OpenCV

Open source computer Vision

- Opencv is an image processing library created by intel and later supported by willow Garage & Now maintained by Itseez
- works in c, c++ & Python
- Open Source & feee

```
# Display Img
import cv2
Image = cv2.imread("a.jpg",1)
cv2.imshow("Image", image)
cv2.waitkey(1000)
cv2.destroyAllWindows()
```

imread() →

1st arg = Image path + Name

2nd arg = Flag → {1, 0, -1}

1 ← loads a color img

0 ← loads a image in Grayscale

-1 ← loads img as such including alpha channel.

If Img path gets wrong then No exception thrown there of Imread() function.

cv2.waitkey() ← used for to show how many time the window appears on display - In that given value of millisecond. If waitkey(0) ← Not destroy ~~after~~ manually close window.

cv2.destroyAllWindows() - distroy window after timeout

```
# save Image
cv2.imwrite('lena-copy.png', image)
```

save as file Name ↓

value which given by imread() ↓

What is ~~Vision~~ Computer Vision

- After Uploading pic on Fb, Fb gives automatic suggestions to tag people who are there in image. that happens all because of Computer Vision.

How computers can gain high level understanding from digital images or videos Idea is to automate tasks that the human Visual Systems can do so.

Open CV is a library of Python designed to solve Computer Vision problems.

1st developed in 1999 at Intel

- all imgs are converted from or to numpy array.

ie Img → numpy array

```
print (type (img))
```

```
#Resize
resized = cv2.resize( img, (600, 600))
                or
resized_img = cv2.resize (img, (int (img.shape[1]/2),
              int (img.shape[0]/2)))
                or
              * by 2 also
```

Face detection

Step I

Image # create cascade classifier. It will contain the features of the face.

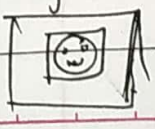
opencv read the features file & Image

Step II

opencv # Numpy Array → search for the row & column values of the face Numpy ndarray (face rectangle co-ordinates)

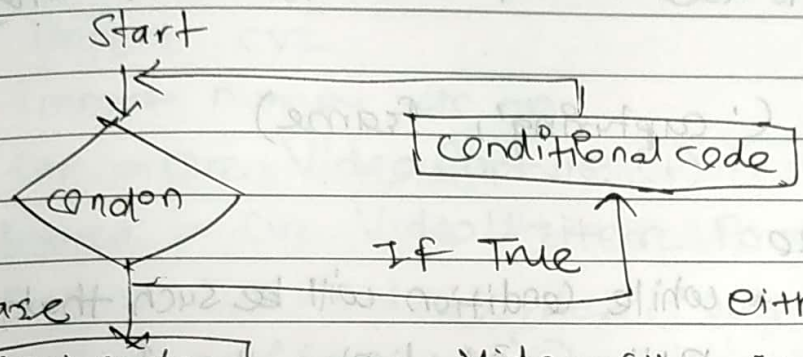
Step III

Display the Image with the rectangular face Box



Capturing Video

opencv for reading frames | images one-by-one
loops - multiple imgs | frames displayed very quickly
→ Video → use loops to build video



either give the path to the video file or use No. No specify that you will be using webcam to capture video.

```
import cv2
video = cv2.VideoCapture(0)
```

0 = use built-in camera.

method to create Vide capture object. It will trigger the camera

If I have external cam, I can put '1' to use that. If I have 2 external cams, I want to use 3 can I can put '2'

If I have video file I can give path to that video file.

Add Time delay

```
import cv2, time  ← Import cv2 & time module

Video = cv2.VideoCapture(0)
time.sleep(3)  ← This will stop the script for 3 sec
Video.release()
```

The web cam will be on for 3 seconds.

Page No.
Date

It is bool data type, return true if python is able to read the videoCapture object

check, frame = video.read()

It is numpy array represents the 1st Img that video captured

imshow method is used to capture the first img frame of the video.

cv2.imshow ('capturing', frame)

Capturing Video

use while loop → while condition will be such that, until unless 'check' is True, Python will display the frames.

key = cv2.waitKey(1) ← This will generate a new frame after every 1 miliseconds

If key == ord('q'): ← once you entered 'q' the
    break window will destroyed

Motion Detector

A webcam, that can detect the motion or any movement in front of it.

Logic