Accessing Operating System Using Finger Gesture

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Abstract :With the large use of computers human computer interaction has become an important part of our daily life. Gesture recognition enables humans to communicate with the machine and interact without any peripheral device like mouse, keyboard etc. Compare to many existing interfaces, hand gestures have the advantages of being easy to use and intuitive. Gestures are used widely for different applications on different domains. This includes human robot interaction, sign language recognition, interactive games etc. The essential aim of building hand gestures recognition system is to create interaction between human and computer where the recognized gestures can be used for controlling computer. With the help of this one can pose hand hand gesture in the vision range of computer and desired action is performed by the system. Simple web camera is used for computer vision, which helps in monitoring in gesture presentation. Keywords— Real time, gesture recognition, human computer interaction, tracking.

I. INTRODUCTION

Computers become a key element of our society. Surfing the web, typing a letter, playing a video game are just a few of the examples of the uses of computers. And due to the continuous decrease in price of computers, they will even more influence our everyday life in the near future.

To efficiently use them, most computer applications require more and more interaction. Because of that human computer interaction (HCI) has been a lively field of research these last few years. To achieve natural and immersive human-computer interaction, the human hand could be used as an interface device [1]. Hand gestures are a powerful human to human communication channel, which helps to transfer information in our everyday life. Hand gestures are an easy to use and natural way of interaction. Using hands as a device can help people to communicate with computers in a more efficient way. When we interact with other people, our hand movements play an important role and the information they convey is very rich in communication. We use our hands for pointing at a person or at an object, conveying information about shape and size. We constantly use gestures to interact with objects: move them, modify them, and transform them. In the same unconscious way, we gesticulate while speaking to communicate ideas. Hand movements are thus a mean of non-verbal communication, ranging from simple actions to more complex ones. In this sense, gestures are not only an ornament of spoken language, but are essential components of the language generation process itself.

II Existing system

In past days, due to computer software and hardware technologies are continuous innovation and breakthrough, the social life and information technology have a very close relationship in the twenty-first century. In the future, especially the interfaces of consumer

electronics products (e.g. smart phones, games) will have become complex. The traditional electronic input devices, such as mouse, keyboard, and joystick are still the most common interaction way, but it does not mean that these devices are the most convenient and natural input devices for most users. Since ancient times, gestures are a major way for communication and interaction between people. People can easily express the idea by gestures before the invention of language. Nowadays, gestures are naturally used by many people and especially are the most major and nature interaction way for deaf people [1]. In recent years, the gesture control technique has become a new developmental trend for many human-based electronics products, such as computers, televisions, and games. This technique let people can control these products more naturally. The objective of this paper is to develop a hand gesture recognition system based on adaptive colour HSV model and motion history image (MHI). By adaptive skin colour model, the effects from lighting, environment, and camera can be greatly reduced, and the robustness of hand gesture recognition could be greatly improved. [6]

III Problem statement

"Accessing operating system using finger gesture" is based on concept of Image processing. In recent year there is lot of research on gesture recognition using kinect sensor and HD camera but this is very costly. This paper is focus on reduce cost and improve system robustness of the proposed system using simple web camera and by removing costly sensors.

IV Proposed system

Most gesture recognition methods usually contain three major stages. The first stage is the object detection. The target of this stage is to detect hand objects in the digital images or videos. Common image problems contain poor brightness, noise, bad resolution and contrast. The better environment and camera devices can effectively improve these problems. But still it is hard to control when the gesture recognition

system is working in the real environment. Hence, the image processing method is a better solution to solve these image problems to construct an adaptive and robust gesture recognition system. The second stage include object recognition. The detected hand gestures are recognized to identify the gestures. The third stage is to analyze sequential gestures to identify users' instructs or behaviours. [2]
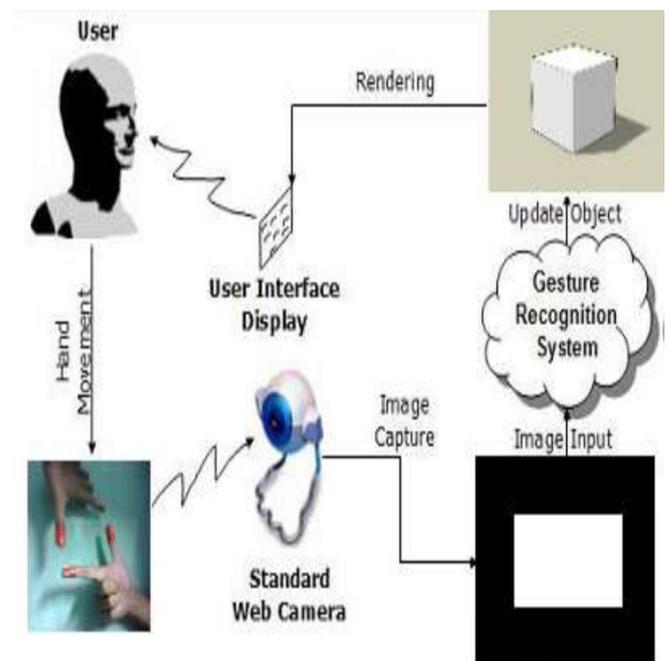
V System Architecture

Fig: System Architecture

During implementation one thing is clear that a system is going to be developed can capture a hand gesture performed by the user in front of web Camera, then this captured image is proceeds to identify the valid gesture through specific algorithm & execute the corresponding operation.

