IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

## IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 5, May 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.165

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005048 |

# Sign Language Recognition using A.I. and Machine Learning

**Swapnil Shelke[1], Mayuri Shelar[2], Sheetal Raut[3], Ajit Surwase[4], Prof. Prajwali Korde[5]**

Student, Dept. of Information Technology, JSPM's Bhivarabai Sawant Institute of Technology & Research, Pune, Maharashtra, India

Assistant Professor, Dept. of Information Technology, JSPM's Bhivarabai Sawant Institute of Technology & Research, Pune, Maharashtra, India

**ABSTRACT**: Voice and language are the primary means through which humans communicate with one another. We can comprehend one other's ideas because of our listening abilities. Even today, we can use speech recognition to issue orders. But what if you can't hear anything and, as a result, can't speak? As a result, because sign language is the primary means of communication for hearing challenged and deafeningly deafeningly deafeningly deafeningly deafeningly deafeningly deafeningly deafeningly deafeningly deafeningly deafeningly deafeningly deaf Many strategies and algorithms have been created in this field using image processing and artificial intelligence. Every sign language recognition system has been taught to recognise and transform signs into the needed pattern. The suggested method aims to deliver speech to those who are unable to communicate. In this article, the double-handed Indian Sign Language is captured as a series of photographs, processed with Python, and then translated to voice and text.

**KEYWORDS:** Support vector machines,Deep learning,Machine learning algorithms,Shape,Assistive technology, Gesture recognition, Approximation algorithms

## I. INTRODUCTION

The first step for a computer to grasp human body language is to recognise hand gestures. It's used in a variety of human-computer interface (HCI) applications, including smart TV control, video gaming, telesurgery, and virtual reality [1]. One of the most important uses of hand motion detection is sign language translation. Because they carry crucial human communication information and sentiments, the hand movements used in sign language are arranged in a very complicated fashion. The global configuration (the hand's orientation and relative location to the body) and the local finger configuration are the primitives of these manual expressions. In a succession of frames, an efficient recognition system should examine all of these complementing primitives.

For video modelling, however, a 3D convolutional neural network (3DCNN) was utilised, which is a more advanced variant of ordinary CNNs that includes spatiotemporal filters. This design has been studied for spatiotemporal feature representation in numerous video analysis disciplines, including [15]–[16][17][18]. The capacity of 3DCNN to immediately generate hierarchical representations of spatiotemporal data is its most crucial feature. It does, however, need more parameters than 2DCNN, which is one of its drawbacks. Furthermore, 3DCNN contains an extra kernel dimension, making it more difficult to train. As a result, rather than training a 3DCNN from scratch, it is preferable to use domain adaptation on pre-trained instances.

Motivation:

We are motivated with aim to use new technologies for better humanity. We found Machine learning like technologies can be used for conquering the backwardness occurred because of this physical disability.

## II. LITERATURE SERVEY

**Paper Name:** A Review on Smart Gloves to Convert Sign to Speech for Mute Community
**Author Name:** Khan Sohelrana ,Syed Faiyaz Ahmed ,Shaik Sameer
**Description:** The mute community all over the globe facing many problems while communicating. The normal and dumb people can commu- nicate only in one way i.e. sign language, but many times communicating with normal

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

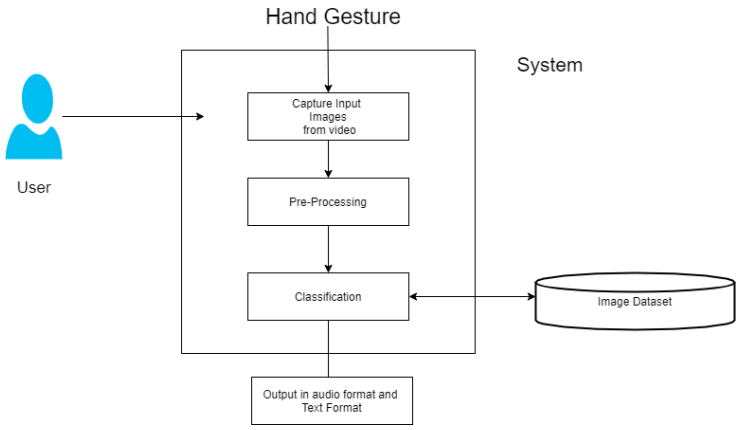
| DOI: 10.15680/IJIRCCE.2022.1005048 |

persons they noticed difficulty. Therefore, there always exists communication barrier. This communication barrier is seen because a speech impaired person uses gesture to commune with common human being which is not suitable. We are implementing this project to reduce the barrier be- tween dumb and normal person. This device design is based on the embedded system. Flex sensor and NodeMCU are the key components.

