Paper Title: Gesture Recognition Using Artificial Neural Network

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Problem(s) Focused: Studying behaviors of different Models of Neural Network used in human - computer interfaces in gesture

recognition.

ALGORITHM/ APPROACH USED:

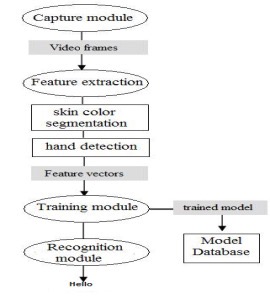
In this paper, a new method for gesture recognition is defined.

The presented system is based on one powerful hand feature in combination with a *multi-layer neural networ*k based classifier.

The main phases:

1. Gesture modeling
2. Segmentation
3. Feature Extraction
4. Recognition

* Flow diagram below explains clearly about the phases involved in the process.



1. Gesture modeling:

By gesture modeling, one means selection and formation of proper gesture. The webcam is used to capture the gesture made by the person in front of the computer. One purpose of Human-Computer Interaction is to make a computer tasks controlled by a set of commands in the form of hand gesture.

1. Segmentation :

The input video is converted into frames and segmentation is applied on each frame. Segmentation is based using the skin color. It is used to separate the skin area from the background. The effect of luminosity should be segregated from the color components. This makes HSI color model a better choice than RGB. The input RGB gesture is converted to HIS form to reduce the burden on the network and also for accuracy.

* After segmenting, the hand region is assigned a white color and other areas are assigned black. A contour of hand image is used as a feature that describe the hand shape

1. Feature Extraction :

The feature extraction aspect of image analysis seeks to identify inherent characteristics, or features of objects found within an image. These characteristics are used to describe the object, or attribute of the object. For static hand gestures features such as fingertips, finger directions and hand‘s contours can be extracted. Feature extraction is a complex problem, and often the whole image or transformed image is taken as input. Features are thus selected implicitly and automatically

4. Recognition:

In this phase the extracted features are fed into the neural network to recognize the particular character.

Dataset Used/Domain:

Neural Network is efficient as long as the data sets are small.

The input dataset consist the gesture featured video.

Size of Dataset: Gestures originating from face or hand

Performance Evaluation:

The following observations were made from the above experimentation:

* This paper is a comprehensive evaluation of how gesture can be recognised in a more natural way using neural networks.
* It consists of 3 stages: image acquisition, feature extraction and recognition.
* In first stage the gesture image is captured using a webcam, digital camera in approximate frame rate.
* In the second stage features are extracted using input image.
* After identification of each finger. Finally neural network is used for recognition of the image.
* So using the multi- layered neural network, we recognised the gesture of the input dataset image.

Advantages:

* Gesture Recognition provides the most important means for non-verbal interaction among people especially for impaired people (i.e. deaf-dumb).
* A very useful application of neural networks.
* Idea of hand gesture recognition using Neural Networks, one of the most effective technique of software computing for hand gesture recognition problem.