

VIRTUAL MOUSE CONTROL USING HAND GESTURES BY USING OPENCV

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ABSTRACT

Virtual mouse control using hand gesture techniques is one of the studies of (HCI) Human Computer interaction . By this study of virtual mouse is implemented with a purpose for future generations. Mainly in this study there are three steps involved in it they are the hand gesture recognition, hand region features extraction, classification of these features. In this the hand gesture recognition is done with an inbuilt camera which will grasp the hand gestures which are extracted previously and classified. Hand-gesture controlled laptops and computers have gained a lot of attraction in the market. This hand-gesture recognition technique is also known as a Leap motion. These hand-gesture recognition techniques are the most natural and effortless manner of communication. In this way the camera's output will be displayed on the screen. The main concept of this virtual mouse control is to use the camera and perform the cursor movements or functions correctly. This virtual mouse provides an infrastructure between user and the system by using an inbuilt camera only. It allows the users to interact with machines without the use of any physical devices. By this study it represents that it is a method for controlling the cursor's position without any electronic equipment. The actions like clicking dragging will be handled by various hand gestures. As an input device system will require a webcam. System will make use of the tools such as Open CV and python etc. The camera's output will be displayed on the screen. Hand gesture recognition techniques were playing a major role in this project to implement it and running of the project also.

Keyword : - Hand-gestures, OPEN CV, Leap motion etc..

1. INTRODUCTION:

With the development of technologies in different areas the devices we use in our daily life is becoming compact in wireless technologies. This system proposes a virtual mouse control which makes use of hand gestures and gesture controlling techniques for performing mouse controls or functions by using computer vision. The proposed system's main objective is to replace the conventional mouse with a built-in camera in the computer that can be used to perform mouse/cursor functions like scrolling up and down, left and right clicking, etc. Hand gestures detection using computer vision is a HCI with the computer. In the computer wireless or Bluetooth connection is used and also some devices like mouse is also used for connecting the pc. But in this system an inbuilt camera or webcam is

used to perform the operations of the mouse. In this system the webcam captures the gestures and performs the mouse functions. Python was used to create the software that controls the virtual mouse. The Open CV computer vision library is used by the virtual mouse system. Additionally, it uses Pyauto-GUI to move the computer screen and perform all actions, including left- and right clicking and scrolling, as well as the Media Pipe package to recognise hand gestures. These hand gesture technologies save time and increase speed of the working of mouse controls and to decrease radiation also. This is introduction about virtual mouse control using hand gesture using OpenCV

2. LITERATURE SURVEY:

[1]Dung-Hua Liou, chenciung Hsieh, and David Lee in 2010'a Real-Time Hand Gesture Recognition System Using Motion History Image

[2] Experimental results show that the accuracy is 94.1% in average and the processing time is 3.81ms per frame. Examples of tasks, such as openness correction, shade modification, picture sound reduction, or enhancing image sharpness, are highly important and thoughtfully requested to obtain the desired results.

[3]Monika B.Gandhi, Sneha U.Dudhane, and Ashwini M. Patil in 2013 proposed a study on "Cursor Control System Using Hand Gesture Recognition". Recent improvements in gesture detection and hand tracking have produced both benefits and challenges. A growing number of people are interested in computer vision, and equipment that can support future developments in AI is being created and enhanced swiftly. This article explores some of these possibilities, applies them, and gathers potential and issues for all kinds of human users. The Python components that will be used to make this computer are NumPy, math, wx, and mouse.

[4]Vinay Kr. Pasi, Saurabh Singh, and Pooja Kumari in 2016 proposed "cursor control using Hand Gestures". Modern advancements in VR (Virtual Reality) and its use in daily life have made Bluetooth and Wi-Fi automation more and more accessible. The Media Pipe package is used by the proposed AI visual mouse system model to monitor hands and titles, and the Pynput, Autopy, PyGames, and PyAutoGUI packages are used to navigate the computer screen and carry out left- and right-click operations. make scrolling motions. The suggested model performs brilliantly in real-world applications despite using the CPU rather than the GPU and producing results with an extraordinarily high level of precision..

