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Implementation of Gesture Cursor Using OpenCV

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ABSTRACT: In general we perform the cursor operation on touch pad or mouse, in our project we will do cursor operation with the help of fingers through the webcam. A layout was made with particular width and height to highlight the action area, the fingers which comes inside this layout we keep the count of them. We plot a point on each fingertip when we have a finger in action then we associate it with the cursor movement the direction in which does our finger moves the cursor will be moving accordingly. If they are two fingers in action we calculate the distance between the two fingertips by the help of points we plotted on the fingertips when the distance between the fingers is zero then we perform a click operation. By moving the cursor to our desired position we perform the operation we need to be done. According to those actions of fingers we convert them into mouse operation on the computer.

KEYWORDS: - Key word1: Python 3.7, Key word2: Open CV, Key word3: PyAutoGUI, Key word4: Numpy, Key word5: Media pipe

I. INTRODUCTION

Computer technology has tremendously grown over the past decade and has become a necessary part of everyday live. The primary computer accessory for Human Computer Interaction (HCI) is the mouse. The mouse is not suitable for HCI in some real life situations, such as with Human Robot Interaction (HRI).

There have been many researches on alternative methods to the computer mouse for HCI. The most natural and intuitive technique for HCI, that is a viable replacement for the computer mouse is with the use of hand gestures. This project is therefore aimed at investigating and developing a Computer Control (CC) system using hand gestures.

Most laptops today are equipped with web cams, which have recently been used insecurity applications utilizing face recognition. In order to harness the full potential of a webcam, it can be used for vision based CC, which would effectively eliminate the need for a computer mouse or mouse pad. The usefulness of a webcam can also be greatly extended to other HCI application such as a sign language database or motion controller.

Over the past decades there have been significant advancements in HCI technologies for gaming purposes, such as the Microsoft Kinect and Nintendo Wii. These gaming technologies provide a more natural and interactive means of playing video games.

Motion controls is the future of gaming and it have tremendously boosted the sales of video games, such as the

Nintendo Wii which sold over 50 million consoles within a year of its release.HCI using hand gestures is very intuitive and effective for one to one interaction with computers and it provides a Natural User Interface (NUI).

There has been extensive research towards novel devices and techniques for cursor control using hand gestures. Besides HCI, hand gesture recognition is also used in sign language recognition, which makes hand gesture recognition even more significant.

II. MOTIVATION

We had chosen this project with an interest of learning the direct interaction of humans with the consumer electronic devices .This takes the user experience to a whole new level. The gesture control technology would reduce our dependence on the age old peripheral devices hence it would reduce the overall complexity of the system.

Initially this technology was considered in the field of gaming (like Xbox Kinect), but the application of motion/gesture control technology would be more diverse if we apply it to our other electronics like computers ,televisions, etc.

For our day to day purposes like scrolling , selecting, clicking etc. Our primary objective in doing this project was to build a device inspired from Leapmotion. It is a device which recognizes hand gestures and can be used to virtually control a computer.

