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A Review on Virtual Mouse Using Hand Gesture and Color Detection

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ABSTRACT

Now a day's intelligent machine which can be used along with the computer are being developed, which helps in friendly Human Computer Interaction (HCI). Mouse & keyboard are unnatural and cumbersome to use at times by disabled people. Virtual mouse or keyboard is the solution for the disabled people to handle the computer system. In the recent years different technologies are used for developing the virtual mouse. In this paper, we have tried to provide a review on different technologies for the virtual mouse.

Keyword: Human Computer Interaction (HCI), disabled people, Virtual mouse.

I.INTRODUCTION

For disabled people / physically challenged persons (persons without hands) it is very difficult to control the compute and now a day's computer has influenced our life. To work with a computer mouse and Keyboard are the very essential input devices. To solve this problem virtual keyboard and mouse is developed. For the Virtual mouse, mostly uses web camera works with the help of different image processing techniques in which color pointer has been used for the object recognition and tracking. Left and the right click events of the mouse have been achieved by detecting the number of pointers on the images [3].

In the Human Computer Interaction (HCI), many researchers have tried to control mouse or keyboard movement or input respectively. Erdem et al. [4], used fingertip tracking to control the motion of the mouse. In this system click of the mouse button was implemented by defining a screen such that a click occurred when a user's hand passed over the region. Another approach was developed by Chu-Feng Lien [5], proposed finger-tips to control the mouse cursor and click, where clicking method was based on image density, and required the user to hold the mouse cursor on the desired spot for a short period of time. Paul et al. [6], used the motion of the thumb (from a 'thumbs-up' position to a fist) to mark a clicking event thumb. Movement of the hand while making a special hand sign moved the mouse pointer. Asanterabi Malima et al. [7], they developed a finger counting system to control behaviors of a robot. In this system contains steps for segmenting the hand region, locating the fingers, and finally classifying the gesture. In this paper introduction section provides the importance of Virtual Mouse Using Hand Gesture and Color Detection where as the section two i.e. literature survey provides an overview on Using Hand Gesture and Color Detection systems developed in the recent year

II. RELATED WORK

Abhik Banerjee rt al. [1] present an approach for Human computer Interaction (HCI). In this proposed system control the mouse cursor movement and click events of the mouse using hand gestures. Basic block diagram is shown in figure 1. Proposed system was worked on eight steps; Capturing the real time video (webcam captures

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the real time video at a fixed frame rate), Flipping of Images (camera captures an image which is in the form of inverted, means that if we move the colour pointer towards the left, the image of the pointer moves towards the right and vice-versa), Conversion of Flipped Image into Gray scale Image (computational complexity is reduced in a gray scale image as compared to a coloured image), Colour Detection (This process creates an image which contains the detected object as a patch of grey surrounded by black space), Conversion of gray scale Image into Binary scale Image (grey region of the image obtained after subtraction needs to be converted to a binary image for finding the region of the detected object), Finding Centroid of an object and plotting (MATLAB is used to find the centroid of the detected region) , Tracking the Mouse pointer(Once the coordinates has been determined, the mouse driver is accessed and the coordinates are sent to the cursor), and finally Performing Clicking Actions (Clicking action is based two colours 1. If Red along with Green colour is detected, Left clicking action is performed and 2. If Red along with Blue colour is detected, Right clicking action is performed

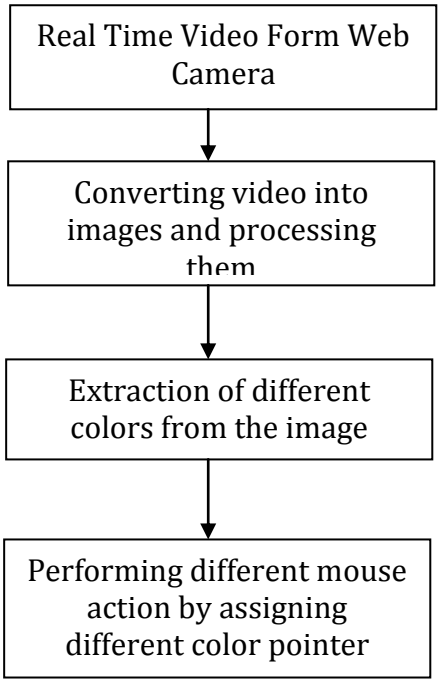

Fig 1 The Basic Block Diagram of the System [1].

Amardip Ghodichor and Binitha Chirakattu [2] proposed Virtual Mouse using Hand Gesture and Color Detection technology, in which three technologies are mainly used: object detection, image processing and color recognition. The proposed system consists of four parts, as shown in fig 2, Hand Gloves (gloves will have different colors painted on different fingers, which will make the system faster and easier for the algorithm), Webcam (necessary component for detecting the image), image processing and mouse movement.

