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Use Face as Mouse

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Abstract- **In this paper, we propose a method for detection and tracking of faces in video sequences in real time and use the motion parameters for performing the task of the mouse. Basic strategy is fast extraction face candidates with a Six-Segmented Rectangular (SSR) filter and face verification by a support vector machine. We propose a fast algorithm for detecting human faces in color images. The algorithm uses color histogram for skin (in the HSV space) in conjunction with edge information. we propose a real-time detection algorithm for face representative called Between-the-Eyes using SSR filter, distance information, and template matching technique. The existing system for performing the task of mouse events handling like select, click etc. are done by the hardware mouse. Sometimes the mouse is not suitable to be handled by physically disabled people. Our system proposes mouse events using facial expressions without hardware mouse.**

Keywords:**SSR,SVM,BTE Template,HSV**

I.INTRODUCTION

To design a software for the physically handicapped people to make them well-versed with the use of computers. The nose tip will be selected as the pointing device. Eyes will be used to simulate right and left mouse clicks, so the user will fire their events as he blinks. Facial features have been the most convenient body part for visual tracking and perceptual user interface. Various mouse events such as selection of certain text in a document, clicking on a particular application etc. are performed by the mouse. motion of eyes would be tracked by the webcam and would be converted in motion parameters of the cursor and hence the cursor would be moved etc. Thus the use of facial movements is done by the software effectively as the movements of the mouse. The person having specs can also able to handle this system.

II. WORKING OF SOFTWARE

A. Camera Detection

This is first module of this software ,where the first step is detection of given specified camera. The camera used is basic camera which is RGB camera and it is cost effective. Once the camera is detected further capturing of images and further processing get done.

B.Face Detection

This is the second module where detection of faces is done with the help of Support Vector Machine.The face detection algorithm classified into following three major steps:

1. Once the image is captured ,this step of algorithm classify skin pixel and nonskin pixels.
2. Using 8-connectivity analysis identification of skin region is done.
3. For each skin region, this decides whether skin region is face or not.

Once the face is detected using face detection algorithm next part is tracking of detected face is done.

C. Face Tracking

This is third module of software where SSR filter is used. SSR filter comes in various sizes but in this software depending upon the required part of the face the required size SSR filter will be used. At the beginning, a rectangle is scanned throughout the input image. This rectangle is segmented into six segments as shown in fig. where B1 and B4 part of rectangle is used for right eye detection similarly B3 and B4 is used for left eye detection and finally B2 and B5 is used for BTE and nose tip respectively.

*III.*TABLE, FIGURE AND EQUATIONS

A.Tables and figures

Table I [2]

SkinThreshold	0.1
EdgeThreshold	125
PercentageThreshold	55
Tolerance	0.65

This is table of threshold values required in Detection algorithm.

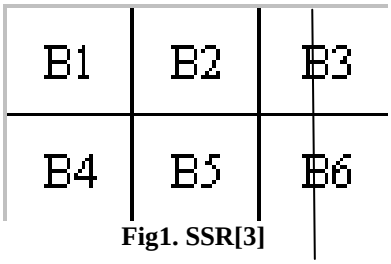

Fig1. SSR[3]

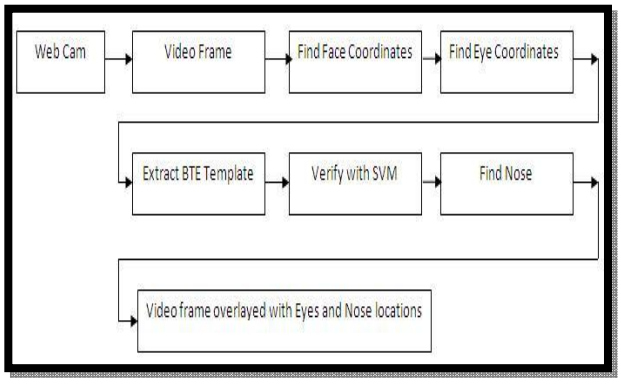

Fig2. Block Diagram of System

B.Equations

HSV color space can be defined as

$$H = \cos^{-1}\left(\frac{\frac{1}{2}\left((R-G)+(R-B)\right)}{\sqrt{(R-G)^2+(R-B)(G-B)}} \right) \quad (1)$$

$$S = 1-3\frac{\min(R,G,B)}{R+G+B} \quad (2)$$

$$V = \frac{1}{3}(R+G+B) \quad (3)$$

R= r/(r+g+b) (4)
G=g/(r+g+b) (5)
B=b/(r+g+b) (6)

*IV.*CONCLUSION

In detection mode for accurate localization of eyes and nose, the face is not rotated more than 5° around the axis that passes from the nose tip (as long as the eyes fall in sectors S1 and S3 of the SSR filter).The face is not rotated more than 30° around the axis that passes from the neck. Wearing glasses does not affect our detection process. As for different scales it is best to get about 35 cm close to the webcam. In tracking mode, the results were very robust when frame rate is 20 fps and higher; the user can move very fast without having the program losing his facial features. The glasses reflect light and cause bright spots that sometimes force our program to lose track of the eyes. For the detection and tracking to be accurate and robust the lighting conditions must be set so the light is frontal in a way that it will spread evenly on the face, because side light will cause false face detection and will affect eventually the tracking process.

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