In short, it provides a virtual screen with which we can interact with the computer. But the required hardware for making a device on these lines was not feasible, in terms of budget and time frame provided.So, we decided to build an introductory software implementation of the device which would eventually act as a virtual mouse.
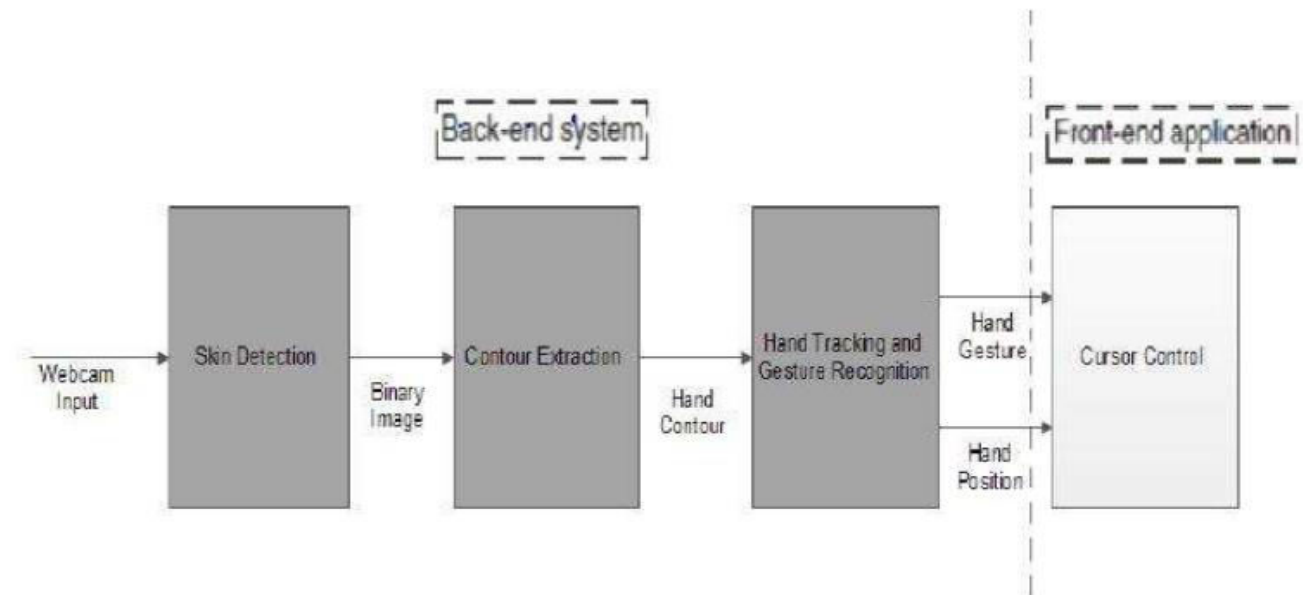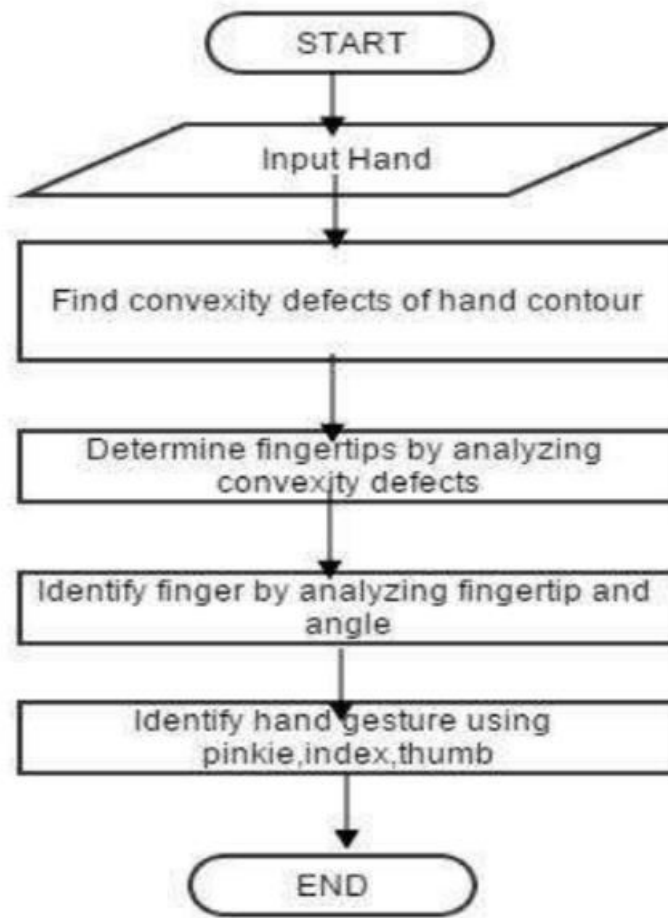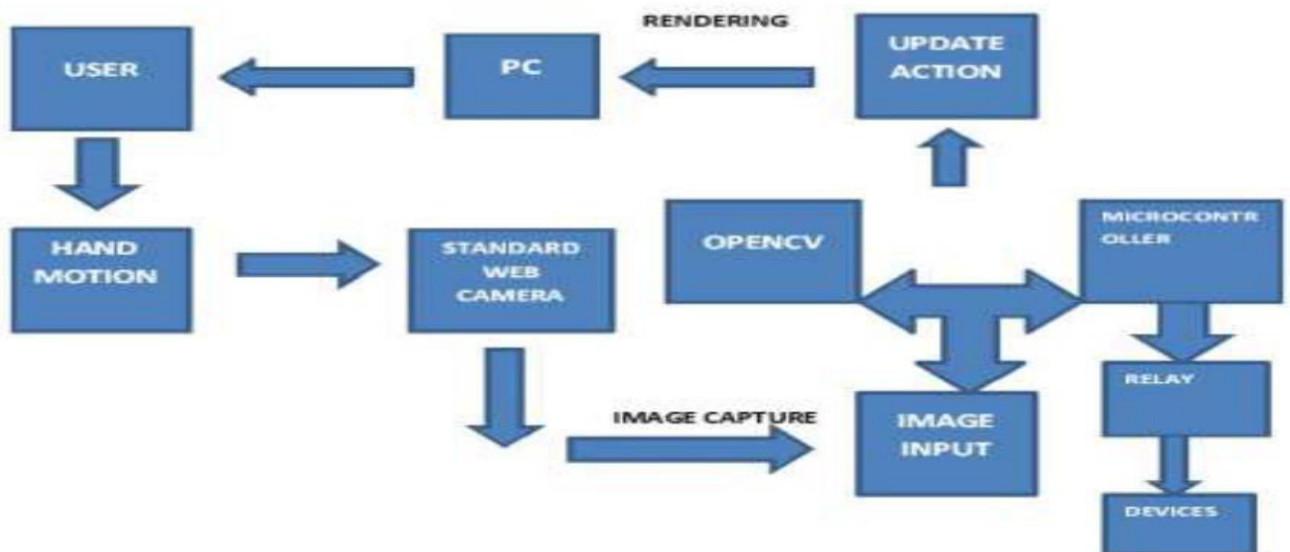
III. METHODOLOGY

