

# Basic Gesture Based Communication for Deaf and Dumb

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**Abstract:** Basic Gesture Based Communication for Deaf and Dumb is an Application which converts Input Gesture to Corresponding text. It is observed that people having Speech or Listening Disability face many communication problem while interacting with other people. Also it is not easy for people without such disability to understand what the opposite person wants to say with the help of the gesture he or she may be showing. In order to overcome this barrier we made an attempt of creating an application which will detect these gesture and provide a textual output enabling a smoother process of communication. There is a lot of research being done on Gesture Recognition. This Project will help the users ie the deaf and dumb people to communicate with other people without having any barriers due their disability.

**Keywords:** Gesture Recognition, Textual Output, Sign Language, real time sign language to natural language conversion

## I. INTRODUCTION

The language used by the Deaf and Dumb people to represent themselves is known as sign language. The deaf and dumb experience numerous challenges in their day to day life while communicating with normal people were social interaction, communication disparity, education, behavioural problems and much more. This has led to them not being able to express them in social gathering, emergency cases or even in a private conversation. For the normal people to communicate and understand what the deaf and dumb people want to convey, they must undergo a special training in understanding the sign language. The sign language primarily uses hand gestures to convey the message. The major idea behind creating this application is to smoothen the communication between normal people and deaf and dumb people by converting the hand gestures into textual outputs. The application developed enables the deaf and dumb to express themselves in a much better way.

This approach had three modules:

1. Capture Gesture
2. Identify the Gesture
3. Give a proper textual output

In this paper we try to get a proper textual output by giving a correct gesture input.

Basic Gesture Based Communication for Deaf and Dumb finds it application majorly in the field of communication.

The few commercial uses of Application are as follow:

1. Disabled people working as a cashier at different cafeterias can use this application to improve their communication with the customers
2. Workers employed at mall can use this application to communicate and help the customers in and around the mall.

## II. LITERATURE SURVEY

Multiple Various paper pertaining to gesture recognition and image processing were studied in search for a method to obtain and recognize gesture which would be unique and very easy to interpret and implement

The paper by Ji-Hwan Kim and Tae-Seong-Kim[1] considers a way of input for the gesture recognition purpose. They used an electronic glove as an input device fitted with multiple sensors to detect the gestures

Meenakshi Pawar[2] used Clustering algorithm to identify the hand and separating the background using K-Clustering algorithm[2].

Aarthi M and VijaylaxmiP[3] and also N. Sriram, M. Nithyanandham [4],[5] discussed the the idea of recognizing gesture from the input.

paper on Houghs Alogrithm[8] helped us to gain knowledge that the algorithmic approach could work using the following algorithm provided. Houghs algorithm basically is used to obtain reference points and recognize shapes using the following reference points. The paper by Jaruwan Toontham and Chaipon Thongchaisuratkrul[6] uses the shapes in recognizing figures and this idea was implemented in identifying fingers which later enabled us to recognize the gesture.

## III. PROPOSED CONCEPT

We have proposed a system of Basic Gesture Based Communication for Deaf and Dumb. There have been many algorithms proposed to find the best outcome possible. However due to certain constraints self implied by us led to us developing an entire new algorithm. We recognize the hand by separating out the background. The separation will be done by converting the image into a black and white scale. The gesture will be recognized using Houghs algorithm by detecting circles around the finger tips and accordingly calculating the Euclidean distance between the centers of

these circles. On recognizing the gesture the application will give a proper textual output.

#### IV. IMPLEMENTATION

The Basic Gesture based communication for deaf and dumb is an application which allows the deaf and dumb people to convey their thought in an textual manner. The application works in 3 Modules

1. Capture Gesture
2. Identify the Gesture
3. Give a proper textual output

Capturing the gesture is done using a simple webcam having high resolution. This ensure that the image captured is not blurred which may causes errors in the processing part. once the image is captured the pre-processing occurs. Here the image is converted into grayscale and further converted into Black and White scale using the Ostus Threshold value for intensity. This is done for the background separation. Once the Bland and white image is obtained the major processing part occurs. The Houghs Algorithm[7] is applied to detect circles at the finger tips. This enables us to spot the fingers and recognize them. Using Euclidian distance formula we calculate the distance between the center of the circles. Any changes in the distance will result in a new gesture being recognized. This is how the gestures are recognized Once the Gestures are recognized, the corresponding text output is displayed in the output window.