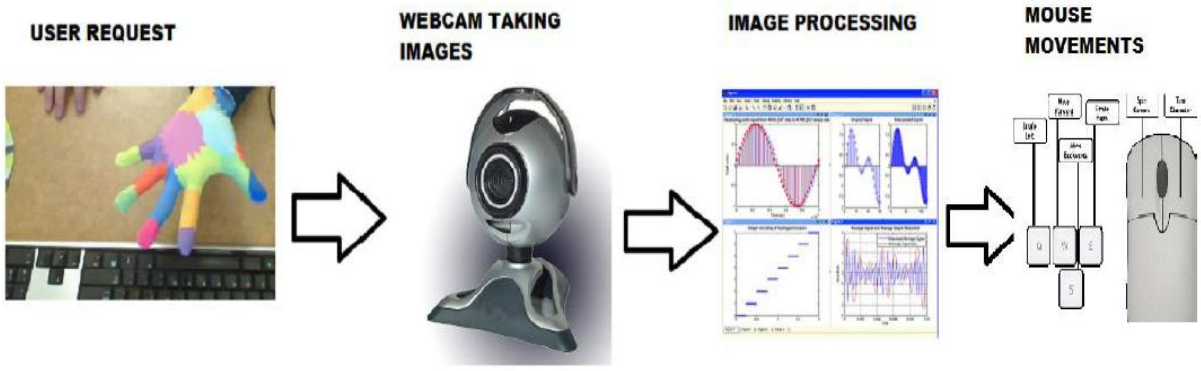

Fig 2. Overview of system [2].

This proposed system, image processing is main part and the flow is shown in the fig 3. Image processing was done in 5 steps; Color Detection (MATLAB built in function "imsubstract" can be used), Filtering the Images (Median filtering gives optimum results), Conversion of Images (after filtering was done over, For conversion of image one may also use in built function "im2bw"), Removing small areas (here MATLABs "bwareaopen" function was used) and Find Centre (Here "bwlabel" Matlab function can be used for cropping the genuine area). Next is Move the cursor and Mouse click event, after Find Centre step centroid from final image, movement has to take place and finalize (X,Y) coordinates where clicking action is taken.

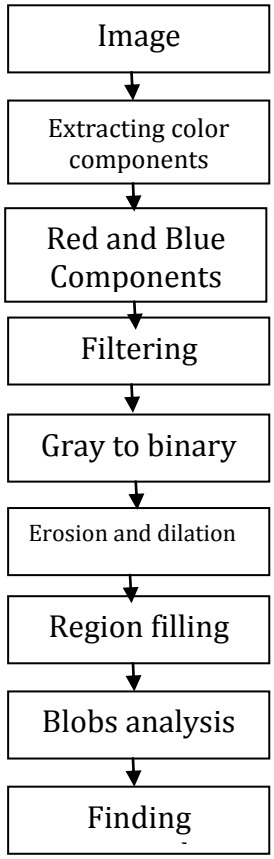

Fig 3. Image processing part sequence

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Abdul Khaliq and A. Shahid Khan present virtual mouse implementation using color pointer detection. Figure 4 shows the flow of / working of the proposed system. In the first step Webcam is used to capture and recognizes an object in view and tracks the user's hand gestures using computervision based techniques. In the second step Video is divided into Image frames based on the FPS (Frames per second) of the camera. In the third step red, green and blue color object is extracted or detected by subtracting the flipped color suppressed channel from the flipped Gray Scale Image. In the fourth step MATLAB is used to find the centroid of the detected region i.e. Matrix consisting of the X (horizontal) and Y (vertical) coordinates of the centroid. Finally Perform Clicking Actions, where JAVA is used to access these flags / centroids.

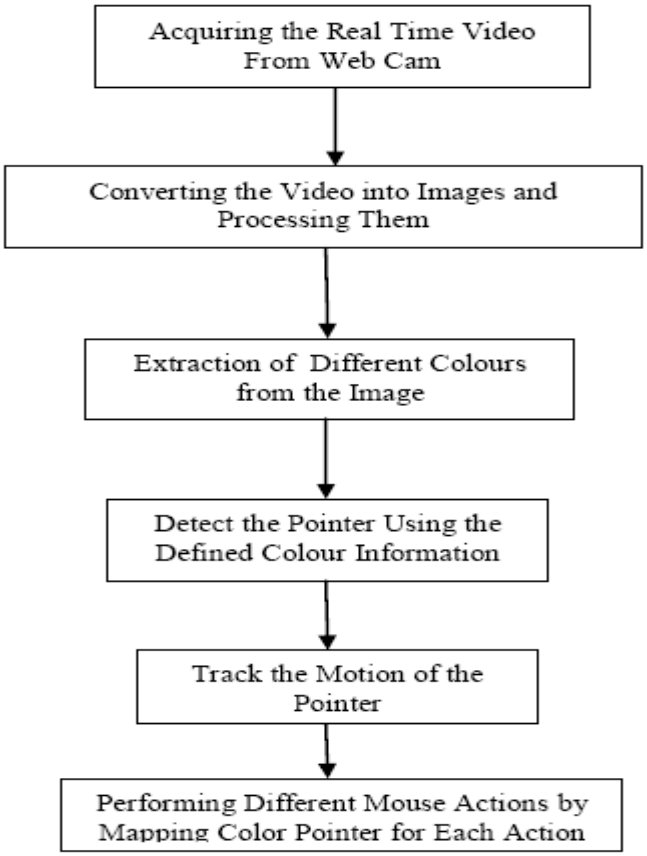

Fig. 4 working of proposed system

II. CONCLUSION

Due to disabilities many people are not able to use the mouse the computers and without using keyboard and mouse User can not interact with a computer system. To solve this problem virtual mouse is one of the solutions. This paper provides a review on different technologies for the virtual mouse.

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