**Paper Name:** A Gesture-to-Emotional Speech Conversion by Com- bining Gesture Recognition and Facial Expression Recognition
**Author Name:** Nan Song,Hongwu Yang*
**Description:** This paper proposes a facial expression integrated sign language to emotional speech conversion method to solve the communication problems between healthy people and speech disorders. Firstly, the charac- teristics of sign language and the features of facial expression are obtained by a deep neural network (DNN) model. Secondly, a support vector machine (SVM) are trained to classify the sign language and facial expression for rec- ognizing the text of sign language and emotional tags of facial expression. At the same time, a hidden Markov model-based Mandarin-Tibetan bilingual emotional speech synthesizer is trained by speaker adaptive training with a Mandarin emotional speech corpus. Finally, the Mandarin or Tibetan emo- tional speech is synthesized from the recognized text of sign language and emotional tags. The objective tests show that the recognition rate for static sign language respectively. Subjective evaluation demonstrates that synthe- sized emotional speech can get 4.0 of the emotional mean opinion score. The pleasure-arousal-dominance (PAD) tree dimensional emotion model is em- ployed to evaluate the PAD values for both facial expression and synthesized emotional speech. Results show that the PAD values of facial expression are close to the PAD values of synthesized emotional speech. This means that the synthesized emotional speech can express the emotions of facial expres- sion.

**Paper Name:** Hidden Markov model-based Sign Language to Speech Conversion System in TAMIL
**Author Name:** Aiswarya V, Naren Raju N, Johanan Joy Singh S, Nagarajan T, Vijayalakshmi P
**Description:** Quick-eared and articulately speaking people convey their ideas, thoughts, and experiences by vocally interacting with the people around them. The difficulty in achieving the same level of communication is high in the case of the deaf and mute population as they express their emotions through sign language. An ease of communication between the for- mer and the latter is necessary to make the latter an integral part of the society. The aim of this work is to develop a system for recognizing the sign language, which will aid in making this necessity a reality. In the proposed work an accelerometer-gyroscope sensor-based hand gesture recognition mod- ule is developed to recognize different hand gestures that are converted to Tamil phrases and an HMM based text-to-speech synthesizer is built to con- vert the corresponding text to synthetic speech.

## III. METHODOLOGY




### Mathematical Model

Let S be the Whole system which consists:
S= IP, Pro, OP.
Where,
IP is the input of the system.
Pro is the procedure applied to the system to process the given input.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005048 |

OP is the output of the system.
Input

IP = u, F,.
Where,
u be the user.
F be set of files used for sending
Procedure:
Process
In this project capture the image from sign and compair with the dataset.
According to image stored in dataset voice alert message give to the user.
Output:

**Data Flow Diagram**

In Data Flow Diagram,we Show that flow of data in our system in DFD0 we show that base DFD in which rectangle present input as well as output and circle show our system,In DFD1 we show actual input and actual output of system input of our system is text or image and output is rumor detected like wise in DFD 2 we present operation of user as well as admin.

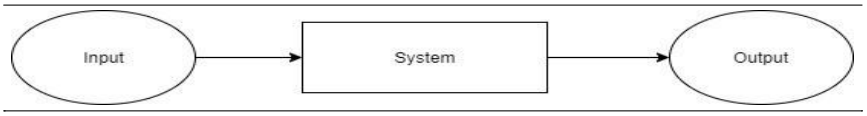
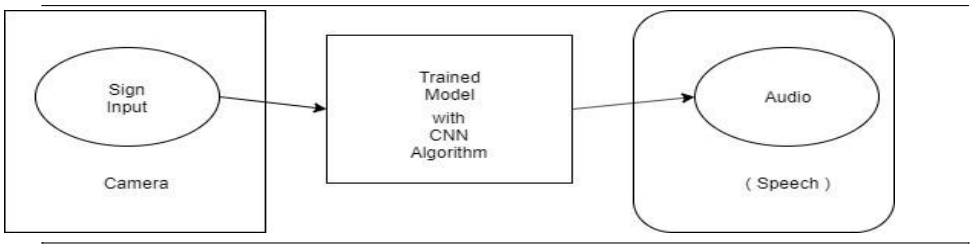



