

REAL-TIME COMMUNICATION SYSTEM FOR THE SPECIALLY ABLED

PROBLEM SOLUTION DOCUMENT

1. Problem Statement (Problem to be solved) :

In our society, we have people with disabilities. The technology is developing day by day, but no significant developments are undertaken for the betterment of these people. Communications between deaf-dumb and a normal person has always been a challenging task. It is very difficult for deaf and dumb people to convey their message to normal people. Since normal people are not trained on hand sign language. In emergency times conveying their message is very difficult. The human hand has remained a popular choice to convey information in situations where other forms like speech cannot be used. Building a system with Voice Conversion combined with Hand Gesture Recognition and translation will be very useful to have a proper conversation between a normal person and an impaired person in any language.

2. Idea/Solution description :

The concepts of Machine learning algorithms and Neural networks were used to implement a solution. A Convolution Neural network is used to create a model that is subsequently trained on different hand gestures available in the dataset (almost around a thousand of them). All the hand gestures are fed into the model which are then processed, trained, and segregated using a certain machine learning algorithm. A certain No. of records are taken aside to continuously train the model and the rest are used to evaluate the learning of the built model. Clustering algorithms are used to segregate gestures into groups based on the different type of attributes available for a hand gesture. This information subsequently gets converted to human-understandable language and speech is given as output.

In the other way, the same process is repeated where the input is given as a set of text commands from the end users, and they get converted to recognized hand gestures by the learning model which are then displayed to the impaired people.

A Web application is built which uses this model. This Web application enables deaf and dumb people to convey their information

3. Novelty/Uniqueness :

A unique feature that sets apart this web application is that it not only provides a path for the impaired people to communicate comfortably, but also the regular people to communicate/respond back to them. The regular two-way form of communication is achieved in this process. The regular people make use of simple textual handwritten scripts to feed into the application as input, for which the impaired people receive the suitable hand gestures generated. In

order to group all the available hand gestures based on attributes, Different clustering algorithm are used.

4. Social Impact/Customer satisfaction :

The usage of this application creates a definite impact in the society. The end users consisting of the regular and impaired people are able to communicate comfortably without any form of hassle. Fear of Anxiety that always prevailed among them are substantially removed. There is no limitation in the process and the customers are satisfied with the system that is available.

5. Business model (Financial benefit) :

Different strategies can be used to obtain financial benefit from the application. Initially, almost all of the comprising features can be made available free for the end users, for a specific time period. This will allow them to get acquainted with the software and the need to use it more and more. Selective features can be made as paid features as time progresses, by releasing 'Premium' or the more refined versions.

Customer feedbacks can be collected on a regular basis since they constitute the heart of the application. They can be used to improve the system into more refined ones.

6. Scalability :

There is a lot of potential for this application to expand and grow. The textual input that is received from the side of the regular users can be made to instead accommodate voice commands. This is an advancement of the previous feature, and this will allow surplus users to use the software. Though issues might be observed during the processing of these voice notes, implementation of the same would see a significant rise in the No. of users making use of the application.