Introduction To OpenCV And Its Practicals

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The following topics are covered in this activity:

1. Introduction to Open CV libraries.
2. work with Image and video files.
3. create a code for capturing images in live video streaming.
4. Face detection using Open CV haar cascade classifiers.

1. OpenCV is a cross-platform library using which we can develop real-time **computer vision applications**. It mainly focuses on image processing, video capture and analysis including features like face detection and object detection.

Computer Vision

Computer Vision can be defined as a discipline that explains how to reconstruct, interrupt, and understand a 3D scene from its 2D images, in terms of the properties of the structure present in the scene. It deals with modeling and replicating human vision using computer software and hardware.

Computer Vision overlaps significantly with the following fields –

Image Processing – It focuses on image manipulation.

Pattern Recognition – It explains various techniques to classify patterns.

Photogrammetry – It is concerned with obtaining accurate measurements from images.

OpenCV Library Modules

Following are the main library modules of the OpenCV library.

-Core Functionality

This module covers the basic data structures such as Scalar, Point, Range, etc., that are used to build OpenCV applications. In addition to these, it also includes the multidimensional array **Mat**, which is used to store the images. In the Java library of OpenCV, this module is included as a package with the name **org.opencv.core**.

-Image Processing

This module covers various image processing operations such as image filtering, geometrical image transformations, color space conversion, histograms, etc. In the Java library of OpenCV, this module is included as a package with the name **org.opencv.imgproc**.

