

GESTURE RECOGNITION USING COMPUTERS

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ABSTRACT: Humans communicate mainly by vision and sound. Due to the tremendous growth of digital world man and machine interface is required for communication. The keyboard and mouse are currently the main interfaces between man and computer. The advancement in modern technology has resulted in the evolution of various innovations like Qwerty keypad, touch screen etc. The scope of this project includes detection of the pointer using defined color information for controlling computer functions like dial pad control and mouse control with clicks, power point slide control, media player control without any contact to the screen. It makes use of hand movements/gestures to feed input to a computer or any other digital device..The key features of this technology include media player volume control, power point slide control, camera control, scrolling, mouse control, initiation and termination of call. The main aspect of this gesture based device is the capturing of hand movements by the camera which interprets and processes the acquired information. The processing of this information, in the form of images is done with the help of MATLAB software version 13. We are making use of neural network in our project for more efficient gesture recognition.

KEYWORDS- mouse control, hand movements or gestures, player volume control, power point slide control, camera control, scrolling, initiation and termination of call.

INTRODUCTION

The motivation behind our venture is to diminish the utilization of keyboard and mouse. With the ubiquity of new information technology and media, more effective methods for human computer interaction (HCI) are being developed which do not rely on traditional devices such as keyboards, mice, and displays. Gesture is the method that is being used for human computer interaction, in spite of using keyboard/mice. Gesture is basically a movement of the body part/parts which contain information or feelings. GESTURES represent meaningful positions of a body that can be seen as a form of non-verbal interaction. We can classify gesture as static and dynamic. Gesture recognition is a mechanism through which a system can understand the meaning of any gesture. A virtual keyboard is also being implemented. The extent of this undertaking incorporates recognition of the pointer utilizing characterized shading data for controlling PC capacities like dial cushion control and mouse control with clicks, power point slide control, media player control with no contact to the screen. The gadget comprises of programming segments like MATLAB, and equipment parts like camera, GSM modem,

and receiver. The fundamental part of this signal based gadget is the catching of hand developments by the camera which deciphers and procedures the procured data. The handling of this data, as pictures is finished with the help of MATLAB programming adaptation MATLAB programming comprises of the Image Processing Tool stash and Acquisition Processing Toolbox which is utilized to examine the contents of the picture.

LITERATURE REVIEW

Gesture recognition is a mechanism through which a system can understand the meaning of any gesture. However, recording conditions sometimes complicate process of feature extraction (gesture recognition). Because of that, it is of crucial importance to implement method that is independent of skin color and illumination and to create robust feature set that can classify different hand poses. One of such methods is Histogram of Oriented Gradients (HOG). Classification of gestures can be realized with neural networks (NN), which showed to be a successful tool for such purpose. Gesture recognition system developed for Japanese finger alphabet of 42 symbols, achieved high accuracy by using neural networks. In addition to the standard pattern recognition applications, NN can be also used for feature learning as well. CNNs were also used for designing of highly precise hand tracker. Another important aspect in terms of gesture recognition is its feature extraction process, gesture segmentation plays an important role in terms of feature extraction. Segmentation is the process of hand detection and localization. Segmentation is followed by two other stages; tracking and recognition. The accuracy of the later two stages strongly depends on the quality of the first one. Also a virtual keyboard is being tried to be implemented. Virtual Keyboard is an onscreen keyboard which provides a mouse based alternative. Gesture recognition is being done by using different methods specified.

PROPOSED METHOD

At first the image must be segmented, gesture must be identified and the feature must be extracted for Gesture recognition technique to happen. Segmentation is the process of hand detection and localization. It is the major first step in many computer vision applications like hand gesture recognition system that often requires as input the location of the hands. It is followed by two other stages; tracking and recognition. The accuracy of the later two stages strongly depends on the quality of the first one. Most of the segmentation algorithms produce false results, but here we use a robust hand gesture segmentation method that is based on adaptive background subtraction with skin color based threshold. The proposed method aims to automatically segment the hand gesture

from a given video under different illumination conditions and complex backgrounds. Experimental results show that the proposed method is accurate, robust, reliable, and significantly reduces false positives. Besides that, this method provides high detection rate compared to other commonly used method for hand gesture segmentation.

We use neural networks for the purpose of classification of gesture. Classification of gestures can be realized with neural networks (NN), which showed to be a successful tool for such purpose. Gesture recognition system developed for Japanese finger alphabet of 42 symbols, achieved high accuracy by using neural networks. In addition to the standard pattern recognition applications, NN can be also used for feature learning as well. CNNs were also used for designing of highly precise hand tracker. In addition, such system enabled determination of hand's closeness in 99.1% images. By combining convolutional neural networks (CNN) with max pooling, classification of images showing six different gestures can achieve accuracy of 96 %. Unsupervised NN based method for feature extraction involves utilization of specialized neural networks, called autoencoder. By adjusting the number of neurons in hidden layers and their sparsity constraint, this multilayer neural network can provide compressed representation of given input images which can be used for pattern recognition tasks as well.

In the preprocessing stages, some operations are applied to extract the hand gesture from its background and prepare the hand gesture image for the feature extraction stage. Feature extraction starts from an initial set of measured data and builds derived values (features) intended to be informative and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human interpretations. Feature extraction is related to dimensionality reduction. The selected features are expected to contain the relevant information from the input data, so that the desired task can be performed by using this reduced representation instead of the complete initial data. Feature extraction involves reducing the amount of resources required to describe a large set of data

Also a virtual A virtual keyboard is a software component that allows a user to enter characters keyboard is also being implemented, On a desktop computer, a virtual keyboard might provide an alternative input mechanism for users with disabilities who cannot use a conventional keyboard

CONCLUSION

This technology recognizes the objects around us, displaying information automatically and letting us to access it in any way we need. This is a kind of Sixth Sense prototype which implements several applications that demonstrate the usefulness, viability and flexibility of the system. Allowing us to interact with this information through natural hand gestures. The potential of becoming the ultimate "transparent" user interface for accessing information about everything around us. It could change the way we interact with the real world and truly give everyone complete awareness of the environment around us. It will definitely revolutionize the world.

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