Real Time Two Way Communication Approach for Hearing Impaired and Dumb Person Based on Image Processing

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ABSTRACT-   It has been observed that, due to the birth defects, accidents and oral diseases the numbers of deaf and dumb victims are increasing, for them communication is the major problem. They require some sort of smart systems which convert the gestures to speech and vice versa. This paper produces the idea based on designing and implementing a system which uses image processing concepts to take input as hand gestures and generate recognizable output in the form of text and voice, also takes input as a speech and generates recognizable output in the form of gesture images.

I. INTRODUCTION

Image processing is a method to perform some operations on an image to get an enhanced image or to extract some useful information from it. Advent of new technologies such as Digital Image Processing or Image analysis technology has many applications. In our daily routine we can communicate each other by using speech and gestures. Gestures are more preferable and natural to interact with computers and human thus it builds richer bridge between humans and machines. For many hearing impaired and dumb person, sign language serves as their primary language creating a strong sense of social and cultural identity. Sign language is widely used by people who can't speak and hear or people who can hear but can't speak. A sign language is composed of various gestures formed by different hand shapes, movements and orientations of hands or body, or facial expressions. There are various sign languages across the world, each with its own vocabulary. Gestures are used by the deaf people to express their thoughts. But the use of these gestures are always limited in the deaf-dumb community, normal people never try to learn the sign language. This causes a big gap in communication between the deaf–dumb people and the normal people. Usually deaf people seek the help of sign language interpreters for translating their thoughts to normal people and vice versa. But this system is very costly and does not work throughout the life period of a deaf person. So a system that automatically recognizes the sign language gestures is necessary. Such a system can minimize the gap between deaf people and normal people in the society.

II. METHODOLOGY

A. Gesture to Speech Conversion System:

Figure drawn below shows the flow diagram for hand gestures to speech conversion System. It includes the following steps:

a) Image Acquisition

b) Image Preprocessing
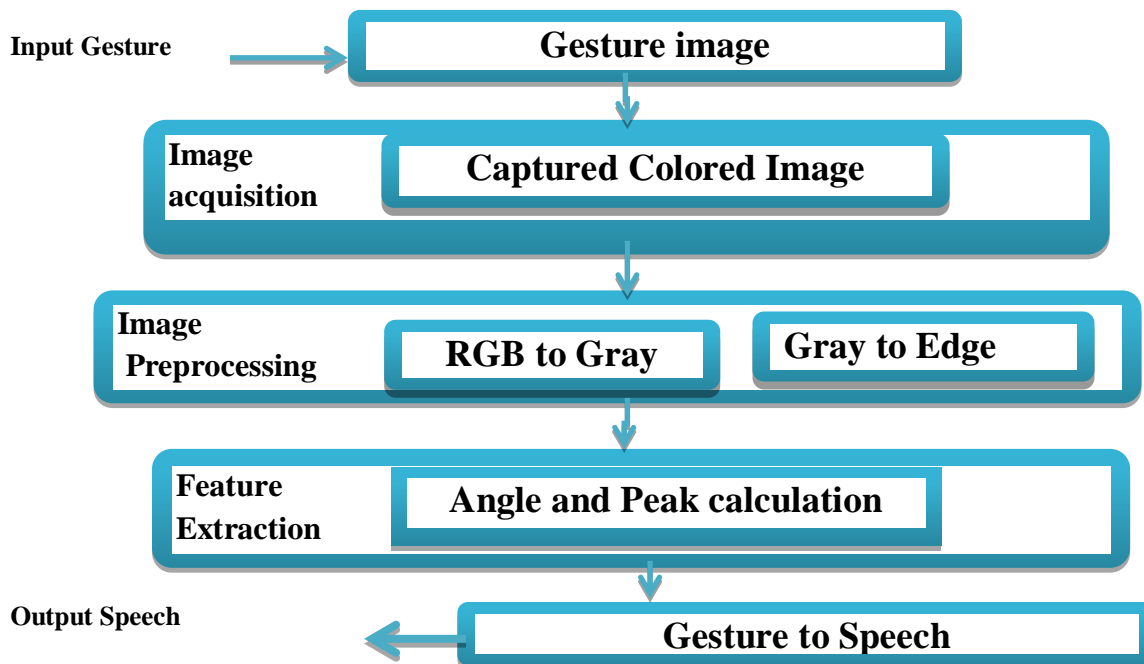
c) Feature Extraction

Figure 1.Gesture to speech conversion system

As specified above the system is decomposed into five different stages. Each of which is described below.

a)   Image Acquisition: In any image processing applications, the work always starts with image acquisition. The digitization and storage of an image is referred as the image acquisition. There are many input devices available some of them are hand images, data gloves and markers etc. In this system a real time image is acquired by using web cam.

b)   Image Pre-processing: This is very important step for getting good results. The real time RGB color images are captured using a webcam and converted into gray Images. Background segmentation is used to separate the hand object in the image from its background.

c)   Feature Extraction: There are many techniques available for feature extraction. The proposed system uses canny edge detection algorithm, which takes input in the form RGB color image and then convert it to gray and then finally to edge image. Finally we recognize the hand gestures and then convert it into speech by using JAVA JARS which contains inbuilt functions.

d)   Gesture to Speech conversion: After recognizing the hand gesture the images are converted into speech for providing better communication for hearing impaired and dumb person.

