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A Review on Gesture Recognition Based Virtual Mouse and Keyboard

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ABSTRACT

In this project, computer vision is used in creating an Optical mouse and keyboard using hand gestures. The camera of the computer will read the image of different gestures performed by a person's hand and according to the movement of the gestures the Mouse or the cursor of the computer will move, even perform right and left clicks using different gestures. Similarly, the keyboard functions may be used with some different gestures, like using one finger gesture for alphabet select and four-figure gesture to swipe left and right.

It will act as a virtual mouse and keyboard with no wire or external devices. The only hardware aspect of the project is a web-cam and the coding is done on python using Anaconda platform. Here the Convex hull defects are first generated and then using the defect calculations an algorithm is generated and mapping the mouse and keyboard functions with the defects. Mapping a couple of them with the mouse and keyboard, the computer will understand the gesture shown by the user and act accordingly.

Keywords—Optical Mouse, Face Recognition,Virtual Mouse And Keyboard, Anaconda Platform

INTRODUCTION:

Idea is to build a Human-Computer Interaction (HCI) module which intelligently orchestrates concurrently-run AI models, one feeding onto another. While the models for face detection, head pose estimation, facial landmarks computation and angle of gaze estimation identify gesture control inputs, another thread is deployed to run virtual keyboard, which communicates with the parent process to give parallel control. Commands based on user utterance, to assist and augment gesture control.

We have used Open CV, Pandas, Tensor flow & Keras in this project.With the help of Gesture Recognition Based Virtual Mouse and Keyboard the physically disabled people(handless) will be able to operate their computer systems with the help of their eyes or by keyboard.This project includes deep learning & machine learning.

In this project, we build a Human-Computer Interaction (HCI) module which intelligently orchestrates concurrently- run AI models, one feeding onto another. While the models for face detection, head pose estimation, facial landmarks computation and angle of gaze estimation identify gesture control inputs, another thread is deployed to run offline hand recognition, which communicates with the parent process to give parallel control. Commands based on user utterance, to assist and augment gesture control.

METHODOLOGY

Haar-cascade is a protest detection algorithm used to find faces, people on foot, items, outward appearances in a picture and primarily utilized for face detection. In Haar-course, the framework is given a few quantities of constructive pictures(like appearances of changed people at various foundations) and pessimistic (pictures that do not face but rather can be whatever else like the seat, table and divider and so forth)

Human face detection [32], noted to be a testing problem in the zones of image handling and patter acknowledgment. Another algorithm for human face detection by crude Haarcourse algorithm, joined with three extra frail classifiers is presented in this work. The three powerless classifiersdepend on tint histogram coordinating, detecting a mouth and detecting eyes. To start with, pictures of individuals are handled by a crude Haar course classifier, without false human face dismissal (low rate of false negative), yet with few false acknowledgment (false positive). Besides, a powerless classifier a view of face skin tint histogram coordinating is connected and a lion's share of non-human countenances are expelled, to dispose of falsely acknowledged non-human faces. Next, another powerless classifier a view of eyes detection is attached and other lingering non-human appearances are resolved and dismissed.

4.1 Architecture

The mouse system is design in python and following modules of python are imported for working of this system. Numpy: is a Python extension module. It provides rapid and efficient operations on arrays of compatible data. Scipy: an open-source Python library which is used for technical and scientific computing. OpenCV: is a library of programming functions mainly focused on real-time computer vision. PyautoGUI: is a cross-platform GUI automation module that works on Python. In this, you can control the mouse and keyboard as well as you can perform basic image recognition to automate tasks on your computer. The system detects the pupil of a person through the webcam using Pupils detected now a person can control mouse cursor through his eye movements.Cursor movement is shown on the home screen of the computer. We used the following procedure to type on virtual keyboard using our fingertip:

Step 1: Capturing real time video using computer's webcam

Step 2: Processing individual image frame from the captured video

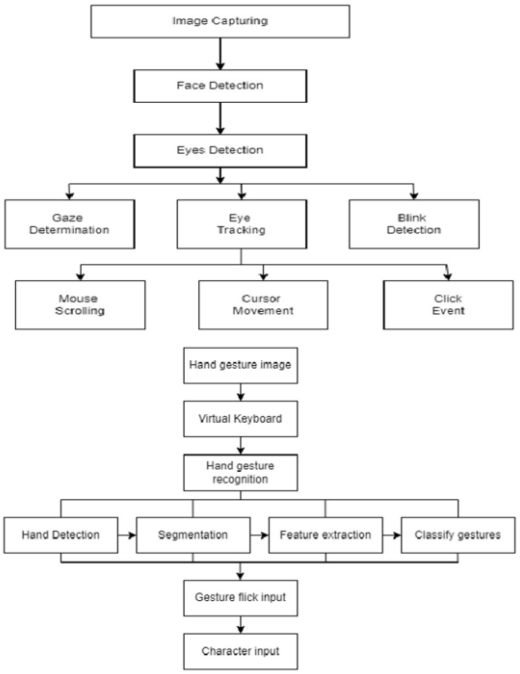
Step 3: Converting image frames. Step 4: Virtual Keyboard.

