

Hand Gesture Recognition for Differently Abled People with Message Integration.



G. Prashanth Kumar., G. Vamsi Krishna Reddy

Abstract : *The objective of this paper is to utilize a webcam to lively track the region of interest (ROI), in particular, the hand locale, in the picture extend and recognize hand motion, we use skin colour discovery and also morphology to delete the unnecessary background information from the picture, and afterward use foundation subtraction to recognize the ROI. Next, to stay away from foundation effects on items or commotion influencing the ROI, we utilize the kernelized connection channels (KCF) calculation to follow the identified ROI. The picture size of the ROI is at that point resized to 28x28 and afterward sent into the profound convolutional neural system (CNN), so as to distinguish*

various hand signals. Two profound CNN designs are created right now are altered from DenseNet . At that point, the above procedure of following and acknowledgment is reshaped to accomplish a moment impact, and the framework's execution proceeds until the hand is removed from the camera.

Keywords: Hand tracking; KCF; DCNN; hand gesture recognition

I. INTRODUCTION

People speak with one another by passing on their thoughts, contemplations, and encounters to the individuals around them. There are various approaches to accomplish this and the best one among all is the endowment of "discourse". The main methods for correspondence for hard of hearing and unable to speak individuals is the "gesture-based communication". It will be unfair on the off chance that we disregard the individuals who are denied of this priceless blessing. Hard of hearing moronic individuals need to speak with ordinary individuals for their day by day schedule. There are a few troubles when they run over in specific zones like banking, emergency clinic. India establishes 2.4 million of hard of hearing and unable to speak populace. The gesture-based communication is significant for hearing hindered individuals. Finding an informed interpreter for the communication via gestures inevitably and wherever is troublesome errand. The human-PC cooperation framework is useful for imbecilic individuals to defeat the trouble, other than it and can be introduced anyplace. This undertaking proposes the technique or calculation for an application which would help in perceiving the various signs and convert those sign signals into some message. The communications through signing for various numbers in words are trained and tested.

The customary technique is to play out the acknowledgment by utilizing the convex hull of the hand after performing skin division. Acknowledgment is controlled by the total polygon edges produced by a hand motion, and just the numbers from 1 to 5 can be perceived.

This technique cannot be used to recognize complex gestures.

In this project we use a technique called convolutional neural network(CNN) is increasingly famous in the field of acknowledgment, and has preferred outcomes over other strategies, basically in light of the fact that it can get the necessary component esteems from the information picture, and can become familiar with the contrast between various examples well by utilizing countless examples in its preparation. Be that as it may, previously, its improvement has been constrained because of the speed of equipment processing. In later a long time, because of the progression of semiconductor producing, the figuring rate of illustrations preparing units is getting quicker, and the bottleneck of equipment preparing speed has been tended to, permitting the CNN system to grow quickly to turn into deep CNN.

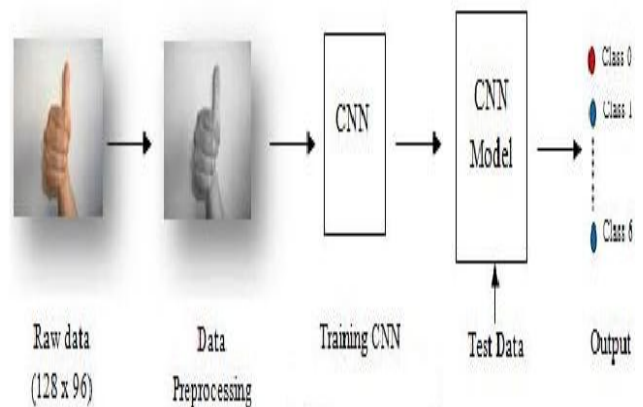


Figure 1. Overview of the proposed hand gesture recognition model.

Revised Manuscript Received on April 18, 2020.

