Hand Gesture Detection

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***Abstract*—Non-verbal communication plays important role in our daily life. It is most commonly used by disabled people who have hearing or speech problems to communicate with others and the most popular way is using sign language systems. The authors create a software which recognize hand gestures of human hand and translate it into Alphabet Letter through photos which take from the dataset of EVP2 contains 200 pictures for each letter.The authors improve the performance from 36 percents for each 200 pictures of one alphabet to 38 percents. This software will help the disabled communicate with normal people who do not know about sign language, much more easier and it will provides us a chance to create a new sign language system of our own.**

I. Introduction

As human-computer interaction developed, hand gesture recognition becoming an important part of our daily life. Its play an essential role in Virtual Reality or Augmented Reality [ref], activity recognition[ref], man-machine interfaces for robots and autonomous vehicles[ref], and sign language translator[ref]. Our group focus on how to translate from one hand gesture to an alphabet, base one the American Sign Language (ASL) [ref].

Hand Gestures include static gesture (images) or dynamic gesture (video). Hand gestures are useful tool the for human-machine communication or for the disabled to communicate with other things.

There are studies successfully recognize the hand gestures. In [ref], the authors recognize ASL from input images by detect the hand region and predict it moving path. In [ref], the authors propose a way to control electronic devices by using hand gestures. Keskin et al [ref] divide the hand into 21 different regions and train a SVM classifier to model the joint distribution of these region for various hand gestures with a purpose that recognize that gesture.

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II. Proposed Method

A. Our Approach

We find a simple solution, which works on both: in real time and non-real time. The authors inherit a CNN network[1] which is created by using TensorFlow and Keras.

B. Operation

In the training phase, in each of the gesture, we get out 80 percents of the images for the training and the rest 20 percents we will use its for the testing. Because our method does not run directly on raw image so we convert all the images in the dataset to binary image using im2bw[]. In the training phase, we have 26 samples of English Alphabet for our training model. We put that 80 percents of binary images into a CNN model [ref] with the outcome called training result In the running phase, the authors can detect both static which is image and dynamic which is get through camera in the real time. About the dynamic, we use the rest 20 percents binary images[] we did not use in the training phase, combine with the training result, we conduct a predicted letter for each image. And if the predicted letter match the label of the image, the outcome result is true and it will false in the opposite case. And we can do it in the real time camera recording.The idea is break the video into frames and we compare each frame to the training result. The authors decide that if the sequence of 15 frames predicts one letter so the predicted letter will be displayed.

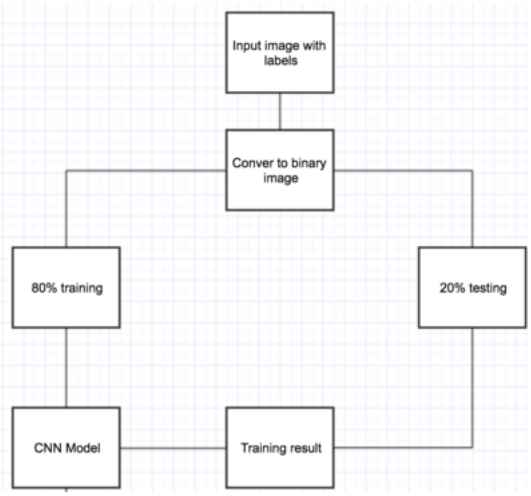

Fig. 1. Dynamic Gestures Detection