International Journal of Technical Research and Applications e-ISSN: 2320-8163,
www.ijtra.com, Volume 5, Issue 3 (May-June, 2017), PP. 81-83

ACCESSING OPERATING SYSTEM USING FINGER GESTURE

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***Abstract* — Accessing operating system using hand gesture recognition affords users the ability to interact with computers in more natural and intuitive ways. Direct use of hands as an input device is an attractive method which can communicate much more information by itself in comparison to mice, joysticks etc allowing a greater number of recognition system that can be used in a variety of human computer interaction applications. The gesture recognition system consist of three main modules like hand segmentation, hand tracking and gesture recognition from hand features. The designed system further integrated with different applications like image browser, virtual game etc. possibilities for human computer interaction. Computer Vision based systems has the potential to provide more natural, non-contact solutions. The present research work focuses on to design and develops a practical framework for real time hand gesture.**

***Index Terms* — Real time, gesture recognition, human computer interaction, tracking.**

I. INTRODUCTION

Computers have become a key element of our society. Surfing the web, typing a letter, playing a video game or storing and retrieving data are just a few of the examples involving the use of computers. And due to the constant decrease in price of personal 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. For that reason, human-computer interaction (HCI) has been a lively field of research these last few years. Firstly based in the past on punched cards, reserved to experts, the interaction has evolved to the graphical interface paradigm. The interaction consists of the direct manipulation of graphic objects such as icons and windows using a pointing device. Even if the invention of keyboard and mouse is a great progress, there are still situations in which these devices can be seen as dinosaurs of HCI. This is particularly the case for the interaction with 3D objects. The 2 degrees of freedom (DOFs) of the mouse cannot properly emulate the 3 dimensions of space. Furthermore, such interfaces are often not intuitive to use. To achieve natural and immersive human-computer interaction, the human hand could be used as an interface device [1].. Hand gestures are an easy to use and natural way of interaction. Using hands as a device can help people communicate with computers in a more intuitive way. When we interact with other people, our hand movements play an important role and the information they convey is very rich in many ways. We use our hands for pointing at a person or at an object, conveying information about space, shape and temporal characteristics. We constantly use our hands to interact with objects: move them, modify them, and transform them. In this sense, gestures are not only an ornament of spoken language, but are essential components of the language generation process itself.

Fig: Human-Computer Interaction

II. EXISTING SYSTEM

In decades, due to computer software and hardware technologies of continuous innovation and development, 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 and infota1inment systems) will have more and more functions and be complex. How to develop a convenient human-machine Interface (Human Machine Interaction/Interface, HMI) for each consumer electronics product has become an important issue. The traditional electronic input devices, such as mouse, keyboard, and joystick are still the most common interaction way. However, 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 still are naturally

used by many 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, intuitively and In case of existing system . The objective of this paper is to develop a real time hand gesture recognition system based on adaptive color HSV model and motion history image (MHI). By adaptive skin color 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 on using HD camera but camera and kinect sensors are more costly. This paper is focus on reduce cost and improve robustness of the proposed system using simple web camera.

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 unstable brightness, noise, poor resolution and contrast. The better environment and camera devices can effectively improve these problems. However, it is hard to control when the gesture recognition system is working in the real environment or is become a product. 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 is object recognition. The detected hand objects are recognized to identify the gestures. At this stage, differentiated features and effective classifiers selection are a major issue in most researches. The third stage is to analyze sequential gestures to identify users' instructs or behaviors.[2]

