

# Hand Gesture Recognition for Deaf and Blind People

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**Abstract:-** Sign language is a unique type of communication language which is essential for bridging the communication gap between deaf and dumb people. In each sign language, there are various signs with variations in palm size, shape and motion and placement of hand which plays a major role in each sign. A large number of applications have been put forward by various researchers. In the past few years, in these applications many remarkable changes have been made using deep learning concepts. Throughout this survey, we analysed these applications of hand gesture recognition using deep learning concepts from the last few years. Although there were many notable improvements in the accuracy in hand gesture recognition, there are still many complications that need to be resolved. We put forward a taxonomy to classify the proposed applications for future lines of research in the field. Our objective is to develop an application that can recognize hand gestures and signs. We will train that model in a way that sign language will be converted into text and audio. This will help people communicate with people who are deaf and blind. The application will recognize hand gestures by comparing the input with pre-existing datasets formed using the American Sign Language. Here the input will be in the form of a real-time video of hand signals of sign language. We will convert those signs into text as well as audio as output for users to recognize the signs which are captured by camera and presented by the sign language speaker.

**Problem Statement:** Conversion of sign language using hand gestures into text and audio for deaf and blind people.

**Keyword:-** Hand Gestures, Sign Language, Communication, Convolutional Neural Network(CNN).

## I. INTRODUCTION

American gesture based communication is the most utilized communication through signing. The main issue hard of hearing individuals face is correspondence hole between them. Therefore the answer for them is to connect the correspondence hole utilizing hand signal acknowledgment. Thoughts like discourse, signs and visuals can be traded during the time spent correspondence. To communicate their thoughts, hard of hearing individuals utilize different hand motions. Correspondence is the giving of data by talking, composing or utilizing another

medium through various way. These individuals use signs to impart and offer their viewpoints. Hand motions are the implicit traded considerations and these signals are perceived with vision. This nonverbal correspondence of hard of hearing and visually impaired individuals is called communication via gestures. The hand motion is a nonverbal approach to imparting. It contains semantic substance that conveys a tremendous measure of data in communication through signing. Thus, programmed hand signal acknowledgment is in incredible interest. Since the finish of twentieth century, this region has drawn in the consideration of numerous scientists. The meaning of programmed hand signal acknowledgment has expanded due to underneath reasons [1]: (1) the developing pace of the almost totally senseless populace, and (2) the utilization of vision-based and touchless gadgets like computer games, savvy TV control, and augmented reality applications. In our undertaking, our fundamental spotlight is on making a model which will actually want to perceive hand motion to shape a total sentence by incorporating each signal. Gesture based communication acknowledgment would assist with connecting correspondence hole between the clients in the public arena. While correspondence innovations and devices like Skype and WhatsApp turned into an essential piece of our lives, hard of hearing individuals have numerous troubles for utilizing these advances. Day to day correspondence of the hard of hearing local area with the significant hearing local area are effectively open utilizing these advancements. Subsequently, gesture based communication, as a primary kind of the hand signals including visual movements and signs, is utilized as a correspondence framework to help the hard of hearing and visually impaired local area for everyday correspondence. language includes the use of various pieces of the body, similar to fingers, hand and arm. There are four principle boundaries in marking, which are hand-shape, palm direction development and area. To claim an exact sign word, those four boundaries should be performed accurately. The present work in language acknowledgment utilize prior dataset including pictures of only one letters in order. We might want to foster an application that might be applied during a discussion among hard of hearing and visually impaired individuals. To do this, the proposed application should be productive and savvy to the point of isolating the info pictures, including a few characters, words, or sentences, into independent characters, words, or sentences and convert the message into sound as well as the other way around.