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II. LITERATURE SURVEY

REF. NO.	TITLE	APPROACH USED	OVERVIEW	INFERENCE
[1]	Hand Gesture Recognition Using Deep Learning.	Deep learning, neural network, and transfer learning	The aim is to recognize six static and eight	In this paper, a hand gesture recognition
			dynamic gestures while preserving System accuracy and speed. The recognized gestures	approach based on vision is implemented
			are for giving command to the computer.	using transfer learning. The approach was
				made reliable by avoiding segmentation of
				the skin color, blob identification, cropping
				of the skin region and extraction of centroids
[2]	Hand Gesture Recognition based on Shape Parameters	Image processing, Human computer interaction and K-means clustering.	The solution that this provides depends entirely	Persons with visual impairments can
			on the form parameters of the hand gesture.	use hand gestures to write text on electronic
				documents such as MS Office, notepad, etc.
[3]	A Static	Cascade Classifier, Convex Hull, Haar like features.	For a blind person this can be helpful and	This system makes use of facial
	Hand Gesture and Face Recognition System for Blind People		can act as a virtual assistant to it. For face detection and identification in real time, hair	recognition and hand gesture to help
			cascade classifiers and LBPH recognizer	and work with the environment to make
			were used, whereas Convex hull and Convex	it a better place for the blind to live.
			defect algorithms were used to detect Hand	
			gestures in real time.	
[4]	Hand Gesture Recognition and Device Control.	Hand Gesture and Microcontroller.	The system uses 2D visual information,	The system uses 2D visual information,
			which is obtained from a normal webcam,	which is accessed from a standard webcam,
			and controls the electrical drives of the	which manages the electrical drives of the
			device by tracking and recognizing hand	computer by detecting and understanding
	gestures.	hand gestures.		

III. PROPOSED WORK

Fig. 1 is a schematic outline of the proposed in general hand signal acknowledgment idea, which adequately joins three key segments, in particular, Data preprocessing, Training the given images and Testing the given data. For the data preprocessing, we first perform skin division on input picture to expel the extra foundation data, and afterward process the clamor to decrease the little damage in certain pictures. The core concept is to extract the ROI features of the target position of the first frame and train a model. Then, after the next frame comes in, the trained model will do the calculation to get a new predicted position. As for the hand recognition aspect, we use the deep CNN network to extract and recognize the hand features.

BLOCK DIAGRAM

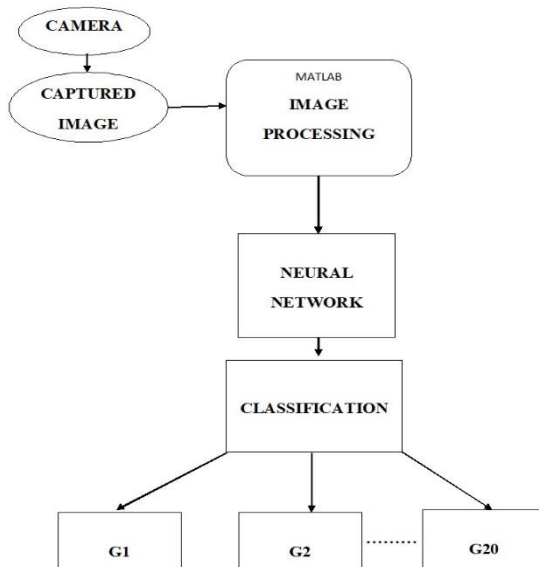


Figure2 Block diagram of proposed system

1. Image Processing

MATLAB stores most images as two-dimensional arrays (i.e. matrices), in which each matrix element corresponds to one single pixel in the depicted image. (Pixels are derived from the picture factor and typically represent a single point on a computer display.)

For example, an image in MATLAB would be stored as a 200-by-300 matrix composed of 200 rows and 300 columns of different colored dots. Many images, such as true color images, involve a three-dimensional array where the first plane in the third dimension represents the intensities of red pixels, the second plane represents the intensities of green pixels and the third plane reflects the intensities of the blue line. This convention makes working with MATLAB images identical to working with any other form of matrix data offering the full power of MATLAB for applications in image processing.

2. Convolutional Neural Network (Cnn):

CNN used to get some positive results and win well-known competitions. Convolutional layers are added to transform a signal or an image with kernels to get feature maps. So, a unit in a feature map is connected through the weights of the kernels to the previous layer. During the training phase, the weights of the kernels are adapted by back propagation to enhance certain features of the input. Because the kernels

are shared between all units of the same function maps, Convolutionary layers have less weights to train than thick FC layers, making CNN easier to train and less prone to over fitting. In addition, since the same kernel is converted over the whole image, the same feature is detected independently of the invariance of the location translation.

