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Online Hand Gesture Recognition and Classification for Deaf and Dumb

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Abstract - As sign language is used by deaf and dumb but the non-sign-language speaker cannot understand there sign language to overcome the problem we proposed this system using python. In this first we taken the some of the hand gestures are captured using the web camera. The image is pre-processed and then feature are extracted from the captured image .comparing the feature extracted image with the reference image. If matched decision is taken the displayed as a text. This helps the non-sign-language members to recognize easily by using Convolutional neural network layer (CNN) with tensor flow

Keywords - gesture, sign language, Python, Convolutional Neural Network (CNN) layer, Tensor Flow

I. INTRODUCTION

Nowadays we are hearing about the new technologies which are making our life easier. But the main challenging task is that there is a communication problem to deaf and dumb as they are unable to communicate easily with normal person. Around 9 billion people in the world are deaf and dumb but everyone could communicate using sign language, for this reason we have used hand gesture method which would convert the hand gesture into the text with give solution to this major problem. Gesture is an expression of a person, they are of two kinds- hand gesture and body gesture [1]. With this we can get to know about the meaning of the gesture. Hand gestures are important which helps them to express their views.

In this Human-computer interaction (HCI) plays a significant role in hand gesture recognition. Many new technologies have been improved in the field of human computer interaction [1]. Gesture is divided into different categories, vision based and detector type. Here we have used a vision based for gesture recognition with the algorithms .Gesture recognition uses the method which would collect the information based on the physical actions and process it and displays the result [3].The vision based only needs camera to capture the image and have a decision and give an output [2].

Here we have used python and tensor flow for this project. The tensor flow is a library which is used to interface the machine learning and image processing to the python programming. In this we have used CNN (Convolutional neural network) layer and dense layer and built the hand gesture model. The main application of this is to avoid communication problem for deaf and dumb.

II. EXISTING SYSTEM

The system has implemented using MATLAB without the hardware and here the runtime image is captured after the image converted into frames and image is extracted and processing the image is applied using HIS model

III. PROPOSED SYSTEM



Fig-1 various data samples

The data samples placed in datasets are showed in the figure-1

The images are predefined in the datasets, the sets are test and train. The preprocessing of images is done to enhance the features which is helpful in further processing. In this preprocessing all the scaling and transformation of the image is done. CNN model is applied in this project .CNN is artificial neural network for recognition of image and process it. It is a deep

learning algorithm .We have used two convolutional layers, two pooling layers and a fully connected layer. We are using dense layer for connecting all the neural layers. Images are tested and trained and output is predicted and displayed.

We are using python software to implement this project we are mainly using a tensor flow library for machine learning .it can be used across a range of tasks but has particular focus Then image data argumentation is done here in this provided various values such as rescale , zoom range, horizontal flips .loading of data and performing data argumentation here we applied the pre-processing technique to the dataset and store them 30 images to 6 class in train set and 594 images to 6 classes test set. Then creating the model using CNN layer .In CNN layer we initializing the model using sequential class which built the layer on by one. Both convolutional layer and pooling layer is used at first and second layer and flattening the layer that will converts the pooled feature map to a single column that is passed to the fully connected layer. Then train the model using train data type in 50 epoch's .after 50 epochs we save the model. We then predicting the results and displayed as text.

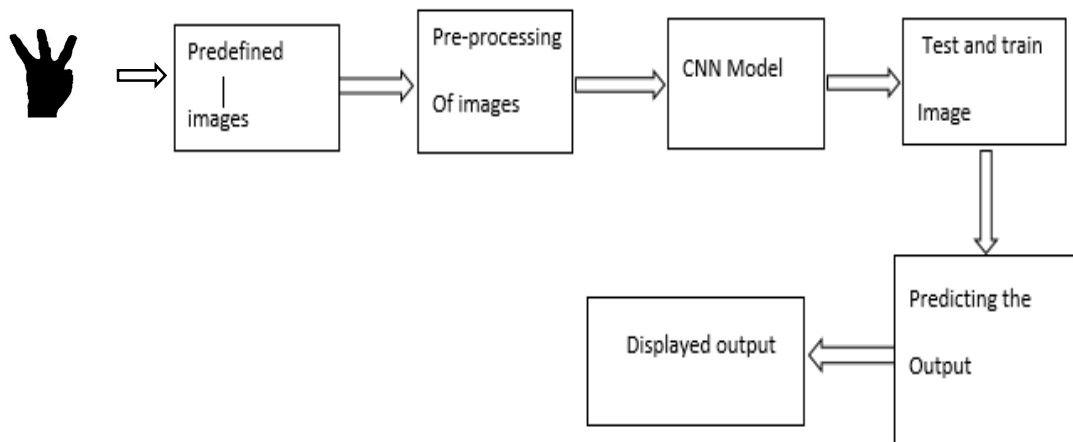


Fig: 2 Block diagram

IV. RESULTS

The hand gesture of three fingers given and the array has taken the third index and printed as loser which is shown in figure- 3

```

In [22]: img = image.load_img(r"E:\priya_project\3.jpg", grayscale=True, target_size= (64,64))
          x = image.img_to_array(img)
          x = np.expand_dims(x,axis = 0)
          pred = model.predict_classes(x)
          pred

Out[22]: array([3], dtype=int64)

In [19]: index=['ok', 'I', 'you', 'loser', 'good job', 'high five']
          result=str(index[pred[0]])
          result

Out[19]: 'loser'
  
```

Fig -3 output

V. CONCLUSION

As we used the feature extraction to extract the image as segmented hands and classification is applied to get understand what type of gesture it is. The proposed system helps to decrease communication barrier between deaf, dumb people and normal people.

VI. FUTURE SCOPE

It could be implemented using hardware complete module which would be helpful for deaf and dumb.Real time application can be designed, which will be user friendly.

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