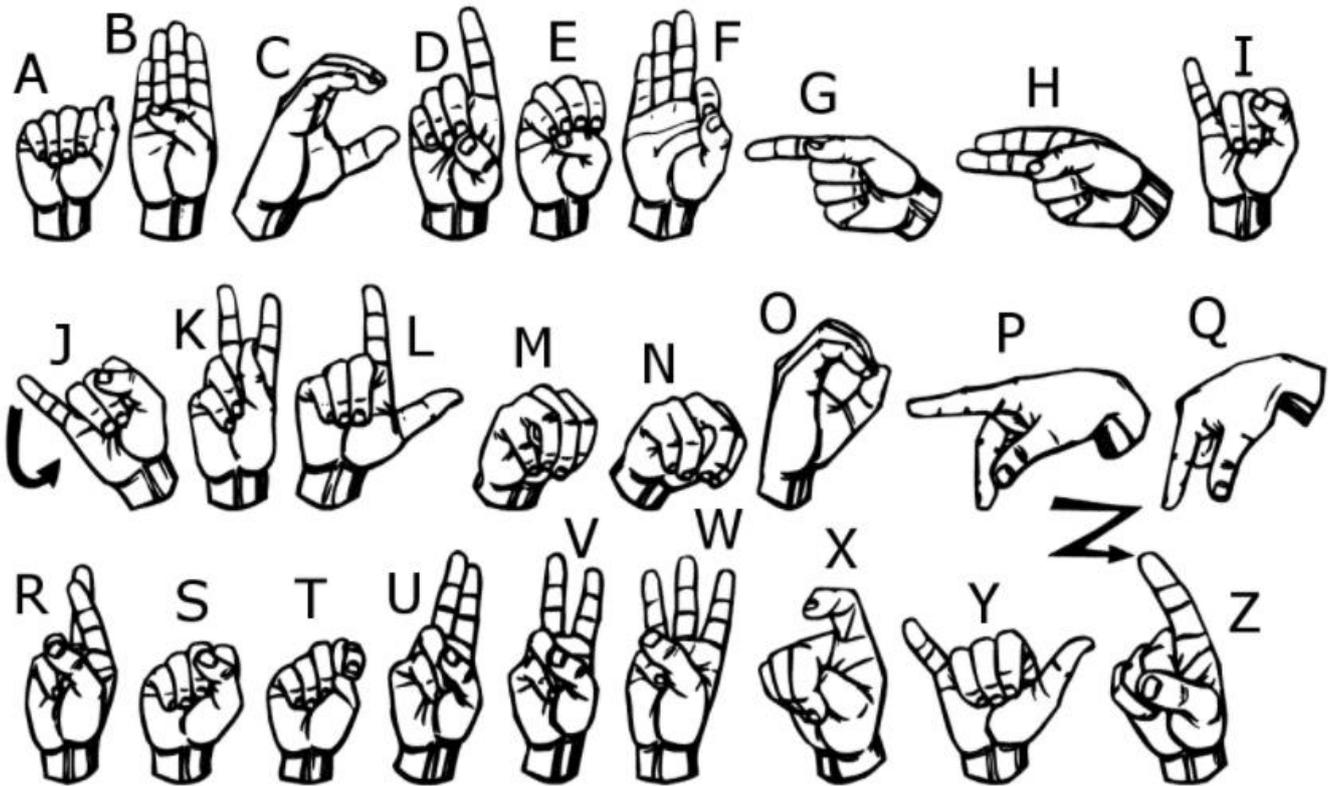


Fig. 1: American Sign Language

## II. LITERATURE SURVEY

- “Sign Language Recognition: A Deep Survey” by Razieh Rastgo, Kouros Kiania, Sergio Escalera  
Deaf people use sign language for communication. In this world, there are different types of sign languages. And American Sign Language is one of them. We created a model which will be helpful for deaf people. This model will translate the signs to simple sentences.
- “Hand Gesture Recognition for Sign Language Using 3DCNN” by Muneer Al-Hammadi, Ghulam Muhammad, Wadood Abdul, Mansour Al-Sulaima  
In this research paper, communication problems of deaf people are highlighted. In this paper, sign language information which includes human hands have been analyzed.
- “Dynamic Sign Language Recognition Based on Video Sequence With BLSTM-3D Residual Networks” by Yanqiu Liao, Pengwen Xiong, Weidong MIN, Weiqiong MIN, Jiahao LU  
In this paper, sign language learning using 2-D image sampling has been proposed. This will help to solve the problem of communication of deaf people. This model will train data and concatenate the data with the model for better results.
- “Machine Learning based Hand Sign Recognition” by Ms. Greeshma Pala, Ms. Jagruti Bhagwan Jethwani, Mr. Satish Shivaji Kumbhar, Ms. Shruti Dilip Patil  
Translation systems which are automatic are very useful in today’s world which shows the increasing

rate in removing barriers which are faced by deaf people. By solving this problem there won’t be any communication gap left between deaf people and normal people.

