**Virtual Mouse**

**Project Description**

This is a Python project which will create a virtual mouse. Here instead of using the normal mouse we are using our hand as mouse. So, we can control the mouse operations with the hand movement.

**Programming Language**

Python

**Prerequisite**

Basics of OpenCV, PyautoGUI and Mediapipe

**IDE used:**

Pycharm

**Overview**

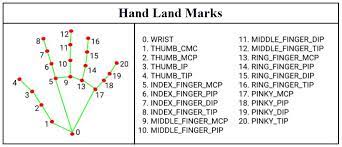
**Objective**

Creating a virtual mouse using the Python programming language. This project will help us to create our own mouse. Instead of the normal mouse, we are using our hand as the mouse. The movement of hand will be captured by the camera of your device and can be used for performing the mouse operations. This will help us to avoid the normal mouse device. It will be more convenient for the people.

**Primary Goals**

* Creating a new project using Pycharm.
* Installing OpenCV package.
* Install Mediapipe package.
* Install Pyautogui package.
* Understanding Hand Landmarks

Hand Landmarks



**Task 1**

Before starting the coding part of the project, we need to classify the entire project into five main steps.

1. First step is to opening the video camera.
2. Once the camera is working properly, we need to detect the hand.
3. From the image captured we need to separate the index finger.
4. Now we need to move the mouse pointer using the index finger.
5. Now we need to enable the click operation using the index finger and thumb.

**Task 2**

The first process to complete is, opening the video camera. Here we are using Opencv package in Python. Once the video camera is open we need to create the frame for it.

**Task 3**

The second step of the project is to detect hand from the image captured by the camera. In order to do that we use Mediapipe package in Python. Here we are just detecting the hand. Inside mediapipe package we have enough functionalities to identify the landamarks on the hand. That we can utilize in this step.

**Task 4**

Once the hand is detected properly, we need to plot the landmarks on the hand. And then from the hand we need to distinguish the index finger. As shown in the hand landmarks image above, we can use numbering for the index finger tip and for the thumb tip also. For this we are making use of the Mediapipe package in python.

**Task 5**

Now we have detected the index finger and the thumb also. The next step is to give the movement of the mouse pointer when the index is moved. Here we are using the index finger tip for moving the mouse pointer. This action can be implemented with the help of a package called as PyautoGUI. With this package we will move the mouse pointer according to the movement of the index finger.

**Task 6**

The final step of this project is to give the click action of the mouse. Here we are using the index finger tip and thumb tip to perform click action. When the thumb tip and index finger meet each other it will wok as a click action of the mouse. Here also we using the PyautoGUI package to perform this task.

**Conclusion**

This project will create a virtual mouse which can use even if some functionality problem occurs to the normal mouse. Here the user can use their hand movement for performing the actions performed by the mouse. This will help us to reduce the usage of electronic device and thereby helping people to work more efficiently. In this project we using different packages of python. In short this help us to remove an electronic device and make its functionality to a virtual mode.