Figure Data Flow Diagram


Figure Data Flow Diagram




**UML Diagrams**

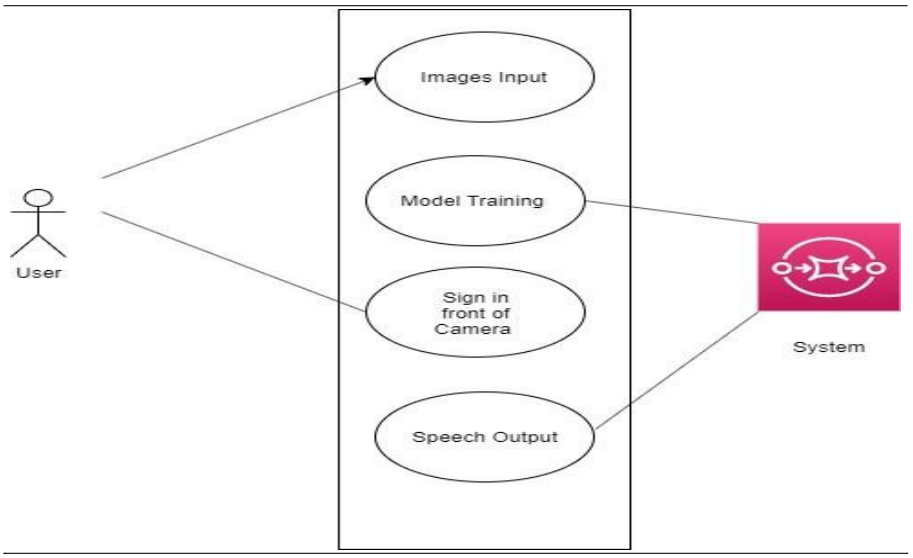
Unified Modeling Language is a standard language for writing software blueprints. The UML may be used to visualize, specify, construct and document the ar- tifacts of a software intensive system. UML is process independent, although optimally it should be used in process that is use case driven, architecture- centric, iterative and incremental. The Number of UML Diagram is available.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005048 |

Use case Diagram.
Activity Diagram.
Sequence Diagram.




## IV.CONCLUSION

Sign Language is a tool to reduce the communication gap between deaf-mute people and normal person. This system which is proposed above gives the methodology which aims to do the same as the two-way communication is possible. This method proposed here facilitates the conversion on the sign into speech. This overcomes the requirement of a translator since real time conversion is used. The system acts a voice of the person who is deaf-mute. This project is a step towards helping a specially challenged people. This can be further enhanced by making it more user friendly, efficient, portable, compatible for more signs and as well as dynamic signs. This can be further improvised so as to making it compatible for the mobile phones using the built-in camera of the phone. We can increase the distance at which it can be used by using a longer trans-receiver module or over Wi-Fi.

## V. FUTURE WORK

In future work, proposed system can be developed and implemented using Raspberry Pi. Image Processing part should be improved so that In future work, proposed system can be developed and implemented using Raspberry Pi. Image Processing part should be improved so that System would be able to communicate in both directions i.e.it should be capable of converting nor- mal language to sign language and vice versa. We will try to recognize signs which include motion. Moreover we will focus on converting the sequence of gestures into text i.e. word and sentences and then converting it into the speech which can be heard.

### Applications

This app was designed by bilingual (English and ASL) Deaf people and is meant to teach conversational ASL. Using more than 1000 videos, it's packed with features to make learning ASL fun and easy.

## REFERENCES

1. Neha Poddar, Shrushti Rao, Shruti Sawant, Vrushali Somavanshi, Prof. Sumita Chandak (Feb 2015), "Study of Sign Language Translation us- ing Gesture Recognition", International Journal of Advanced Research in Computer and Communication Engineering
2. Jayshree R. Pansare, Maya Ingle (2016)," Vision-Based Approach for American Sign Language Recognition Using Edge Orientation Histogram", at 2016 International Conference on Image, Vision and Computing.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005048 |

3. Arslan Arif, Syed Tahir Hussain Rizvi, Iqra Jawaid, Muhammad Adam Waleed, Techno-Talk: An American Sign Language (ASL) Translator, at CoDIT'16 - April 6-8, 2016, Malta
4. Justin K. Chen, Debabrata Sengupta, Rukmani Ravi Sundaram," Sign Language Gesture Recognition with Unsupervised Feature Learning
5. Cireşan, D., Meier, U., Schmidhuber, J.: Multi-column deep neural networks for image classification. In: IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 3642–3649. IEEE (2012)
6. Cooper, H., Ong, E.J., Pugeault, N., Bowden, R.: Sign language recognition using sub-units. The Journal of Machine Learning Research 13(1), 2205–2231 (2012)
7. Escalera, S., Bar, X., Gonzlez, J., Bautista, M.A., Madadi, M., Reyes, M., Ponce, V., Escalante, H.J., Shotton, J., Guyon, I.: Chalearn looking at people challenge 2014: Dataset and results. In: ECCV Workshop (2014)

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 8.165

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

## IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details