[5]Chaithanya C, Lisho Thomas, Naveen Wilson, and Abhilash SS in 2018 proposed "Virtual Mouse Using Hand Gesture". Hand detection: It is essential to encourage the identification and tracking of hands so that they can be distinguished from the surrounding environment in order to simplify operations. Due to the low visibility in this space zone, tracking and visualisation may be more difficult. Hand-tracking and demonstrations raise a number of problems related to inclusiveness and irregular embodiment. inclusiveness and participation.

3. METHODOLOGY:

Gesture tracking: The Media Pipe system is employed for the characteristics of the hand signals and hand development, and Open CV is used for computer vision to see and create the hand developments and finger tips.

Hand landmarking: The main use of this hand landmarking is to store or collect the land marks of the palm by using palm detection model also. In this finger counting is also used for counting the fingers it is also helpful for identifying the land marks easily.

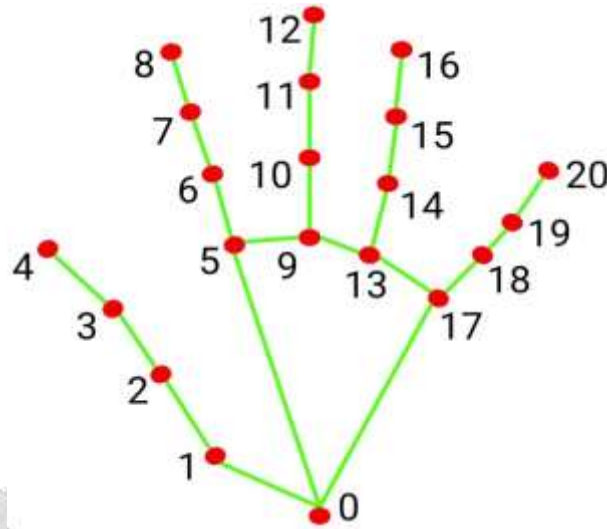


Fig 1:Hand Co-Ordinates

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3.2 Media Pipe: Media Pipe is a system that is utilized for applying in a different AI pipeline. Media Pipe is used across different stages in the virtual mouse control. The Media Pipe structure is a multi-modular structure. A pipeline is a diagram made up of "number cruncher" components where each minicomputer is connected by streams that allow the pieces of information to flow through.

3.3 Open-CV Module: Computer vision is the cornerstone or main tool of artificial intelligence. Open-base CV's version is 1.0. C, Python, Java, C++, and C connections are available in Open-CV.It works with Windows,Mac OS, iOS, and Android,Linux. At the time it was being developed, open primary CV's goal was to support ongoing applications for computational productivity. By using this open-CV Module user can control the operations performed by the mouse. Open-CV is really very useful and also helpful in performing operations of mouse

4.IMPLEMENTATION:

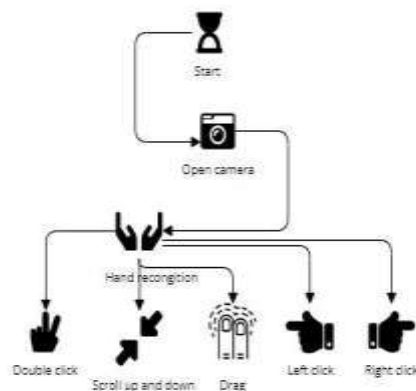


Fig 2: System Architecture

It includes a national portal for archiving data on the major part of the project is implemented using two modules they are the important keys of the project. Those two modules are: 1. GESTURE_CONTROLLER.PY. 2. GESTURE_CONTROLLER.GLOVED.PY. Both the modules very important and in one module the main code is saved in that and with the help of the main code only we can run the project in a smooth manner without any delay. In this all the hand marks were stored in the math module and that module will help to run the project by identifying some co-ordinates on our palm and it recognizes the co-ordinates of the hand by using hand gesture detection. These co-ordinates play a major role in the hand detection. In the implementation part Pyauto-GUI it acts as an interface between user and the computer and make the process move forward in a smoother manner. Math module and hand co-ordinates play a major role in this project. This implementation also includes existing and proposed systems. This is all about implementation of the project. Gesture controls are very important in running of the project. Implementation of this project should be done in PyCharm and also have to use python compiler for smooth running of the project. Based on the modules also the detection Of hand gestures is possible. Open-CV and Media pipe are fit to act as good libraries for the project and useful.