V. System Architecture

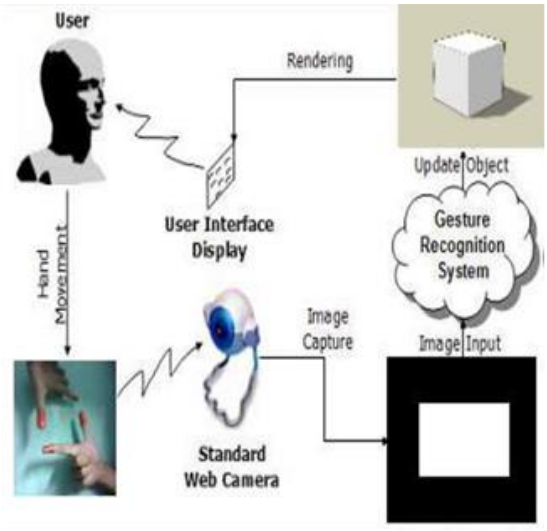

Fig: System Architecture

During implementation one thing was clear that a system is going to be developed which can capture a hand gesture performed by the user in front of web Cam, this capture image is then proceed 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 startup, 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 either a 3D skin histogram or non-skin histogram. Given these histograms, the probability is computed that a given RGB color belongs to the skin or non-skin classes. The skin segmentation process outputs an image which is ready for detection of color tapes in the finger. For this an algorithm based on HSV color space is used which is very effective to select acertain color out of an image. The idea is to convert the RGB pixels into the HSV color plane, so that it is less affected to variations in shades of similar color. 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

Gesture: As a first step of implementation user will show one gesture. The gesture should be constant for some period of time, which is necessary for dynamic processing. These gestures should be already defined as valid gesture for processing.

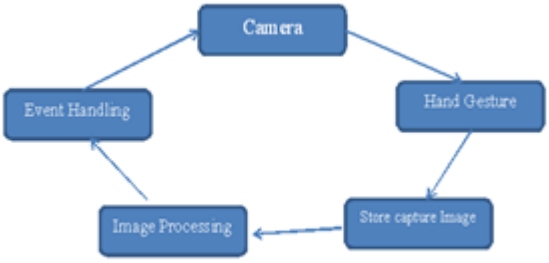

Fig: Workflow of System

A. Human Generated

B. Web Camera :The purpose of web camera is to capture the human generated hand gesture and store it in memory. The package called Java Media Framework is used for storing image in memory and again calling the same program after particular interval. [7]

C. Image Processing Algorithm: This carries the major portion of implementation. First the captured image is pre-processed by techniques like making binary, zooming, cropping and standard resizing. Such pre-processed image is given to the image-processing algorithm. The algorithm will count the number of fingers shown by user, which will work as input for next processing. [7]

D. Event Handling: Once the gesture is identified the appropriate command for it will be executed. This includes opening, traversing my computer contents as per user requirement. Shortcut for applications like notepad, WordPad are also provided. Other control commands include shutdown and restart facilities using gestures. [7]

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

Algorithm:

1. Point Pattern Matching

For finding the validity ratio Point Pattern Matching algorithm is used.

C - Denotes the centre points D - Denotes the distance mask

T - Denotes the No. of test image to match

M - Denotes the No. of Matched Points 1, 2, 3 are the key points.

The procedure to find the Validity ratio of One Database Image versus Test Input Image.

The working of point pattern matching algorithm is as follows:

1. Take a test image
2. Pre-process the test image.
3. Initialize the distRatio = 0.65 and threshold= 0.035
4. Run the SHIFT match algorithm
5. Key point matching starts its execution by running the threshold. It gets the key point matched between test and all 36 trained images. We get the validity ratio.
6. Check that we got more than one result or not.
7. If we get more than1 result then increment the SHIFT distRatio by 0.05 and threshold by 0.005 and repeat the steps from 4 to 7.
8. If we get only one result then display the result.

VII. ADVANTAGES

The Advantage of System is to Reduce External Interface like Mouse And Keyboard.

High Portability: The proposed System reduce the working of external interface like keyboard and mouse so it makes it high portable.

VIII. CONCLUSION

The proposed work will help to eliminate the traditionally completely. It only requires web-camera to capture I/P image. This would lead to a new generation of human computer interaction in which no physical contact with device is needed. Anyone can use the system to operate the computer easily, by using gesture command.

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