

# LITERATURE SURVEY

PNT2022TMID04485

Artificial Intelligence

*Real-Time application system powered by AI*

## **[1] Machine learning methods for sign language recognition: A critical review and analysis :**

*I.A. Adeyanjua, O.O. Bello b, M.A. Adegboyea*

*2021*

After a comprehensive literature review, the commonly intelligent predictors utilized for recognition of sign language are k-nearest neighbor (KNN), artificial neural network (ANN), support vector machine (SVM), hidden Markov Model (HMM), Convolutional Neural Network (CNN), fuzzy logic and ensemble learning. This section briefs about machine learning techniques used to recognize sign language.

Accuracy of the paper: 89.5%

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

*S. Subburaj , S. Murugavalli*

*2022*

Using their ideas and limitations for the Sign Language Recognition System, comparing one method to another 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.

Accuracy of the paper: 89.5%

### **[3] Conversation of Sign Language to Speech with Human Gestures**

*Rajaganapathy. S , Aravind. B , Keerthana. B , Sivagami. M*

*2019*

Research in the sign language system has two well-known approaches are Image processing and Data glove. The image processing technique using the camera to capture the image/video. Analysis the data with static images and recognize the image using algorithms and produce sentences in the display, vision based sign language recognition system mainly follows the algorithms are Hidden Markov Mode (HMM), Artificial Neural Networks (ANN ) and Sum of Absolute Difference (SAD) Algorithm use to extract the image and eliminate the unwanted background noise. The main drawback of the vision-based sign language recognition system image acquisition process has many environmental apprehensions such as the place of the camera, background condition,s and lightning sensitivity. The camera is placed to focus on the spot that capture maximum achievable hand movements, a higher resolution camera takes up more computation time and occupy more memory space. Users always needs camera forever and cannot implement in public place. Another research approach is a sign language recognition system using a data glove . Users need to wear glove consist of flex sensor and motion tracker. Data are directly obtained from each sensor depends upon finger flexures and computer analysis sensor data with static data to produce sentences. It's using neural network to improve the performance of the system. The main advantage of this approach less computational time and fast response in real time applications. Its portable device and cost of the device also low. Another approach using a portable Accelerometer (ACC) and Surface Electro Myogram (sEMG) sensors used to measure the hand gesture. ACC used to capture movement information of hand and Arms. EMG sensor placed, it generates different sign gesture. Sensor output signals are fed to the computer process to recognize the hand gesture and produce speech/text. But none of the above methods provide users with natural interaction. This proposed system will be capable of performing the conversation without any wearable device instead using the human motion and gesture recognition.

Accuracy: 90%

## **[4] Real-Time Assistive Interpreter For Deaf Community Over Machine Learning**

Ms. Priyanka Pandurang Patil Dr. Y. B. Gurav

2020

The purpose of this system is to represent a real-time two way communication interpreter based on Indian Sign Language (ISL) with higher accuracy. Our motive behind this implementation is to create a complete language that involves movement of hands, facial expressions and gestures of the body. This system captures hand gesture images of ISL with a system camera for feature extraction. The analyzing phase, the pre-processing unit is used for the noise removal, greyscale conversion by using Gaussian filter, binary conversion of images done by using OTSU's method followed by feature extraction. In real-time scenario we have achieved accuracy above 90% in each trained model.

## **[5] Sign Language Recognition**

*Monika Chaturvedi, 2Bharti Kothari, 3Sandhya Singh, 4Vandana Rani Kujur, 5Aastha Tiwari*

2022

In this sign language recognition, they try to create a sign language recognizer. Which detects alphabet characters from 'A' to 'Z' that can very easily be extended to cover a vast multitude of other sign and hand gestures including the alphabets.

Data processing, manipulation of data by a computer. It include the conversion of raw data to machine-readable form, flow of data through the CPU and memory to output devices, and formatting or transformation of output. Any use of computers to perform defined operations on data is included under data processing.

We used open computer vision (OpenCV) library in order to produce our dataset. Firstly, we captured 300 images of each of the symbols in ASL for training purpose and around 300 images per symbol for testing purpose. First, we captured each frame shown by the webcam of our machine. In each frame we define a region of interest (ROI) which is denoted by a blue bounded

square. From the whole image we extracted our ROI which is RGB and convert it into grey scale image. Finally, we apply our gaussian blur filter to our image which helps us extracting various features of our images.

After a model has been trained, it can be used to classify a new gesture that is available as a file on the file system. The user inputs the file-path of gesture image. Pre-process the file the same way as the model has been trained.

## **[6] Sign Language Recognition System using Convolutional Neural Network and Computer Vision**

*Mehreen Hurroo, Mohammad Elham Walizad*

*2020*

Computer vision-based gesture recognition system is widely researched for detection of sign gestures. This method involves capturing of hand movements by a camera and therefore the captured images are processed using computer vision software frameworks for alphabet detection. Image pre-processing methods like image enhancement, ROI selection, image segmentation are followed to get the processed images for detection of alphabets. This takes up tons of computation task and sometimes requires manual intervention for ROI selection within the input images. . This paper proposes a custom DNN model for recognition of English alphabets using Convolution Neural Network (CNN). The proposed DNN extracts features automatically from the input hand gesture images and classifies it. A test sample of 10 sign gestures are trained DNN model and therefore the prediction accuracy is calculated. The weights that are obtained within the last trial with the simplest training and validation accuracy is stored during the training process. A more comprehensive image collection and data augmentation can cause better prediction probabilities.

## **[7] Survey On English Alphabet Sign Language Recognition Using Deep Learning Methods**

*Harsh Shah, Dr.Harshal Shah*

2020

This paper utilizes recent improvements in deep learning methodologies for the development of English alphabet sign language machine translation. In this paper, a 3D model-based method for the recognition of sign language and semaphoric hand gestures is present. In particular, the proposed approach utilizes a skeletal-based demonstration, where a virtual portrayal of the skeleton hands is mapped to explicit fragments. We are planning to create this new dataset also including RGB frames, depth maps, and the whole hand skeleton model. With the use of more convolution neural network blocks and use different optimizer functions we get higher accuracy in sign language recognition.