Eye Gesture Control System

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Abstract **- Vision is probably the most important sense for human beings. As a consequence, our way of behaviour and thinking is also often based on visual information. When trying to perform complex information especially in situations where humans are involved, it is of great benefit if some information can be obtained from images. This is the field of image processing and computer vision. OpenCV is the library used in this project. It can also be used in Python programming language. Simple and complex image processing algorithms are available in the library. Face detection is one of them and face detection can be executed within python with OpenCV library. Now-a-days many people are getting disabled with hands and any other disabilities by which a candidate cannot be able to use keyboard and mouse. So, for disabled persons we had a thought on vision which can be responsible for controlling a computer using mouse and keyboard.**

Index Terms **- eyes gesture control system; eye tracking systems; mouse cursor; eye mouse; webcam; eye movement, Harr-cascade algorithm.**

INTRODUCTION

The eye gesture control system directly interacts with the vision of the human eyes and then controls the system. Eye gesture, a real-time gesture assurance programming which controls a computer mouse cursor by using the user's eye gestures. Only requirement to operate the imouse system is, individuals having at least one eye with good vision and ability to control the computer. Its users can be grown-ups and youngsters with cerebral paralysis, spinal rope wounds, mental wounds, ALS, different sclerosis, Brainstem strokes, and so on. Eye gesture control system can be utilized as a part of homes, workplaces, schools, healing centers, and long-haul mind offices. By looking at the control of a system that is display on a screen, a person can run a computer software, operate a computer mouse, and access the internet and also email.

Provide a cheap eye-tracking system, to control the cursor of a computer with eyes. Allow physically disabled people to use computers. To control a computer and communicate with other systems. To provide a real-time accurate eyes gesture control system. To provide a hand free mouse control system. To provide a complete generic eye-gesture mouse control system. To provide a complete wire free mouse control system. Easy to control cursor movement of a mouse.

LITERATURE SURVEY

A literature review establishes familiarity with and understanding of current research in a particular field before carrying out a new investigation. Conducting a literature review should enable you to find out what research has already been done and identify what is unknown within your topic. The literature was studied to address the aims, understanding of the research area, focus on the research questions, planning of the data collection approach, clarification of the meaning of the terms and proper identification of the framework. The most important task was to understand the research domain in which eyes detection and cursor movement of a mouse is involved.

Going with the literature, we are focusing on customer satisfaction who are physically disabled.

In 2018 [1], an eye tracking algorithm based on Hough transform was developed. This system detects the face and eyes of a person. It uses a webcam to detect user's face and eyes. The system is based on Matlab. The issue in this system is of real-time tracking and time-speed issue. The system is quite slow and it needs a high-quality computer system to work properly which

is costly. In 2017 [2] a better system was introduced by the authors. This system is developed for the paralytic patients. This system uses webcam through MATLAB and moves the mouse cursor by using the pupil of a person. The issue in this system is that it takes a lot of time in detecting the pupil of a person. It uses a lot of algorithms and techniques to detect the pupil. In 2016 [3] a Vision-based wearable eye-gaze tracking system was introduced. This system works using a high infrared camera. It detects the eyes of the person through the infrared cam. The issue in this system was that it is slow and costly. In 2015 [4], a Pupil center coordinate detection using the circular Hough transform technique was introduced. In this system, the webcam uses Hough Transform Techniques to detect the pupil of a person. The issue in this system was that it takes a lot of time and is not a real-time system. It first captures the body after that, it moves to face then eyes and finally to the pupil taking a lot of time. In 2014 [5], a face and eye-controlled system were developed which were based on MATLAB [6]. It uses a webcam to control the mouse by eye and face movement. The issue in this system is that this system only works in a few centimeters radius. In 2013 [7], a system was developed which used eye tracking system, this system is based on the pictogram selection. It uses different eye-tracking techniques to make the system reliable. The issue in this system is that if any liquid is found in eyes, it will not work. Like female use eyeliner or mascara in their eyes, so the system stops working in those situations.

