

## **Ideation Phase Literature Survey**

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Team ID	PNT2022TMID16504
Project Name	Real Time Communication System for the specially Abled

### **Introduction:**

When it comes to managing their daily activities and chores, people with special needs have various difficulties. These include climbing stairs, using public transportation alone, and a host of other things. This category also includes those who have hearing loss and lack the gift of speech (specially-abled). Numerous difficulties exist for them, but the absence of interpersonal communication is the biggest one. Although sign language can be used to communicate, due to a lack of awareness, relatively few people actually use it.

### **1. Sign Language Recognition Through Fusion of 5DT Data Glove and Camera Based Information:**

**Published on:** 13 June 2015.

**DOI:** [10.1109/IADCC.2015.7154785](https://doi.org/10.1109/IADCC.2015.7154785)

The paper suggests the use of a proposed system which aims to translate hand gestures made using sign language into words with the help of 5DT gloves fitted with position sensors and different machine learning techniques.

#### **Pros:**

- The designed system is precise and accurate.

#### **Cons:**

- The system's high level of sophistication and the use of various electronic components make it less portable.

### **2. Dynamic Tool for American Sign Language Finger Spelling Interpreter**

**Published on:** 13 October 2018.

**DOI:** [10.1109/ICACCCN.2018.8748859](https://doi.org/10.1109/ICACCCN.2018.8748859)

The following paper proposes a method that can reliably classify the letters a-z in American Sign Language. The method first converts videos into frames, which are then pre-processed to create greyscale images. Convolutional Neural Network (CNN) classifier is then used to construct the classification model.

**Pros:**

- Training the model can be easily done using videos .

**Cons:**

- It is only limited to ASL.

### **3. Intelligent Gloves for Deaf and Dumb People:**

**Published on:** 28 August 2019.

**DOI:** [10.1109/FiCloudW.2019.00019](https://doi.org/10.1109/FiCloudW.2019.00019)

This project is constructed with the help of a mobile app and a back-end procedure that operates on a dedicated server. The primary job of the mobile application is to accept data from the gloves and pass it to the back-end procedure. To process the input and release the output, the latter employs the MLP's (Multi-Layer Perceptron) Back-Propagation method.

**Pros:**

- The use of flex sensors make it a very cost effective system.
- Back propagation algorithm is a very simple and easy to use algorithm that yield accurate results.

**Cons:**

- Flex sensors are prone to malfunction under moving and warping garments.
- The performance of a back-propagation algorithm is determined by it's input data.

### **4. Deaf talk using 3D animated sign language - A sign language interpreter using Microsoft's kinect v2:**

**Published on:** 15 July 2016.

**DOI:** [10.1109/SAL.2016.7556002](https://doi.org/10.1109/SAL.2016.7556002)

This paper outlines an innovative strategy for bridging the communication gap between hearing persons and everyday people. Deaf Talk, the proposed system, provides a dual way of communication between sign language speakers and speakers of natural language. It serves as a sign language interpreter and translator. It makes advantage of the most recent Microsoft Kinect for Windows V2 technology, through Kinect's field of view (FOV), the system gets the gestures that are being executed. It then understands the motions by comparing them to the gestures that have already been pre-stored.

**Pros:**

- Kinect can easily detect the exact dimensions of the human body which can prove useful for gesture detection.

**Cons:**

- Can only be used in indoor applications, does not work in outdoor areas
- The distance depth detection of a Kinect is limited.

## **5.Real-Time American Sign Language Recognition using Skin Segmentation and Image Category Classification with Convolutional Neural Network and Deep Learning:**

**Published on:** 31 October 2018.

**DOI:** [10.1109/TENCON.2018.8650524](https://doi.org/10.1109/TENCON.2018.8650524)

The paper that follows presents a method for automatically segmenting human skin based on colour data. The YCbCr colour space is selected because it is frequently used in video coding and offers a useful way to use chrominance data to mimic the colour of human skin. In the CbCr plane, it models the distribution of skin tones as a bi-variate normal distribution. By simulating the behaviour of the algorithm on photos of people of various ethnic backgrounds, it is possible to demonstrate how well it performs. Following that, Deep Learning Method is used to train a classifier to recognise Sign Language, and Convolutional Neural Network (CNN) is utilized to extract features from the photos.

### **Pros:**

- Skin Segmentation can identify gestures with precision as it is primarily used for face recognition.

### **Cons:**

- Cannot differentiate between skin and skin color backgrounds.
- Results might not be consistent.

