LITERATURE SURVEY

Real-Time Communication System Powered by AI for Specially Abled

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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 ofthese people. Communications 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 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. 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.

OBJECTIVE

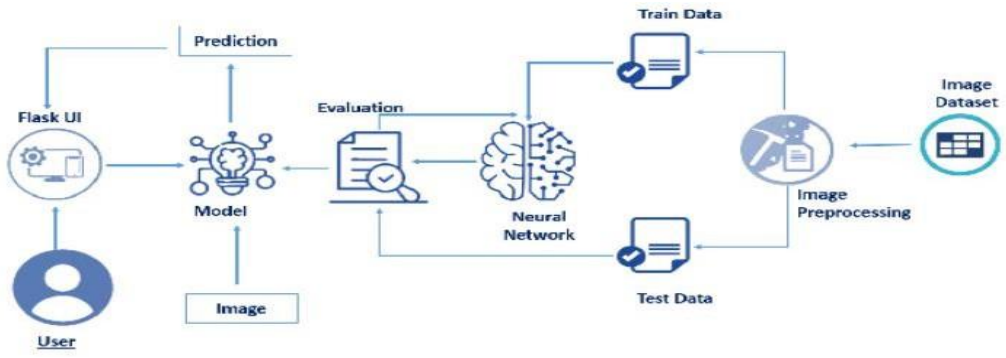
The project aims to develop a system that converts the sign language into a human hearing voice in the desired language to convey a message to normal people, as well as convert speech into understandable sign language for the deaf and dumb. We are making use of a convolution neural network to create 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 asoutput.

METHODOLOGY

Open-CV (Open Source Computer Vision) is an open source computer vision and machine learning software library. It is a cross platform library used to develop real time computer vision applications. It mainly focuses on image processing¸ video capture and analysis including features like Sign language is not a global language. Every country has its own local sign language. Each sign language has its own grammar rules, word structure and sounding. The problem exists when deaf and dumb people try to communicate using with normal peoplewho are unable to understand this language. So it becomes important to develop an automatic and reciprocal transcriber to understand them.

So it's mandatory to overcome these communication gaps between the deaf community and normal persons. Two way communications system is providing for deaf and dumb peoples. We take input as action of hand gestures and convertit into common words of communication in text. After getting text, normal peoplecan understand it. Similarly, normal people can speak in form of voice; our system will convert it into text and further convert it into actions which are simplyunderstandable by deaf people.



We are going to develop two way communication systems by using machine learning and image processing techniques. The current real time application will work for real time assistance

Activities to be carried out:

Machine learning methods for sign language recognition:

A critical review and analysis : After a comprehensive literature review, the commonly intelligent predictors utilized for recognition of sign language are k-nearest neighbor (KNN), artificial neural network (ANN), support vector machine (SVM), hidden Markov Model (HMM), Convolutional Neural Network (CNN), fuzzy logic and ensemble learning. This section briefs about machine learning techniques used to recognize sign language. Accuracy of the paper: 90%.

Survey on sign language recognition in the context of vision-based and deep learning

Using their ideas and limitations for the Sign Language Recognition System, comparing one method to another is still subjective. Deep learning-based approaches like CNN, RNN, LSTM, and Bi-Directional LSTM Models provide good recognition accuracy in the sequence of images and video streams. Accuracy of the paper: 89.5%

Conversation of Sign Language to Speech with Human Gestures

Research in the sign language system has two well-known approaches are Image processing and Data glove. The image processing technique using the camera to capture the image/video. Analysis the data with static images and recognize the image using algorithms and produce sentences in the display, vision based sign language recognition system mainly follows the algorithms are Hidden Markov Mode (HMM), Artificial Neural Networks (ANN) and Sum of Absolute Difference (SAD) Algorithm use to extract the image and eliminate the unwanted background noise. The main drawback of the vision-based sign language recognition system image acquisition process has many environmental apprehensions such as the place of the camera, background condition,s and lightning sensitivity. The camera is placed to focus on the spot that capture maximum achievable hand movements, a higher resolution camera takes up morecomputation time and occupy more memory space. Users always needs camera forever and cannot implement in public place. Another research approach is a sign language recognition system using a data glove . Users need to wear glove consist of flex sensor and motion tracker. Data are directly obtained from each sensor depends upon finger flexures and computer analysis sensor data with staticdata to produce sentences. It’s using neural network to improve the performanceof the system. The main advantage of this approach less computational time andfast response in real time applications. Its portable device and cost of the device