B. Speech to gesture conversion system:
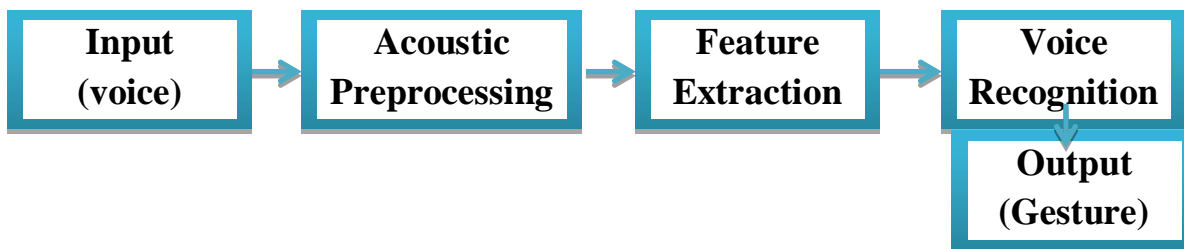
**Figure 2.Speech to gesture conversion system**

a)   Speech recognition: Speech recognition or Automatic Speech Recognition (ASR) is an essential and integral part of the human computer interaction Voice Recognition based on the speaker can be classified into two types namely: Speaker dependent and Speaker-independent.

b)   We take input from the speaker and compare the spoken alphabet with the stored data.

c)   And finally we get the output in the form of gesture image depending on the compared data.
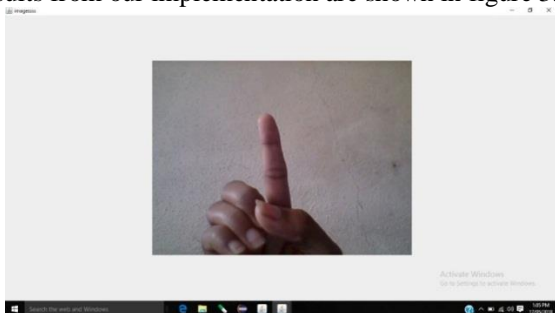
d)

III.   RESULT

This System is cheap, efficient and portable. This system also uses simple techniques. Deaf and dumb people are helped by this Paper doing communication in marking areas, public sectors, working areas with others.

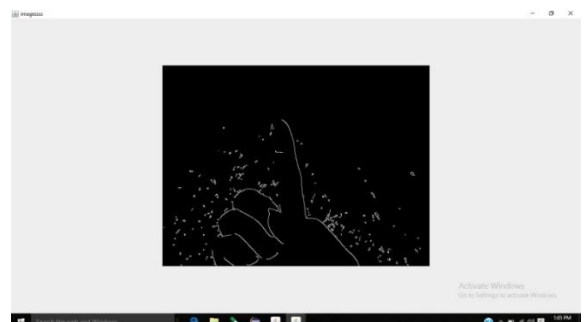Results from our implementation are shown in figure 3.

Figure 3(a).Input image

This input image representing digit 1 is color image which is taken directly from the webcam of system.
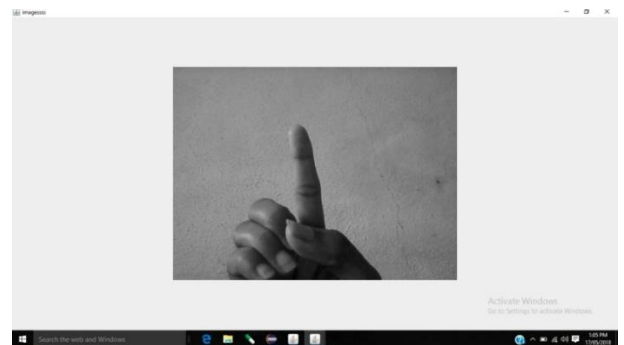
Figure 3(b).Gray image.

Figure 3(c).Edge image.

The figure 3 is obtained after applying canny edge detector technique. In which we use JAR containing inbuilt function for capturing color image and converting it into gray image and then finally to edged image. After this using edge image we calculate angle and peak of that and compare it with images stored and then give output in the form of speech.

Next in the second phase we convert the input speech given to the system with the help microphone and compare that voice with the gesture stored and give output in the form of gesture.

IV. CONCLUSION

The main aim of this Paper is to reduce the communication gap between deaf or mute community and normal people. This system is proposed to improve lifestyle of dumb/ deaf person's. This Paper bridge the gap by introducing an inexpensive computer in the communication path so that the sign language can be automatically captured, recognized and translated to speech for the benefit of blind people. In the other direction, speech must be analyzed and converted to either sign or textual display on the screen for the benefit of the hearing impaired,since it facilitates dual communication. Hence this system enables deaf and dumb people to further connect with their society and aids them in overcoming communication obstacles created by the society's incapability of understanding and expressing sign language.

V. REFERENCES

[1]. Cao Dong, Ming C.Leu, Zhaozheng Yin, *" American sign language Alphabet Recognition Using Microsoft Kinect"*, Computer Vision andpattern Recognition workshop, IEEE conference, pp ,2015.

[2]. Vajjarapu Lavanya, M.S. Akulapravin, Madhan Mohan, *"Hand Gesture Recognition and Voice Conversion System Using Sign Language Transcription System"*, IJECT Vol. 5, Issue 4, Oct – Dec2014.

[3]. M. M. Gharasuie, H.Seyedarabi, *"Real-time Dynamic Hand Gesture Recognition using Hidden Markov Models"*, 8th Iranian Conferenceon Machine Vision and Image Processing (MVIP), 978-1-4673-6184- 2/13/$31.00,2013.

[4]. Aditi Kalsh, N.S. Garewal ,*"Sign Language Recognition for Deaf & Dumb"*, International Journal of Advanced Research in ComputerScience and Software Engineering, Volume 3, Issue 9, September 2013.

[5]. Bhupinder Singh, Neha Kapur, Puneet Kaur "Speech Recognition with Hidden Markov Model: A Review" *International Journal of Advancsed Research in Computer and Software Engineering, Vol. 2,Issue 3,* March 2012.