Fig-1
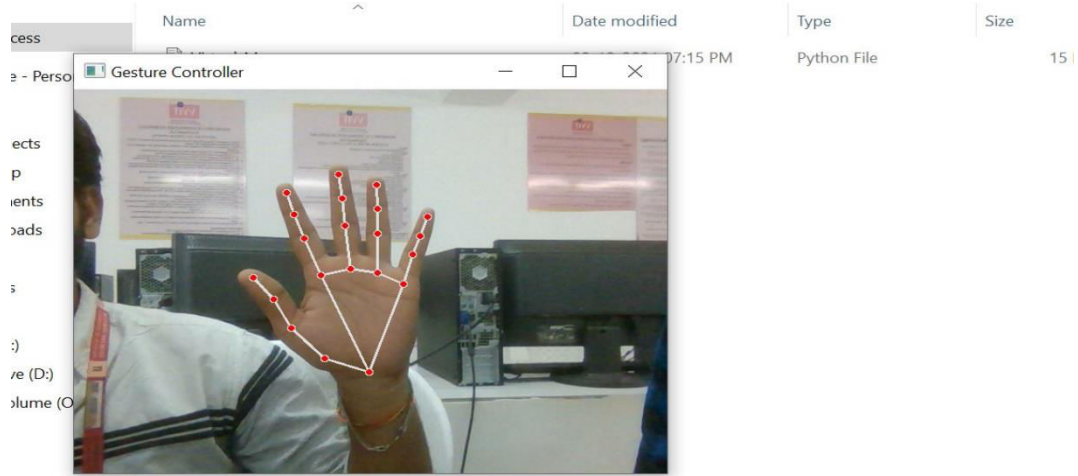
Fig-2

Fig-3

System Architecture

IV. RESULTS & DISCUSSION

Fig-4
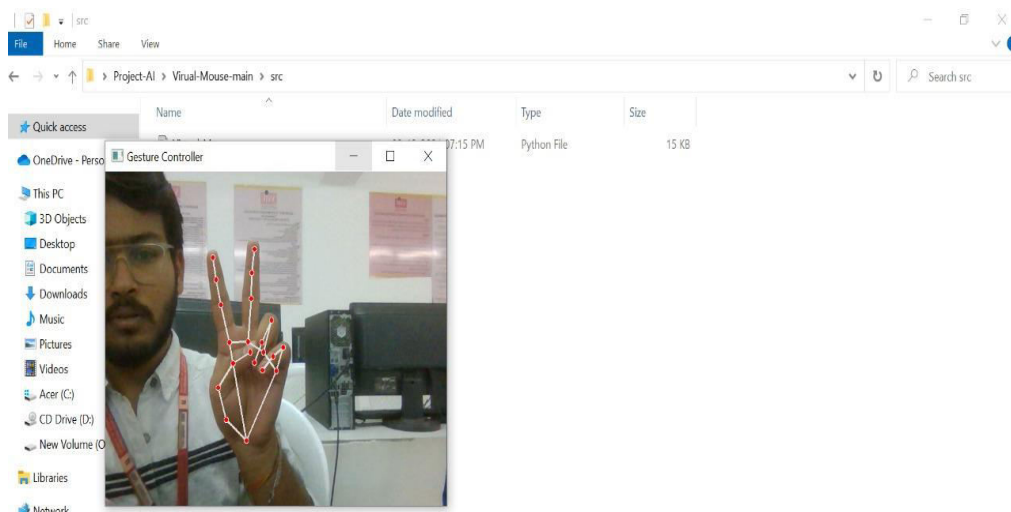
Hand Detection
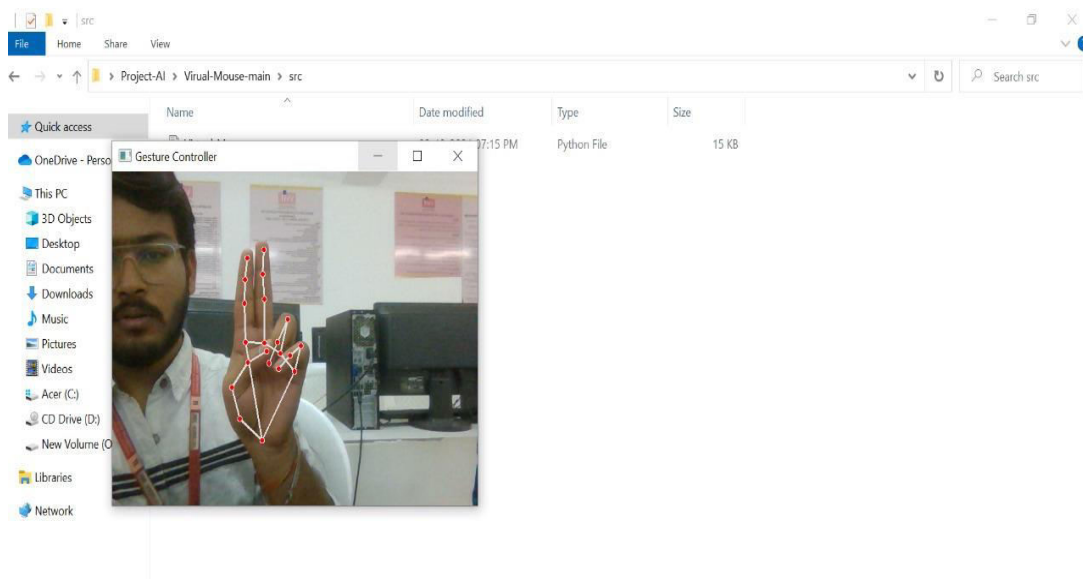