PROPOSED SYSTEM

The aim of proposed system is identification of emotion using facial features. However, at the pre-processing stage, the solution is only to crop the eye region and grab the characteristic value, which causes the results of emotion recognition to be lower. To improve accuracy, this process needs to be transformed. In order to improve the accuracy, mouth features are added using Haar Cascades. The Haar Cascades method is used to identify whether a face exists in the images, and if the face does not exist, then return to the start and input the image frames. If the face exists, eyes and mouth need to be located and eye and mouth regions need to be cropped.

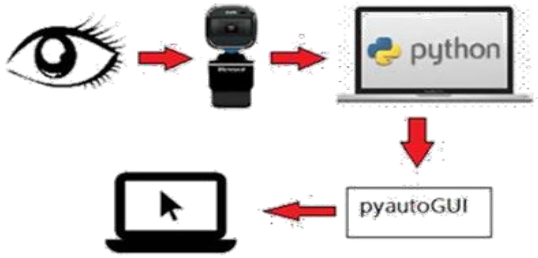

Figure1: Block Overview of the Designed System

RESULT AND DISCUSSION

A) Work On System:

In this approach, a system is developed using python, named imouse. First it will open the camera and start capturing video, the video consists of frames, it will select a frame and then convert it to a grayscale image as it converts images to binary form, and it becomes easy to detect objects from that image. It will then detect the face from it using Haar-cascade. Haar-cascade is a cascade function which is trained from a lot of positive and negative images and then it detects objects from other images. It will detect the face from the given frame and then crop that frame and will pass on for further processing. Then from the obtained frame it will detect eyes using Haarcascade and crop that from. Haar-cascade that detects eye is called eye-cascade. A four-variable array (i.e supported by NumPy) is defined that will give us four values at a time x, y, w, and h. x and y are for the starting point from where the camera detects eyes, w is for the width of eye detected and h gives us the height. By using these variables, we draw a rectangle around the eye and then crop that image.

B) The System Analysis and Evaluation:

We start by presenting the results of the working contour detecting algorithm that works by using Haar-cascade functions.

C) Haar-Cascade Algorithm:

In this algorithm, the system performs two functions detect the face and eyes of the persons illustrate the face cascade function. It first detects the face of the user from an image using face-cascade. It draws a box around the face and crops the Image for further processing. After we extract the face from the image it detects the eyes of the user from that image.

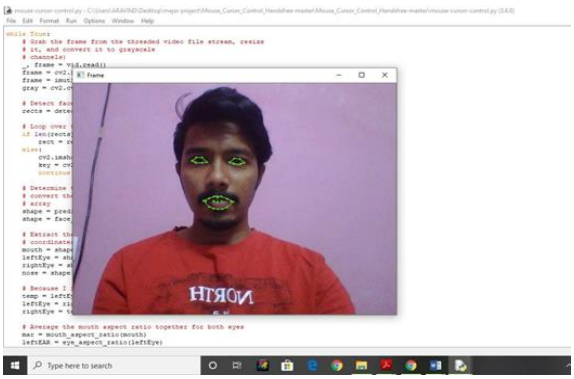

Figure 2: Eye Detection using Haar-Cascade Algorithm

CONCLUSION

As a final review in this research, the system aims to deliver a low-cost eye-tracker that will allow the user to control the mouse cursor of a computer system. The designed system is low cost and efficient, utilizing only a camera (Microsoft LifeCam Hd-6000), software modules coded in C++ and Python Programming language. If required, the spatial field of view history can also be drawn on the world process, showing eye movements and where the user spent a lot of time looking, to tweak the interface or to just retrieve spatial attention data for the purposes mentioned in the "future applications" section. Finally, we note that the project is operable in variable environmental conditions, only a few tweaks in the brightness and contrast setting need to be applied for it to maintain its robustness. This is an impressive feat for such a low-cost eye-tracking system.

FUTURE SCOPE

Controlling computer system using eye movements focuses on the development of hands-free computing. The study of various movement –based human-computer interaction techniques are implemented. Mouse cursor is operated by the eye movement here, Viola jones algorithm is used to implement movement of mouse pointer and clicking operations are performed. The paper presented above has a very wide future scope as the human computer interaction-based software can be very useful in the field of modern technology. Various different scope of this project could be driving cars with the eye movements and operating other digital appliances with the body movements.

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