**Assignment 2: Introduction to Hand Detection with MediaPipe**

Learning Objective: Learn how to use MediaPipe to detect hand landmarks in real-time video.

Required Libraries: OpenCV, MediaPipe, NumPy

Tasks

Main Task

Create a Python script that:

1. Captures video from your webcam

2. Detects hand landmarks using MediaPipe

3. Draws two things:

- The hand skeleton (using MediaPipe's built-in drawing)

- A red circle at the tip of the index finger (landmark 8)

4. Displays the frame

5. Exits when 'q' is pressed

Bonus Task

Add a feature that:

- Prints "Pinching" when the distance between your thumb tip (landmark 4) and index finger tip (landmark 8) is less than 40 pixels

- Prints "Not Pinching" when the distance is greater

To capture video from webcam VideoCapture function of OpenCV is used. Then, we go on to convert the BGR image to RGB format by using cvtColor attribute of OpenCV. Then, the Hands and process function of MediaPipe is used to detect the hand from the webcam. The skeleton of the hand is displayed using HAND\_CONNECTIONS attribute of mp\_hands. The tip of the index finger is the landmark 8 in the hand skeleton. So we use this information directly to draw a circle at the tip of the index finger.

Additional task was to check whether the hand is pinching or not. To do this, we had to check whether the distance from the tip of the index finger to the tip of the thumb is less than 40 pixels. The tip of the thumb is represented by landmark 4. So now, to find the distance between the tip of thumb to tip of index finger, we first find their coordinates and then use distance formula to check their distance. If it turns out to be less than 40 pixels, we print ‘pinching’ else we print ‘not pinching’.