Fig 1:Proposed Basic Gesture Based Communication for Deaf and Dumb Model

#### V. CASE STUDY

The following are some of the cases considered for recognizing the gesture and giving a textual output. Users give their gestures using the camera provided and the textual output will be shown in an adjoining box.

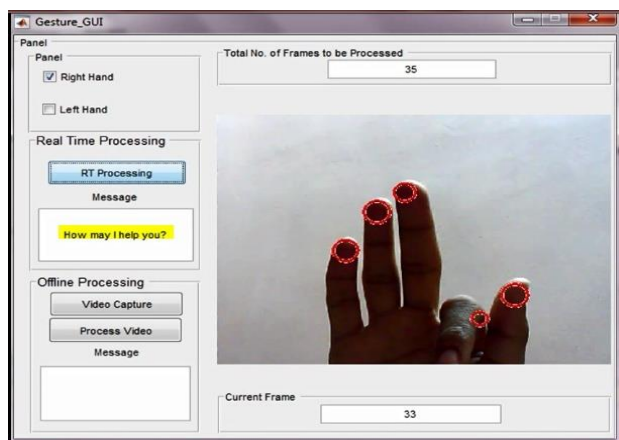


Fig 2: Application GUI

#### VI. RESULTS

When the user opens up the application from his system,he can convey message to the human's who have disability to hear and speak. As the application runs at first time , the gesture which is being shown at the web-camera is being captured and the text is being simultaneously displayed in the textbox. The application as consists of the real-time processing as well as video processing , the user has choice of using the application in real-time or as processed video. The application when works on real-time processing, the text is being displayed as 'Thumb down', 'Ring finger down' etc which consists of five different hand gestures. Similarly when the application works on video processing , the text is being displayed as 'One', 'Two', 'Three' etc which consists of rest five different gestures. Besides this the user is also being given choice of choosing type I and type II and also the choice of using his left hand or right hand according to his convenience.

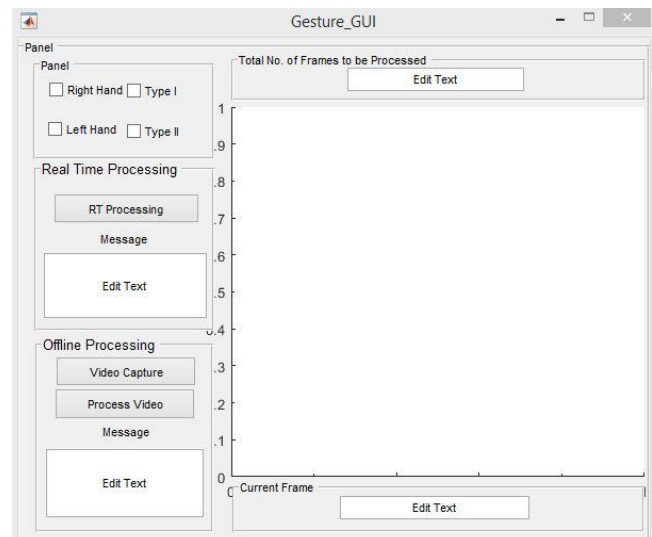


Fig 3: (GUI –output at first screen)

