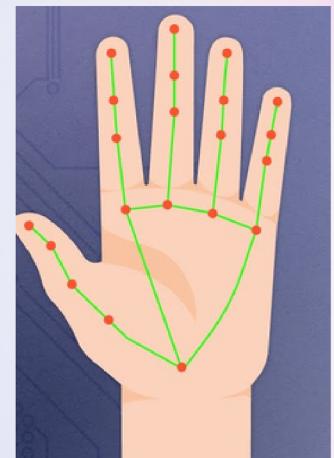




# Virtual Mouse Using Python

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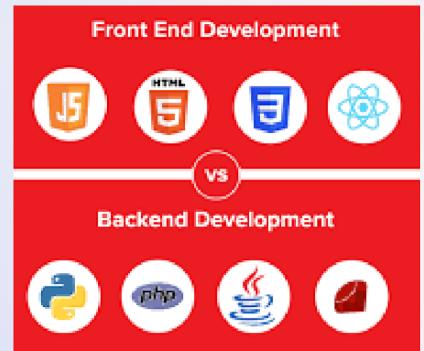


## Introduction

To build any project irrespective of the programming language you are using your project has to have these two things which are **"Frontend"** and **"Backend"**

**Front-end:** a style of computer programming that focuses on the coding and creation of elements and features of a website that will then be seen by the user.

**Back-end:** refers to parts of a computer application or a program's code that allow it to operate and that cannot be accessed by a user.



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There are multiple platforms wherein you can code and develop your project



Following are the examples:

**Jupyter Notebook:** formerly known as IPython Notebook, is an interactive web application for creating and sharing computational documents. It is a fully open-source product, and users can use every functionality available for free. It supports more than 40 languages including Python, R, and Scala.



**Google Colab:** is a product from Google Research. Colab allows anybody to write and execute arbitrary Python code through the browser and is especially well suited to machine learning, data analysis, and education.



**Pycharm:** is an integrated development environment (IDE) used for programming in Python. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems, and supports web development with Django.



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After doing your Project the next immediate question arises



## Where to upload the project?

**GitHub** is a web-based version control and collaboration platform for software developers. Microsoft is the biggest single contributor to GitHub.

Git is used to store the source code for a project and track the complete history of all changes to that code. It lets developers collaborate on a project more effectively by providing tools for managing possibly conflicting changes from multiple developers.



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## Problem Statement

### Build a virtual mouse using Python

Gesture Controlled Virtual Mouse makes human-computer interaction simple by making use of Hand Gestures. The computer requires almost no direct contact. This project makes use of state-of-art Machine Learning and Computer Vision algorithms to recognize hand gestures that work smoothly without any additional hardware requirements.

It leverages models such as [CV2](#), [MediaPipe](#), [pyautogui](#)



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## **Elaboration of my Problem statement and my project**



**Important: Installing 3 Packages (OpenCV, mediapipe, pyautogui)**

**Step 1 - Open the video camera**

**Step 2 - Detect the Hand**

**Step 3 - Separate the index finger (landmark 8) so that we can use that as a mouse pointer**

**Step 4 - Move the mouse pointer using the Index finger**

**Step 5 - Click Operation**

**Step 6- Final Result**



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# About Libraries



**OpenCV:** It is a Python library that allows you to perform image processing and computer vision tasks. It provides a wide range of features, including object detection, face recognition, and tracking.

**Mediapipe:** It provides a suite of libraries and tools for you to quickly apply artificial intelligence (AI) and machine learning (ML) techniques in your applications. You can plug these solutions into your applications immediately, customize them to your needs, and use them across multiple development platforms.

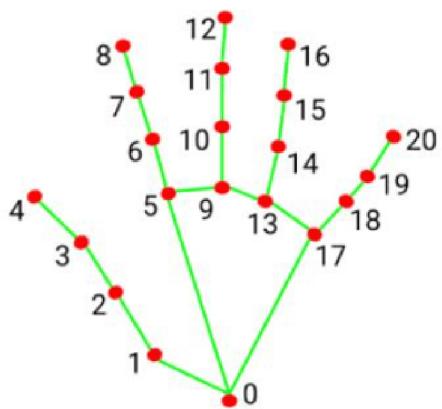
**Pyautogui:** PyAutoGUI is a cross-platform GUI automation Python module for human beings. Used to programmatically control the mouse & keyboard.



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## The landmarks on hand

### Hand Land Marks



- |                       |                       |
|-----------------------|-----------------------|
| 0. WRIST              | 11. MIDDLE_FINGER_DIP |
| 1. THUMB_CMC          | 12. MIDDLE_FINGER_TIP |
| 2. THUMB_MCP          | 13. RING_FINGER_MCP   |
| 3. THUMB_IP           | 14. RING_FINGER_PIP   |
| 4. THUMB_TIP          | 15. RING_FINGER_DIP   |
| 5. INDEX_FINGER_MCP   | 16. RING_FINGER_TIP   |
| 6. INDEX_FINGER_PIP   | 17. PINKY_MCP         |
| 7. INDEX_FINGER_DIP   | 18. PINKY_PIP         |
| 8. INDEX_FINGER_TIP   | 19. PINKY_DIP         |
| 9. MIDDLE_FINGER_MCP  | 20. PINKY_TIP         |
| 10. MIDDLE_FINGER_PIP |                       |



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# THANK YOU



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