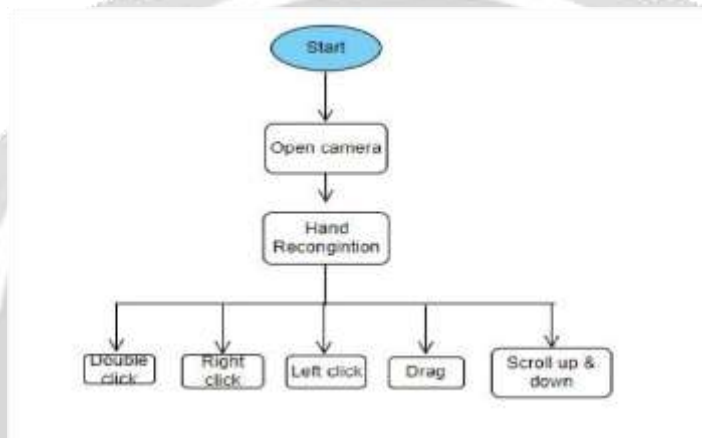


Fig 3: Flow Chart

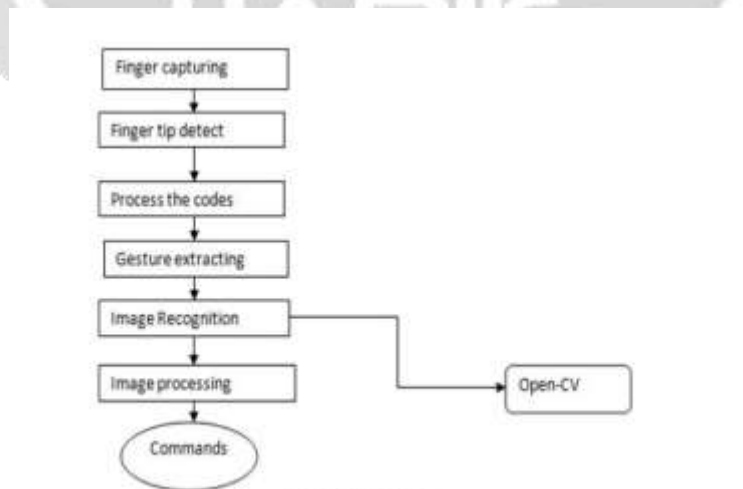
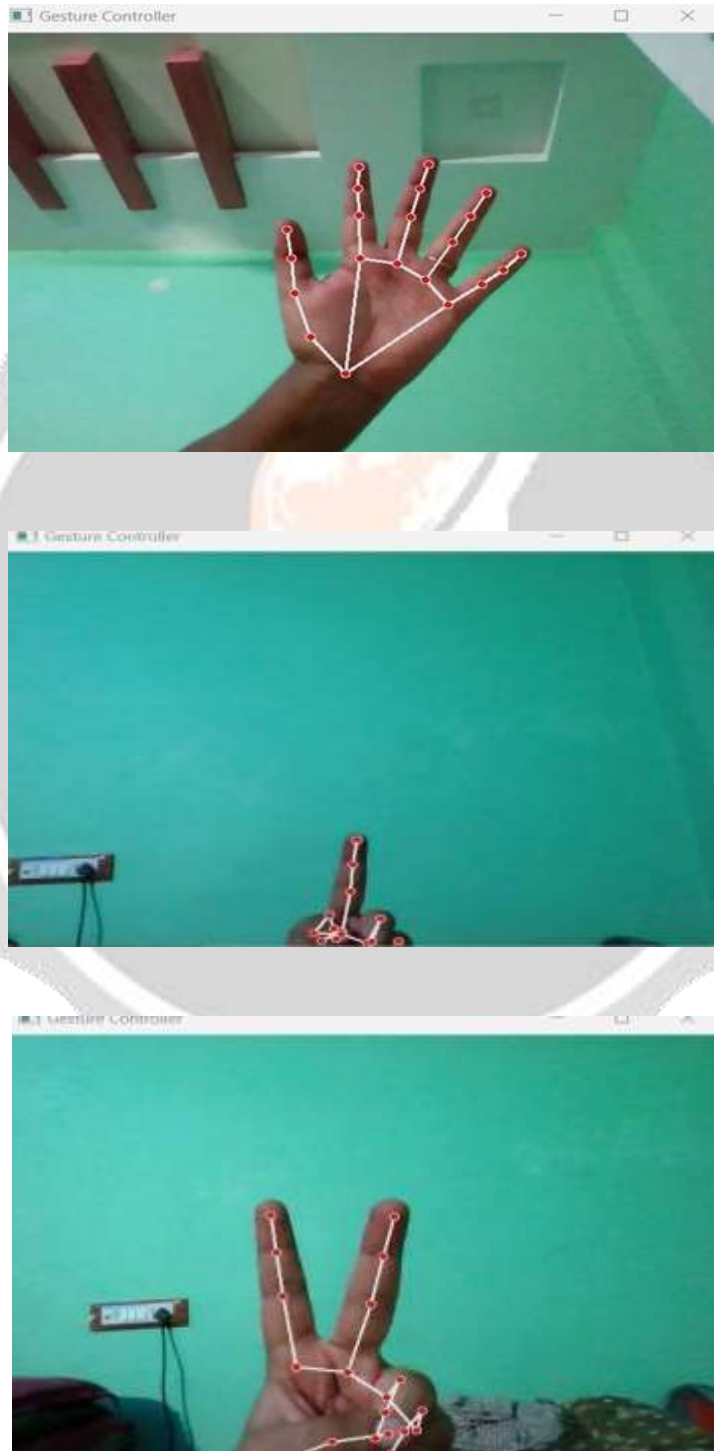