also low. Another approach using a portable Accelerometer (ACC) and Surface Electro Myogram (sEMG) sensors used to measure the hand gesture. ACC used to capture movement information of hand and Arms. EMG sensor placed, it generates different sign gesture. Sensor output signals are fed to the computer process to recognize the hand gesture and produce speech/text. But none of the above methods provide users with natural interaction. This proposed system will be capable of performing the conversation without any wearable device instead using the human motion and gesture recognition. Accuracy: 90%

Real-Time Assistive Interpreter For Deaf Community Over Machine Learning

The purpose of this system is to represent a real-time two way communication interpreter based on Indian Sign Language (ISL) with higher accuracy.Our motive behind this implementation is to create a complete language that involves movement of hands, facial expressions and gestures of the body. This system captures hand gesture images of ISL with a system camera for feature extraction. The analyzing phase, the pre-processing unit is used for the noise removal, greyscale conversion by using Gaussian filter, binary conversion of images done by using OTSU's method followed by feature extraction. In real-time scenario we have achieved accuracy above 90% in each trained model.

Sign Language Recognition

In this sign language recognition, they try to create a sign language recognizer. Which detects alphabet characters from 'A' to 'Z' that can very easily be extended to cover a vast multitude of other sign and hand gestures including the alphabets. Data processing, manipulation of data by a computer. It include the conversion of raw data to machine-readable form, flow of data through the CPU and memory to output devices, and formatting or transformation of output. Any use of computers to perform defined operations on data is included under data processing. We used open computer vision (OpenCV) library in order to produce our dataset. Firstly, we captured 300 images of each of the symbols in ASL for training purpose and around 300 images per symbol for testing purpose. First, we captured each frame shown by the webcam of our machine. In each frame we define a region of interest (ROI) which is denoted by a blue bounded square. From the whole image we extracted our ROI which is RGB and convert it into grey scale image. Finally, we apply our gaussian blur filter to our image which helps us extracting various features of our images. After a model has been trained, it can be used to classify a new gesture that is available as a file on the file system. The user inputs the file-path of gesture image. Pre-process the file the same way as the model has been trained.

Sign Language Recognition System using Convolutional Neural Network and Computer Vision

Computer vision-based gesture recognition system is widely researched for detection of sign gestures. This method involves capturing of hand movements by a camera and therefore the captured images are processed using computer vision software frameworks for alphabet detection. Image pre-processing methods like image enhancement, ROI selection, image segmentation are followed to get the processed images for detection of alphabets. This takes up tons of computation task and sometimes requires manual intervention for ROI selection within the input images. . This paper proposes a custom DNN model for recognition of English alphabets using Convolution Neural Network (CNN). The proposed DNN extracts features automatically from the input hand gestureimages and classifies it. A test sample of 10 sign gestures are trained DNN modeland therefore the prediction accuracy is calculated. The weights that are obtained within the last trial with the simplest training and validation accuracy is stored during the training process. A more comprehensive image collection and data augmentation can cause better prediction probabilities.

Survey On English Alphabet Sign Language Recognition Using Deep Learning Methods

This paper utilizes recent improvements in deep learning methodologies for the development of English alphabet sign language machine translation. In this paper, a 3D model-based method for the recognition of sign language and semaphoric hand gestures is present. In particular, the proposed approach utilizes a skeletal-based demonstration, where a virtual portrayal of the skeleton hands is mapped to explicit fragments. We are planning to create this new dataset also including RGB frames, depth maps, and the whole hand skeleton model. With the use of more convolution neural network blocks and use different optimizer functions we get higher accuracy in sign language recognition