Real-Time Communication System Powered By AI For Specially Abled

INTRODUCTION :

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. Communication between deaf-mute and a normal person has always been a challenging task. It is very difficult for mute people to convey their message to normal people. Since normal people are not trained in 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. Voice Conversion System 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.

The project aims to develop a system that converts the sign language into a human hearing voice in the desired language to convey a message to normal people, as well as convert speech into understandable sign language for the deaf and dumb. We are making use of a convolution neural network to create a model that is trained on different hand gestures. An app is built which uses this model. This app enables deaf and dumb people to convey their information using signs which get converted to human-understandable language and speech is given as output.

LITERATURE SURVEY :

Naresh Thoutam, Deepak Kumar Jha, Lakshya Jaiswal Sanchit Deshmukh Rishabh Raj [1] First , the hand gestures are recorded using the camera and the image feature extraction will be done and the text message will be generated and the system will convert the text message into Audio format . PCA algorithm is used in order to extract the features of an image. PCA algorithm is applied on the captured images in order to extract the best featured image from the database. PCA converts the images into some independent linear set of variables which refers to the information in the original data which is referred to as principal components.

Shweta S. Shinde, Rajesh M. Autee and Vitthal K. Bhosale [2] have proposed a method in which the angle and peak calculation approach is used to extract the features of hand gestures by using MATLAB and then they convert the recognized gesture into speech using MATLAB inbuilt command.

Sangeetha .R.K, Valliammai .V and Padmavathi .S [3] have proposed a system based on the Indian hand sign language which contains both hands to create a gesture unlike the American sign language in which one hand is used. Their system is implemented using MATLAB without using any other external hardware for the user, here the runtime live image is captured after which image frames are extracted and image processing is applied using HIS model and then the feature extraction is done by distance transform method.The results obtained by this model are found to be satisfactorily good for most of the hand signs.

Anchal Sood and Anju Mishra [4] have proposed a sign recognition system based on Harris algorithm for extraction of feature in which after the image pre-processing part, the feature is extracted and stored in the Nx2 matrix. This matrix is further used to match the image from the database. There are some limitations to the system. The very light brown to somewhat dark brown background gives errors as they are considered in the range value for skin segmentation. But the results are efficient.

Prashant G. Ahire, Kshitija B. Tilekar, Tejaswini A. Jawake, Pramod B. Warale [5] system works on MATLAB for hand gesture recognition, here they have taken a real time video as an input and after applying the image processing stage they have used the correlation based approach for mapping purpose and then at last the audio is generated using google TTS API. The system provides an efficient result as per the system is proposed.

Mrs.Neela Harish and Dr. S. Poonguzhali [6] has proposed a system based on the hardware approach. The system consists of hardware called a data glove, the glove consists of a sensory part that consists of flex sensors, accelerometer and PIC microcontroller which provides all the input and output for the system. The results obtained are efficient and satisfactory.

With the utilization of image processing and artificial intelligence, numerous algorithms and techniques have been produced. Each gesture based communication acknowledgment framework learns and recognizes the signs and changes them into required patterns. Double handed Indian Sign Language is caught as a progression of pictures and it's computed with the assistance of MATLAB and after that it's changed over to speech and text [7].

A framework that can distinguish static hand indications of letters in order in American Sign Language (ASL). Flex Sensor-based signal acknowledgment module is produced toperceive English letter sets and few words and a Text-toSpeech synthesizer in light of HMM is worked to change over the comparing content It requires less segments, some of which are flex sensor, Arduino and accelerometer and consequently its cost is low contrasted with vision-based motion acknowledgment framework. In the first place the framework will change over the signal (gesture) to the comparing content and after that the discourse is blended forthe relating content by utilizing the text-to-speech synthesizer.The framework devours low power and it is versatile. Thesensor glove outline alongside the material sensor helps in diminishing the uncertainty in signals and shows enhanced exactness [8].

Tan Tian Swee et al. [9] proposed a hardware design for Malay Sign Language Gesture Recognition Systems. Accelerometer sensors and flex sensors are used to capture movement of shoulder, elbow, wrist, palm, and fingers. These sensors connect wirelessly to a PC via Bluetooth. This system is able to recognize 25 common words in Bahasa Isyarat Malaysia(BIM) by using Hidden Markov Models (HMM) method. This system consists of 24 sensors in total.

Pham The Hai et al. [10] developed a project to extractfeatures of the Vietnamese sign language. This system collects the Sign Language gesture images which include depth images, RGB images and skeletal joint maps. These Images are used to extract the desired features of each hand gesture. Multiclass classSupport Vector Machines(SVM) are used to classify gestures.

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