**An Approach to Control the PC with Hand Gesture Recognition using Computer Vision Technique**

**Alternative Title:**

Finger detection using Hand Gesture Recognition an approach to control the computer

**Aim:**

Human-Computer Interaction (HCI) can be defined as communication between user and computer system so that both will be able to exchange information. For a long time, Keyboards and mouse are the main basis of HCI

**Abstract:**

 Human-Computer Interaction (HCI) is the interface between humans and computers. Traditionally, mouse and keyboards are used to interact with computers. An approach recently introduced to interact with computers is hand gestures. In this research paper, an approach to recognize hand gestures is introduced, and a virtual mouse and keyboard with hand gesture recognition using Computer Vision techniques are implemented. Full keyboard features and mouse cursor movement and click events are implemented to control the computer virtually. The recognition rate and response rate of all the considered inputs are calculated and presented in the

results.

**Synopsis:**

Human computer interaction is the interface between humans and computer with the help of fingers detection in hand gesture method based on application program interface.

**Existing System:**

 In the past, a lot of people have been working in the field of HCI and robotics to command the movement of the mouse with the help of video devices and used various approaches to construct a click event. Used tracking of the fingertip to control the movement of the

mouse. When a user passes his hand over the surface of the screen, a click of the mouse button occurs. In a different approach by Lien, fingertips were used to handle

the mouse cursor movements.

**Problem Definition:**

The user needed to hold on to the mouse cursor on a particular location to make a click event. In the vision-based method, only the camera of the computer system is required for human-computer interaction. An option for replacing touchpad or mouse (HCI) is the vision-based HCI through real-time object tracking and Gesture recognition. This system makes use of a webcam to track the colored object and recognize the gesture to interact with the system.

**Proposed System:**

 The object is tracked by flowchart of the above system for the single image of the captured video. As work is done on a real-time system, the operations shown in the flowchart will be applied continuously for each image that is taken out from the video.

**Advantage:**

This Application is a real-time image processing basedupon a real-time object tracking application system. Thisapplication replaces the input devices such as mouse andkeyboard with hand gestures so that the usage of the systembecomes easy.

Capture Image

Contours finding

webcam

Converting image into YC,C Colour space

Centroid calculation

Decision making

**Modules:**

 **The main process involves the following steps:**

 1. Camera view capture.

 2. Taking out frames from it.

 3. Tracking object's color in the frame.

 4. Finding pixel RGB.

 5. Compare the pixels and convert pixel to white if pixels match otherwise convert it to black.

 6. Make the decision.

**Implementation:**

1. Capturing the video from the webcam and converting it into images.

 2. Flip each image frame 180-degree clockwise.

 3. Rotation of image

 4. Convert each image frame from RGB to a grayscale image.

 5. Detect the colors and extract the different colors from the image frame.

 6. Find contours of a colored object.

 7. Find the centroid of both contours.

 8. Find mid of both centroid and track the mouse cursor to the midpoint of centroids

 9. For the Keyboard feature, a virtual keyboard was drawn, and a mouse feature was used to detect key hits on the keyboard.

**Hardware Requirements:**

* Hard Disk : 500GB and Above
* RAM : 4GB and Above
* Processor : I3 and Above
* Webcam - 1

**Software Requirements:**

* Operating System : Windows 10 (64 bit)
* Software : Python
* Tools : Anaconda

**CONCLUSION:**

An object tracking-based keyboard and mouse have been implemented utilizing the PC’s webcam. The proposedsystem has been developed using the python environment and utilizing the OpenCV tool of image processing. The proposed method has a very good scope in augmented reality applications and games. The system can also be useful for third-person games as we can act as a game object. Modern gaming consoles also can be implemented using this
technique and it can prove to be very useful for patients who have lost control over their muscles. Other technologies use extra hardware which is often costly. So, we tried to present this project as the cheapest way of Human Control Interaction System

**FUTUREWORK**:

 In the future, AI can be used to build a trained classifier to detect hand gestures. The problem with this approach is that it needs abundant data for training the classifier and it is also very time-consuming to select the characteristics that distinguish the object being recognized. It is still a rousing research issue to implement an economic real-time HGR that takes less amount of time and does not need any extra hardware.