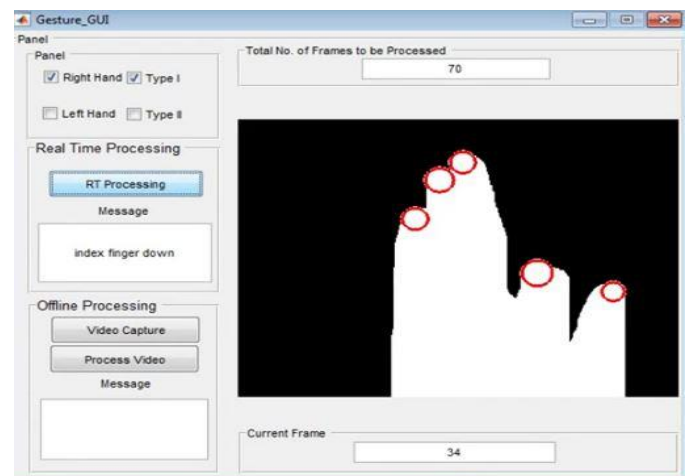


Fig 4: (Back Process Output – Captured gestured is being scaled in black & white image )

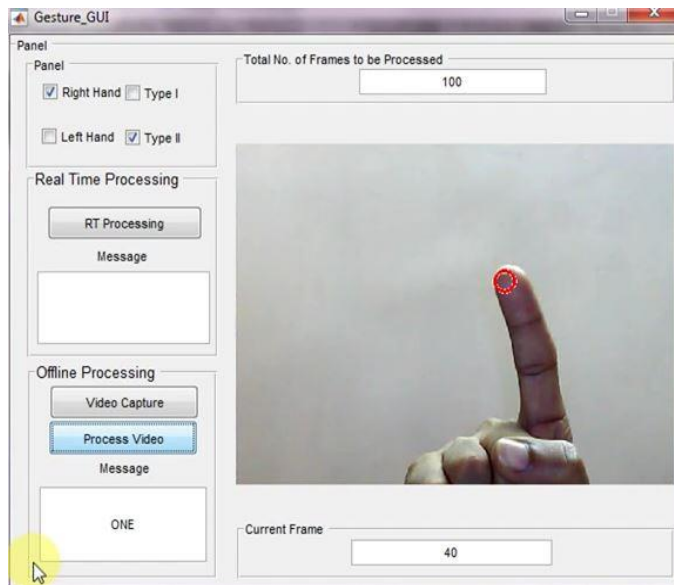


fig 5: (Right Hand , Type II , Process Video – shows ONE)

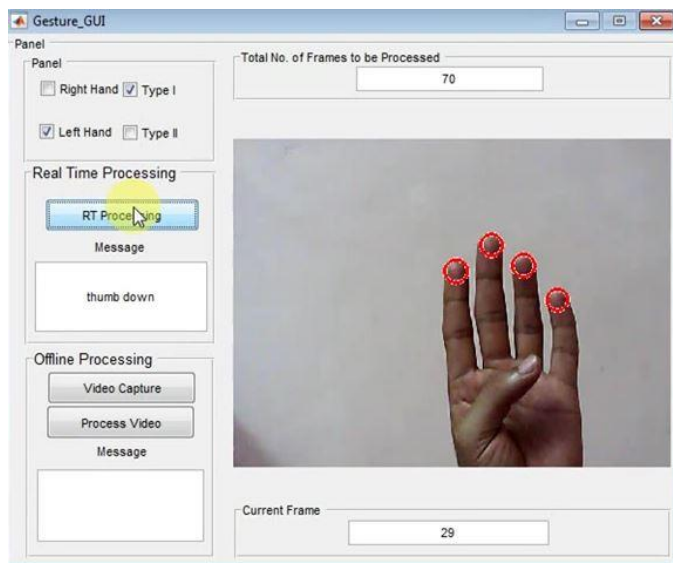


Fig 6: (Left hand, Type I, Real time Processing – shows Thumb Down)

## VII. CONCLUSION

The need of Gesture based communication systems are on a high these days because it results into better interaction between humans having speaking disability with the other common people. Hence to make the communication more interactive we convert these Gestures into Text which can be understood by everyone including those who fail to understand the Gesture based communication. The process of gesture recognition requires a broad algorithm which can accommodate all the gestures possible without hindering the performance of the system. This will result in quick and accurate Gesture detection and give the corresponding text output. A basic description of data set and application of each module is provided in the given document. The impact of the proposed system can be checked in situations where Gestures based communication is primary mode of communication where the application will convert the gesture to a particular text reducing the communication gap between the Speech Disabled People and the Common people.

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