robust in getting exact text labels of each letters.

Proposed Method

System Architecture:

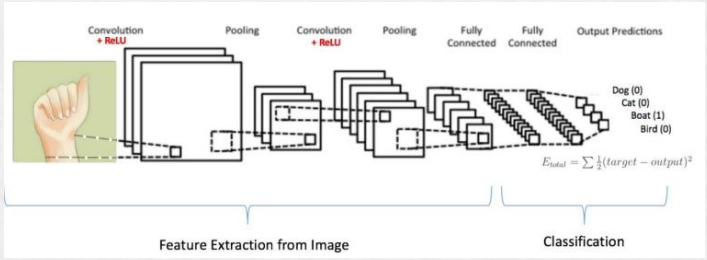
Capturing gestures through camera

video stream

Single frame of video

Segmentation with threshold

Segmented image with extracted hand



Trained Convolution neural network with ISL dataset

Output-label

Project Status

S.No	Functionality	Status (Completed /in-progress/Not started)
01	Research Papers Collection	Completed
02	Dataset Collection	Completed
03	Code Implementation: Training Testing	In-progress
04	Documentation	Not yet started

Note: Submit Form 1,2 and 3

References

[1] J. Ekbote and M. Joshi, "Indian sign language recognition using ANN and SVM classifiers," 2017 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), Coimbatore, India, 2017, pp. 1-5, doi: 10.1109/ICIIECS.2017.8276111.

[2] M. Jaiswal, V. Sharma, A. Sharma, S. Saini and R. Tomar, "An Efficient Binarized Neural Network for Recognizing Two Hands Indian Sign Language Gestures in Real-time Environment," 2020 IEEE 17th India Council International Conference (INDICON), New Delhi, India, 2020, pp. 1-6, doi: 10.1109/INDICON49873.2020.9342454.

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