Fig-5

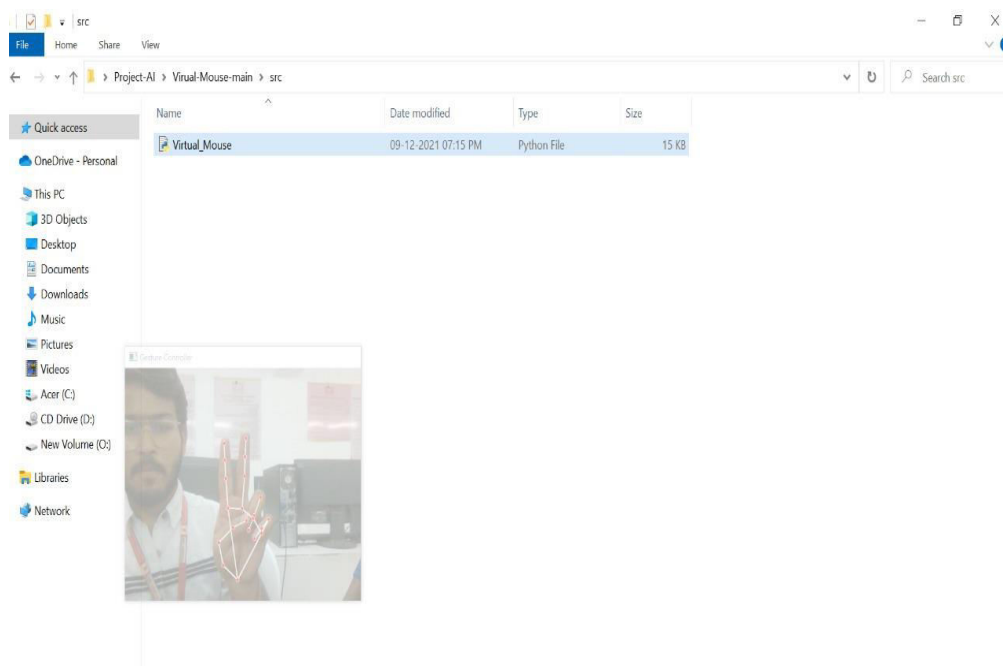**Mouse Movement**

Fig-6

Mouse Click

Fig-7

Operation Performed

V. CONCLUSION

The main objective of the AI virtual mouse system is to control the mouse cursor functions by using the hand gestures instead of using a physical mouse.

The proposed system can be achieved by using a webcam or a built-in camera which detects the hand gestures and hand tip and processes these frames to perform the particular mouse functions.

From the results of the model, we can come to a conclusion that the proposed AI virtual mouse system has performed very well and has a greater accuracy compared to the existing models and also the model overcomes most of the limitations of the existing systems. Since the proposed model has greater accuracy

The AI virtual mouse can be used for real-world applications, and also, it can be used to reduce the spread of COVID-19, since the proposed mouse system can be used virtually using hand gestures without using the traditional physical mouse.

The model has some limitations such as small decrease in accuracy in right click mouse function and some difficulties in clicking and dragging to select the text. Hence, we will work next to overcome these limitations by improving the finger tip detection algorithm to produce more accurate results.

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