The first step of our system is to separate the potential hand pixels from the non-hand pixels. This can be done by background subtraction scheme which segments any potential foreground hand information from the non-changing background scene. At the system start up, a pair of background images is captured to represent the static workspace from

camera view. Subsequent frames then use the appropriate background image to segment out moving foreground data. [4] After background subtraction, the process of skin segmentation is done. Here, a histogram-based skin classifier assigns each of the RGB pixels in the training set to a 3D skin histogram or non-skin histogram. Given these, the probability is computed that a given RGB colour belongs to the skin or non-skin classes. The skin segmentation process outputs an image which is ready for detection of colour tapes in the finger. For this an algorithm based on HSV colour space is used which is very effective to select a certain colour out of an image. The idea is to convert the RGB pixels into the HSV colour plane, so that it is less affected to variations in shades of similar colour. Then, a tolerance mask is used over the converted image in the saturation and hue plane. The resulting binary image is then run through a convolution phase to reduce the noise introduced. [4]
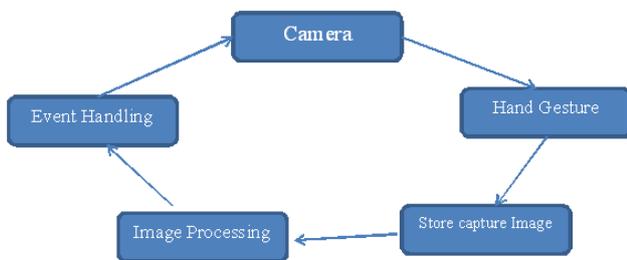
VI Workflow of System

Fig: Workflow of System

1. Human Generated Gesture: User will show one gesture. The gesture should be constant for some time, which is necessary for dynamic processing. These gestures should be already stored for valid gesture for processing.

2. Web Camera: The web camera is used to capture the human generated hand gesture and store it in memory.
3. Image Processing Algorithm: This performs the major portion of implementation.

Firstly, the captured image is pre-processed by techniques like making binary, cropping and standard resizing. This pre-processed image is given to the image-processing algorithm. Then algorithm will count the number of fingers , which will work as input for next processing. [7]

4. Event Handling: Once the gesture is identified the appropriate command will be executed. This includes opening, traversing the computers content as per the user requirement.. Other control commands include shutdown and restart facilities using gestures. [7]

5. Back to Capturing Gestures: Gesture recognition is a dynamic process. Once particular gesture is identified and appropriate control command is executed then it will again go to capture next image and process it accordingly. [7]

VII. Advantages

High Portability: The proposed System reduce the working of external interface like keyboard, mouse or joystick so it makes it high portable
Reduce Cost: As we are removing costly sensors, it will help to reduce cost of system.
Reduce external Interface: The Advantage of System is to Reduce External Interface like Mouse And Keyboard.

VIII. Conclusion

The proposed system will only requires web-camera to capture input image. This will lead to the new generation of human computer interaction in which no physical contact with device is needed. Anyone can use this system to operate the computer easily, by giving gesture command.

IX. References

[1]Robust Part-Based Hand Gesture Recognition Using Kinect Sensor

Zhou Ren, Junsong Yuan, Member, IEEE, JingjingMeng, Member, IEEE, and

Zhengyou Zhang, Fellow, IEEE, 15, AUGUST

2013

[2] Accelerometer-Based Hand Gesture Recognition System For Interaction in Digital TV J.Ducloux,P. Colla,P. Petrashine ,Facultad de Ingenieria Universidad Catolica de Cordoba,Argentina,IEEE 2014

[3] Real-Time Hand Gesture Recognition System for Daily Information Retrieval from InternetIEEE Fourth International Conference on Ubi-Media Computing

[4] Mouse Simulation Using Two Coloured Tapes Kamran Niyazi1, Vikram Kumar2, Swapnil Mahe3 and Swapnil Vyawahare4

Department of Computer Engineering, AISSMS COE, University of Pune, India

[5] Hand gesture recognition for automatic tap system , Sadiq Ullah Department of Computer Science,GIK Institude of Engineering Topi,IEEE 2015

[6] A   Hand   Gesture   Based   Interactive Presentation System UtilizingHeterogeneous Cameras, Bobo Zeng, Guijin Wang**, Xinggang Lin

[7]Hand   Gesture   Based   Interactive Presentation System Utilizing

Heterogeneous CamerasBobo Zeng, Guijin Wang**, Xinggang LinDepartment of Electronic Engineering, Tsinghua University, Beijing 100084, China.