- “Sign Language Recognition Using Neural Network” by Shailesh Bachani, Shubham Dixit, Rohin Chadha, Prof. Avinash Bagul  
Sign Language is used for communication purposes. Sign Language contains some hand movements which is helpful for a person to communicate without speaking a word. This language is very popular among deaf people but other people avoid learning this language. Therefore, it creates a problem of communication and therefore it kind of creates isolation of physically impaired people.
- “Indian Sign Language Based Static Hand Gesture Recognition Using Deep Learning” by SGnanapriya, Dr. K. Rahimunnisa, AKarthika, MGokulnath, K Logeshkumar  
As sign language is the main language of deaf and dumb people. So it is difficult for a normal person to talk with them as normal people don’t understand their language. So a framework for recognizing Sign Language has been introduced.
- “A New Benchmark on American Sign Language Recognition using Convolutional Neural Network”  
Complicated hand movements along with their constantly changing shapes and positions is observed to be a difficult problem now-a-days. Problems like these will be solved by CNN (Convolutional Neural Network).

### III. PROPOSED SYSTEM APPROACH

The system which is created to convert the hand gesture videos into simple words and also it will be able to create a sentence. Users will get expected results by using CNN(Convolutional Neural Network). When a hand gesture

is captured by camera , it will match with the dataset which has been created and it is stored in the specified folder. The data which is stored in these folders will serve as the input to the Sign Language Generation.

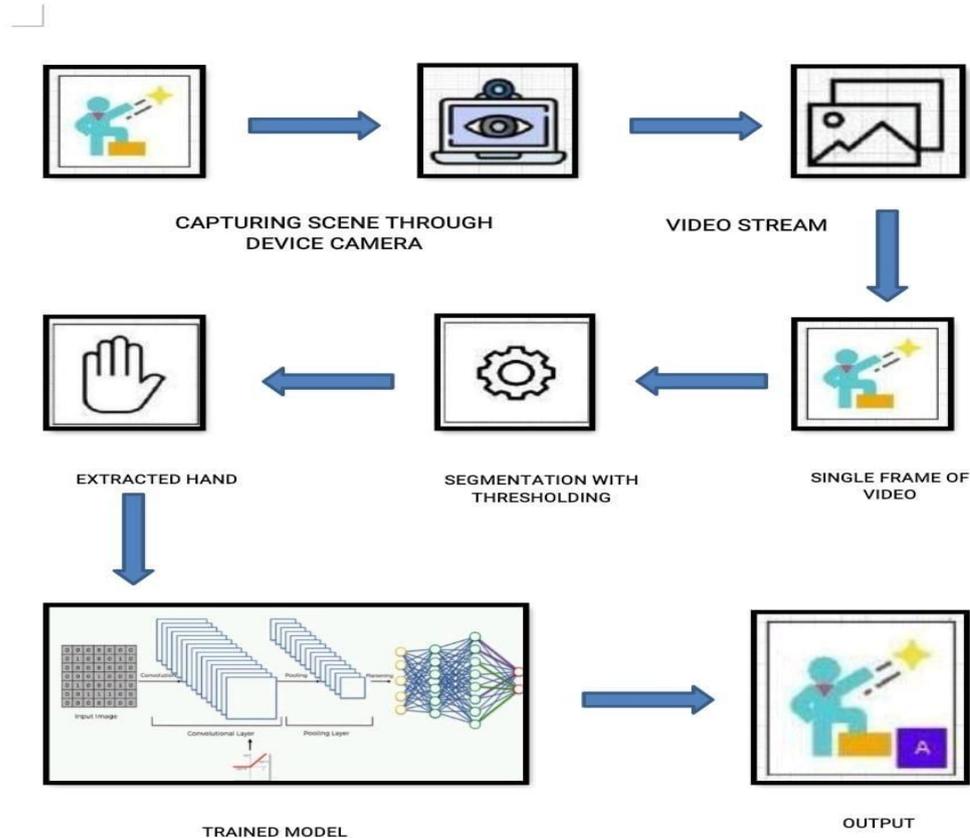


Fig. 2: Architecture

### IV. CONVOLUTIONAL NEURAL NETWORK(CNN) ALGORITHM

In the architecture of Convolutional Neural Network(CNN) takes input as 2-D structured images (or other input as speech signal). This is achieved by some kind of connection followed by some kind of pooling which results in creating various features. One of the most important advantages of Convolutional Neural Network (CNN) is that it is easier to train and they have very less parameters than other networks with similar rate of hidden units.

Input: Hand gestures through camera

Output: Recognize the input hand gestures and then make a full sentence. And the play feature will read that sentence out loud.

### V. CONCLUSION

The communication via gestures acknowledgment framework is possible for hard of hearing individuals since they can convey effectively through this framework. The framework can catch hand signals and explore the words as in message design it will be helpful so that hard of hearing individuals could see these words and get the sentences. It is likewise usable for blind individuals since they need to speak with typical individuals (utilizing discourse acknowledgment).

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