Step 5:Hand gesturerecognition is done by hand landmarks.

Step 6: Find position of object over the virtual keyboard and gesture input is flicked.

Step 7: Print the character.Convolutional Neural Network.

detection algorithms. Then the system detects the face. After Advantages of Gesture Recognition that the system detects and captures the eyes. Then the system detects the pupils. In the last module, the system Gesture recognition can be used to improve a variety of fields, such starts moving the mouse cursor by tracking pupil as movements. The system accomplishes to have the following steps. Software running.



Public health:

By removing the need for touchscreens on self-service kiosks, business and organizations could help reduce the number of germs being spread. This is especially helpful for mitigating the spread of infectious diseases such a Covid-19 or influenza.

Health diagnostics:

Through analysis of movements, doctors can help diagnose patients with diseases or fall risks in order to improve their overall out look.On top of analyzing gaits, gesture analysis and machine learning can be used to identify small movements such as tics and spasms to help recognize potential diagnoses.

Security:

Programs can be set up to recognize hand gestures and to send alerts in response. For example, home security systems can be set up to recognize what hands look like when they are holding guns and then send an alert in response. Or an organization can set up and train employees around a specific hand gesture, so that when cameras pick up the gesture, they can silently alert law enforcement, such as in the event of a robbery.

Feature Tracking:

The tracking system is the first step in the eye-tracking device and is the most directly in contact with the user. Tracking processes all of the data from the camera input(s), presents the calibration and parameter-tweaking interfaces to the user, and performs computer vision-related algorithms to determine the location of the user's pupils and eyebrows. From a user-interface perspective, the operation of the device is as follows: • When the program begins, the user is prompted to position the camera and headgear properly so that the full regions of both eyes are clearly visible and unobstructed System Design Figure 4.1: Eye and Keyboard Architecture in the video. • With the regions selected, detailed tracking windows diagram

System Design

1) Open the webcam on the laptop and show the image ofa person.
2) Face detection action is performed.
3) The system detects the eyes of a person.
4) After the above action system move on to the nextoperation.
5) In the next step the system detects eyes and facethrough webcam of a laptop.

appear and the user is prompted to configure (via a set of trackbars) the parameters that determine APCOER-Information Technology(2021-2022) 2 Chapter 1. Introduction to "Gesture Recognition Based Virtual Mouse And Keyboard" tracking. This is certainly the clunkiest part of the system, and the part that would benefit greatly from improvement in a more polished version of the device. • After the parameters are set, calibration mode begins. In this stage, the user is prompted conduct a few eye and eyebrow movements while the program trains. The specific required actions are looking left, right, up and down, and raising the eyebrows. Once calibration is complete, the user is ready to begin using the device. The device can be recalibrated or disabled at any time with a simple keystroke. The tracking algorithms are both based heavily on the contrasts and contours contained in the image of the eye. The pupil recognition algorithm is borrowed from Zafer Savas' TrackEye software ([7]). The image is first thresholded and then run through a Canny edge detector. Then contours are found and the contours are filtered to extract the largest, most circular closed contour available. In a sufficiently controlled image with proper parameters, this contour will be the pupil. The eyebrow recognition follows a similar process, and was custom written by our group. Very few existing eye trackers that we could find dealt at all with eyebrows, and we think eyebrow raise/lower recognition could provide useful control motions. The eyebrow recognition algorithm uses thresholding and contour finding, and then looks for the contour highest up in the image that is sufficiently large and oval-shaped.

LITERATURE SURVEY ON HAND GESTURE TECHNIQUESFOR SIGN LANGUAGE RECOGNITION

The demands for 3D models have been increased due to high involvement in animated characters, virtual reality and augmented reality. Virtual reality is a technology that provides users with a virtual 3D environment created on a computer and at the same time. By using Pose estimation Algorithm we are improve the accuracy of our system.helpful for deaf and dumb people. We will build a simple gesture recognizer based on OpenCV toolkit and integrated it into Visionary framework.As a yes gesture we'll price and down hand motions regardless of which hand is employed.

CONCLUSION AND FUTURE SCOPE

The basic objective is to develop a virtual mouse and keyboard using the concepts of hand gesture are cognition and image processing which will ultimately move the mouse pointer according to the hand gestures, To similarly with the help of the gesture can use keyboard functions which will be defined as per the convenience of the user Reducing the cost of hardware. This paper is proposing a system to recognize the eyes hand gesture and replace the mouse and keyboard function. That includes the movement of the mouse cursor, the drag and click with the keyboard features like printing alphabets and other keyboard functions.

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