Fig 4: flow chart

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5.RESULTS:

The idea of improving human-computer interaction (HCI) through computer vision is presented in the virtual mouse control system. This program is developed for controlling the movement of the mouse using Hand Gestures and Open-CV with a real -time camera which detects the hand land marks, tracks, gesture patterns instead of a physical mouse. The results of the virtual mouse control are the results which are given by the hand gesture recognition technique.





6.CONCLUSION:

In the end, the AI virtual mouse performed admirably and outperformed the present versions in terms of performance. This strategy has enormous advantages for the disabled. The main objective of the virtual mouse is to eliminate the need for a physical mouse by using hand movements to control mouse functions. This can be achieved by using a webcam or the integrated camera. The AI virtual mouse is more accurate than the present one in comparison. The model contains a number of flaws, including some difficulties when dragging and clicking to select text and a slight loss of precision when using the right click mouse function. To resolve this situation, fingertip detection must be employed to provide accurate results.

7.FUTURESCOPE:

The recommended AI virtual mouse has a number of flaws, including some concerns with the model's ability to click and drag to select text and a slight reduction in the accuracy of the right click function. We will attempt to address these and other issues with the proposed AI virtual mouse technology in our next study. The suggested solution also makes advantage of HCI to control simultaneous keyboard and mouse operation. (HUMAN-COMPUTER-INTERACTION). The future integration or development of keyboard functionalities in addition to mouse functionalities will benefit from this endeavour. This is also coming under the (HCI). By using this HCI in future there will be a lot of demand for the virtual keyboards also not only virtual mice. It also helps in decreasing the radiation also if virtual keyboards come into existence and also it will be useful for the people who continuously work on laptops or pc's and they will enjoy working on virtual keyboard which performs all the functionalities of the keyboard virtually.

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