



Hand Gesture Recognition

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Abstract: Hand gesture recognition systems have

gotten a lot of interest in recent years due to their wide range of applications and ability to easily connect with machines via human-computer interaction. A survey of modern hand gesture recognition systems is offered in this study. With challenges of gesture system, key issues of hand gesture recognition are highlighted. A review of recent postures and gestures recognition systems is also offered. A summary of hand gesture research results, databases, and a comparison of the main gesture recognition phases are also provided. Finally, the benefits and downsides of the various systems are explored.

Crop inspections are now partial, expensive, and time-consuming. Chronological satellite photos of crops can be used to train and model neural networks for detecting illicit crops, but if we wish to do inter or intra class classification on various crops, the prediction will degrade due to the lack of information in satellite images. As a result, we used genuine field photographs to train the model. Once the patterns of a crop have been determined, the neural network's output model may be systematically predicted

Keywords: Deep learning, Hand gesture recognition, Human-Machine Interface, Resnet Model

INTRODUCTION:

The main goal of developing a hand gesture recognition system is to establish a realistic human-computer interface in which the recognised gestures can be utilised to drive a robot or to send the generated hand signals to the computer, which is referred to as the challenge of gesture interaction.

The system that attains a suitable balance between these concepts considered as influential performance and powerful system. Gestures used for communicating between human and machines as well as between people using sign language. International Journal of Artificial Intelligence & Applications (IJAIA), Vol.3, No.4, July 20

Gestures can be static (posture or certain pose) which require less computational complexity or dynamic (sequence of postures) which are more complex but suitable for real time environments . Different methods have been proposed for acquiring information necessary for recognition gestures system .

Some methods used additional hardware devices such as data glove devices and color markers to easily extract comprehensive description of gesture features . Other methods based on the appearance of the hand using the skin color to segment the hand and extract necessary features , these methods considered easy, natural and less cost comparing with methods mentioned before . Some recent reviews explained gesture recognition system applications and its growing importance in our life especially for Human computer Interaction HCI, Robot control, games, and surveillance, using different tools and algorithms .

This work demonstrates the advancement of the gesture recognition systems, with the discussion of different stages required to build a complete system with less erroneous using different algorithms. Humans have hands as a part of the body to communicate and interact with anything. The means of communication have been changing from time to time but there is a part of the process commonly used ever since and that is hand. Keyboard is an important input device for computer usually we type the keys on the keyboard why instruct the computer to connect accordingly. While hands playing this part there are hand gestures which can do the same as it does in physical man to man communication. But if a computer have the ability to understand the gastric and in act accordingly as a keyboard does, it would become a step up in the human machine interface. This can be achieved in many ways with the revolutionary growth in technology. Considering the rich quality of images that a basic webcam can provide we can make it look so simple with the setup part. Hand gesture is always a variable means of communication that provides variable meanings.

LITERATURE SURVEY

Deaf Mute Communication Interpreter- A Review : This paper aims to cover the various prevailing methods of deaf-mute communication interpreter system. The two broad classification of the communication methodologies used by the deaf –mute people are - Wearable Communication Device and Online Learning System. Under Wearable communication method, there are Glove based system, Keypad method and Handicom Touch-screen.

An Efficient Framework for Indian Sign Language Recognition Using Wavelet Transform :The proposed ISLR system is considered as a pattern recognition technique that has two important modules: feature extraction and classification. The joint use of Discrete Wavelet Transform (DWT) based feature extraction and nearest neighbour classifier is used to recognize the sign language.

Hand Gesture Recognition Using PCA : In this paper authors presented a scheme using a databasedriven hand gesture recognition based upon skin color model approach and thresholding approach along with an effective template matching with can be effectively used for human robotics applications and similar other applications.. Initially, hand region is segmented by applying skin color model in YCbCr color space.

Hand Gesture Recognition System For Dumb People : Authors presented the static hand gesture recognition system using digital image processing. For hand gesture feature vector SIFT algorithm is used. The SIFT features have been computed at the edges which are invariant to scaling, rotation, addition of noise.

Design Issue and Proposed Implementation of Communication Aid for Deaf & Dumb People : In this paper author proposed a system to aid communication of deaf and dumb people communication using Indian sign language (ISL) with normal people where hand gestures will be converted into appropriate text message. Main

objective is to design an algorithm to convert dynamic gesture to text at real time.

Real Time Detection And Recognition Of Indian And American Sign Language Using Sift :

Author proposed a real time vision based system for hand gesture recognition for human computer interaction in many applications. The system can recognize 35 different hand gestures given by Indian and American Sign Language or ISL and ASL at faster rate with virtuous accuracy.

METHODOLOGY:

Most of the researchers classified gesture recognition system into mainly three steps after acquiring the input image from camera(s), videos or even data glove instrumented device. These steps are:

- Extraction Method
- Features estimation and extraction
- Classification or recognition

• Extraction Method and image preprocessing

- Segmentation process is the first process for recognizing hand gestures.
- It is the process of dividing the input image (in this case hand gesture image) into regions separated by boundaries .
- The segmentation process depends on the type of gesture, if it is dynamic gesture then the hand gesture need to be located and tracked , if it is static gesture (posture) the input image have to be segmented only.
- The hand should be located firstly, generally a bounding box is used to specify the depending on the skin color and secondly, the hand have to be tracked, for tracking the hand there are two main approaches; either the video is divided into frames and each frame have to be processed alone, in this case the hand frame is treated as a posture and

segmented , or using some tracking information such as shape, skin color.

- Some preprocessing operations are applied such as subtraction, edge detection, and normalization to enhance the segmented hand image.

• Features estimation and extraction

- Good segmentation process leads to perfect features extraction process and the latter play an important role in a successful recognition process .
- Features vector of the segmented image can be extracted in different ways according to particular application.
- Some methods used the shape of the hand such as hand contour and silhouette while others utilized fingertips position, palm center, etc. created parameters as a feature vector, the first parameters represents the ratio aspect of the bounding box of the hand and the rest parameters are mean values of brightness pixels in the image,used Self-Growing and Self-Organized Neural Gas (SGONG) neural algorithm to capture the shape of the hand, then three features are obtained; Palm region, Palm center, and Hand slope.
- They calculated the Center Of Gravity (COG) of the segmented hand and the distance from the COG to the farthest point in the fingers, and extracted one binary signal (1D) to estimate the number of fingers in the hand region.

• Gestures classification

- After modeling and analysis of the input hand image, gesture classification method is used to recognize the gesture.
- Recognition process affected with the proper selection of features parameters and suitable classification algorithm

- For example edge detection or contour operators cannot be used for gesture recognition since many hand postures are generated and could produce misclassification .

FUTURE SCOPE:

Various hand gestures can be recognized and applied as input to the computer. The hand gestures representing numbers can also be converted into commands to perform related tasks in real time.

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