



REAL TIME COMMUNICATION SYSTEM POWERED BY AI FOR SPECIALLY ABLED

LITERATURE SURVEY

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[1] *Survey on sign language recognition in context of vision-based and deep learning*

S. Subburaj |S. Murugavalli| Department of CSE, Panimalar Engineering College, Anna University, Chennai, India |
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This paper aims to research and examine the methods employed within the SLR systems, and the classification methods used, and to propose the most promising technique for future research. our proposed works specifically contribute to classification methods, together with hybrid techniques and deep learning. This paper specializes in the classification strategies utilized in earlier Sign Language Recognition. Based on our review, HMM-based techniques were explored significantly in previous studies, which include modifications. Deep learning consisting of convolutional neural networks has become popular over the past five years.

Keywords: SLR, Sign language Recognition, Computer vision, Neural networks, Deep learning, HMM, CNN

A sign language recognition system has been developed from classifying only static signs and alphabets to a system that can effectively apprehend dynamic actions that come in continuous sequences of images. Researchers are currently paying more attention to making a large vocabulary for sign language recognition systems. Dataset availability and improvements in computing speed provide access to more training for given samples. The classification technique for identifying sign language also varies among researchers. Using their ideas and limitations for the Sign Language Recognition System, the comparison of one method to another method is still subjective. Deep learning-based approaches like CNN, RNN, LSTM, and Bi-Directional LSTM Models provide good recognition accuracy in the sequence of images and video streams.

[2] *Artificial Intelligence enabled virtual sixth sense application for the disabled*

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Aditya Sharma |Aditya Vats |Shiv Shankar Dash|Surinder Kaur

The current implementation deals with object recognition and text to speech and a speech to text converter by utilizing the Web Speech API (Application Program Interface) for the website and text to speech and speech to text library for the mobile platform. The object recognition wouldn't fetch enough use out of a website. Hence, it has been implemented on the mobile app utilizing the Firebase ML toolkit and different pre-trained models, which are both available offline as well as online. The major contribution of the work is an innovative approach for text to speech is implemented to provide a faster and convenient approach for mute to communicate through SAM (Speech Assisted for Mute).

Keywords: Sixth sense, disabilities, Web Speech API, Firebase ML toolkit, cognitive disabilities

The main highlight of the project is an application that provided a one-stop-shop solution to all the sections of differently-abled people. Integration has provided a seamless User interface/experience for the initial setup. Another point achieved here was no extra hardware; hence, no additional cost to utilize the service. The application still does depend on the camera picture quality for object detection and OCR but is still high enough in confidence level (70%) for most of the cases which were covered.

[3] *Design of a Communication System using Sign Language aid for Differently Abled Peoples.*

Shrikant Temburwar |Payal Jaiswal |Shital Mande |Souparnika Patil |Department of Information Technology |Dhole Patil College of Engineering, Pune, Maharashtra, India |e-ISSN: 2395 -0056 Volume: 04 Issue: 03 | Mar -2017
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Our goal is to design a human computer interface system that can accurately identify the language of the deaf and dumb. With the use of image processing and artificial intelligence, many techniques and algorithms have been

developed in this area. Each character speech recognition system is trained to recognize the characters and convert them into the required pattern. The proposed system aims to give speech speechless, a real-time character language is captured as a series of images, and it is processed and then converted into speech and text

Key Words: Sign Language, Communication aid, Sign Recognition, Image Processing, Text Language.

This paper adds in complete two - sided communication in an efficient manner because the system is implemented as one Handy mobile application .Accuracy of system may vary depending upon light intensity changes.Also accuracy depends upon distance between camera and object.

[4] ***SIGN LANGUAGE RECOGNITION USING NEURAL NETWORK***

kaustubh Jadhav|Abhishek Jaiswal|abbas munshi| mayuresh yerendekar| Department of Electronics and Telecommunication Engineering |K.C. College of Engineering & Management studies & Research, Kopri, Thane (E)- 400 603, India. |ISSN: 2581-4419| Volume 1 Issue 1

Here we present the development and implementation of an American Sign Language (ASL) fingerspelling translator based on a convolutional neural network. We utilize a pre-trained Google Net architecture trained . We produced a robust model which classifies letters a-z correctly with first-time users and another that correctly distinguish letters a-k in a majority of cases.

Keywords- ASL, Sign Language Character Recognition, Convolution Neural Network, Computer Vision, Machine Learning.

The system presents a performance pretty good to identify the static images of the sign alphabetic language. In this work, the developed hardware architecture is used as image recognizing system but it is not only limited to this application, it means, the design can be employed to process other type of signs. As future work, it is planned to add to the system a learning process for dynamic signs, as well as to prove the existing system with images taken in different position.

[5] ***Real-Time Sign Language Detection using TensorFlow, OpenCV and Python***

Authors: Prashant Verma, Khushboo Badli DOI Link: <https://doi.org/10.22214/ijraset.2022.43439>

We gathered a dataset for identifying 36 distinct gestures (alphabets and numerals) and a dataset for typical hand gestures in ISL created from scratch using webcam images. The system accepts a hand gesture as input and displays the identified character on the monitor screen in real time. This project falls under the category of human-computer interaction (HCI) and tries to recognise multiple alphabets (a-z), digits (0-9) and several typical ISL hand gestures. To apply Transfer learning to the problem, we used a Pre-Trained SSD Mobile net V2 architecture trained on our own dataset. The main goal of this research is to create a computer-based intelligent system that will allow deaf persons to interact effectively with others by utilising hand gestures based on technologies tensor flow, object detection, open cv, labelling . As a result, by expanding the dataset, the model may simply be scaled up to a vast size. The model has some limitations, such as environmental conditions such as low light intensity and an unmanaged backdrop, which reduce detection accuracy.

[6] ***Deepsign: Sign Language Detection and Recognition Using Deep Learnin*** Article

Kothadiya |Chintan Bhatt| Krenil Sapariya | Kevin Patel | Ana-Belén Gil-González | Juan M. Corchado
<https://doi.org/10.3390/electronics111117>

This paper proposes a deep learning-based model that detects and recognizes the words from a person's gestures. Deep learning models, namely, LSTM and GRU (feedback-based learning models), are used to recognize signs from isolated Indian Sign Language (ISL) video frames. The four different sequential combinations of LSTM and GRU (as there are two layers of LSTM and two layers of GRU) were used with our own dataset, IISL2020. The proposed

model, consisting of a single layer of LSTM followed by GRU, achieves around 97% accuracy over 11 different signs. This method may help persons who are unaware of sign language to communicate with persons whose speech or hearing is impaired.

Keywords: Indian sign language; deep learning; LSTM; GRU; sign

This paper presents Indian Sign Language recognition using LSTM and GRU on an IISL2020 dataset of different hand gesture the developed models work in terms of isolated signs; this approach could be utilized for interpreting continuous sign language that leads to syntax generation, especially in the context of ISL. The use of vision transformers can lead to more accurate results than those of feedback-based learning models

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