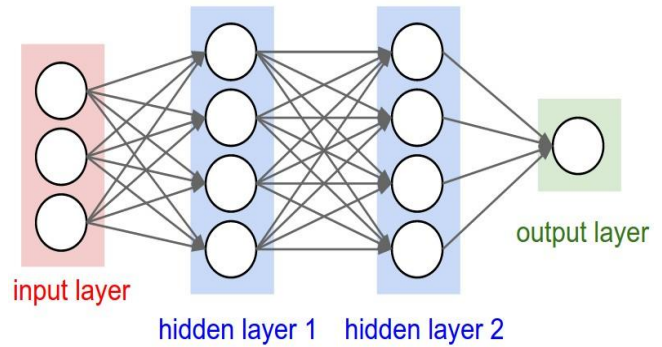


Figure 3 CNN Explanation

IV. RESULT

In the experiments, data sets of hand gestures are used to determine the efficiency of the proposed method. The data set is an image collection of 12 different gestures. For each gesture, 50 images are captured using the phone camera in different angles. So, there are total 600 images in total for the implementation. The data are divided into test and training data 30% of the images are used for the testing and 70% are used for training. All the captured images belong to one single person. These gestures are labeled as 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12. After training the data we have got an accuracy rate of 0.9784, we have showed it in the figure4 below.

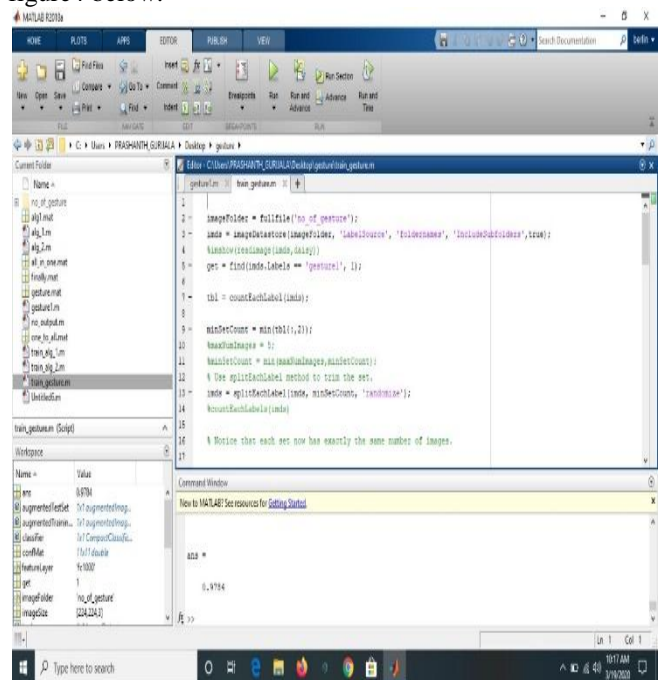


Figure4 Accuracy rate

After training the data set, now we capture the image live using the IP webcam app, and classification of the image is done as shown in figure5.

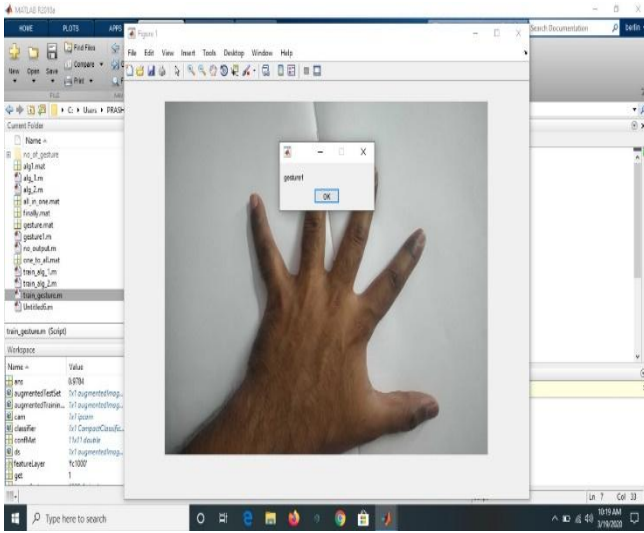


Figure5 Classification of the input given

V. CONCLUSION

This paper introduces a solution to basically solve the problems faced by differently abled.

Simple hand gestures are detected and classified using the methodology mentioned. We've seen people drawing with their fingers or creating mini games that would allow you to use the webcam to control the character with gestures but you can use the detection results for whatever you want your application to do.

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