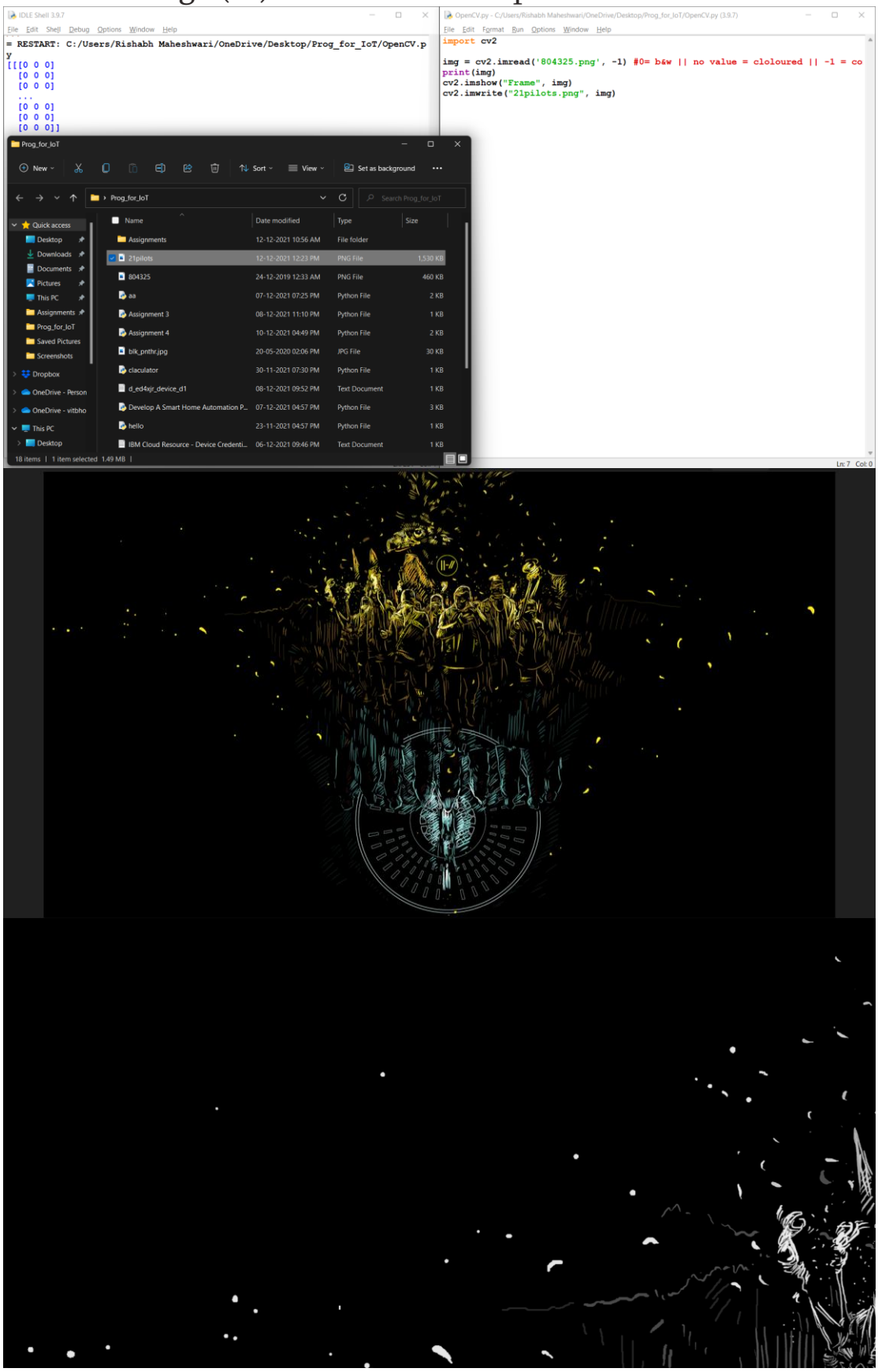
-Video

This module covers the video analysis concepts such as motion estimation, background subtraction, and object tracking. In the Java library of OpenCV, this module is included as a package with the name **org.opencv.video**.

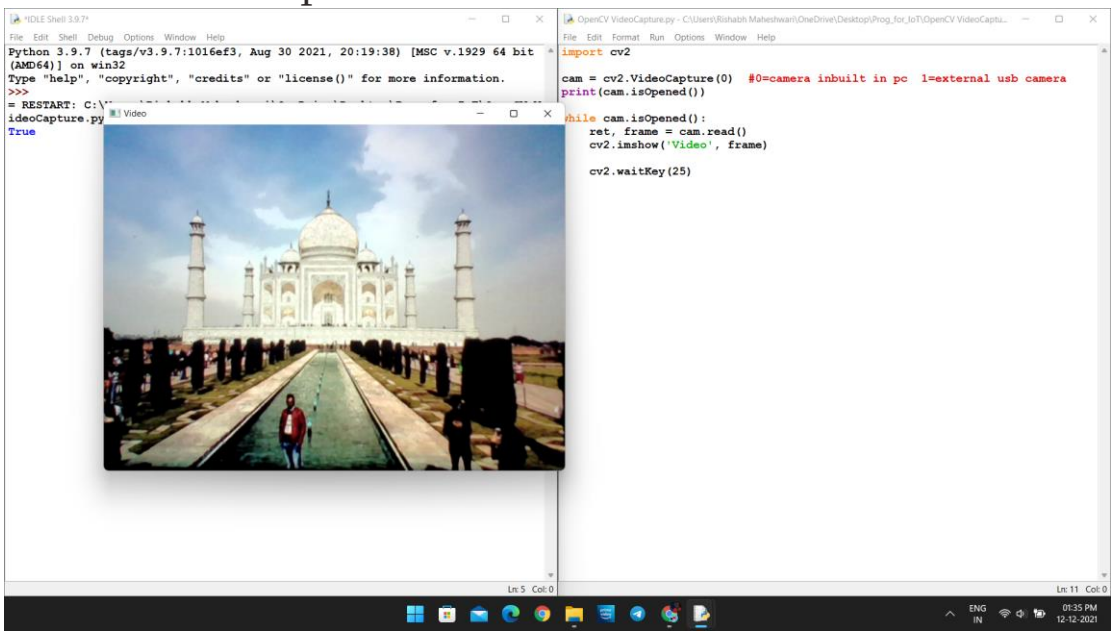
-Video I/O

This module explains the video capturing and video codecs using OpenCV library. In the Java library of OpenCV, this module is included as a package with the name **org.opencv.videoio**.

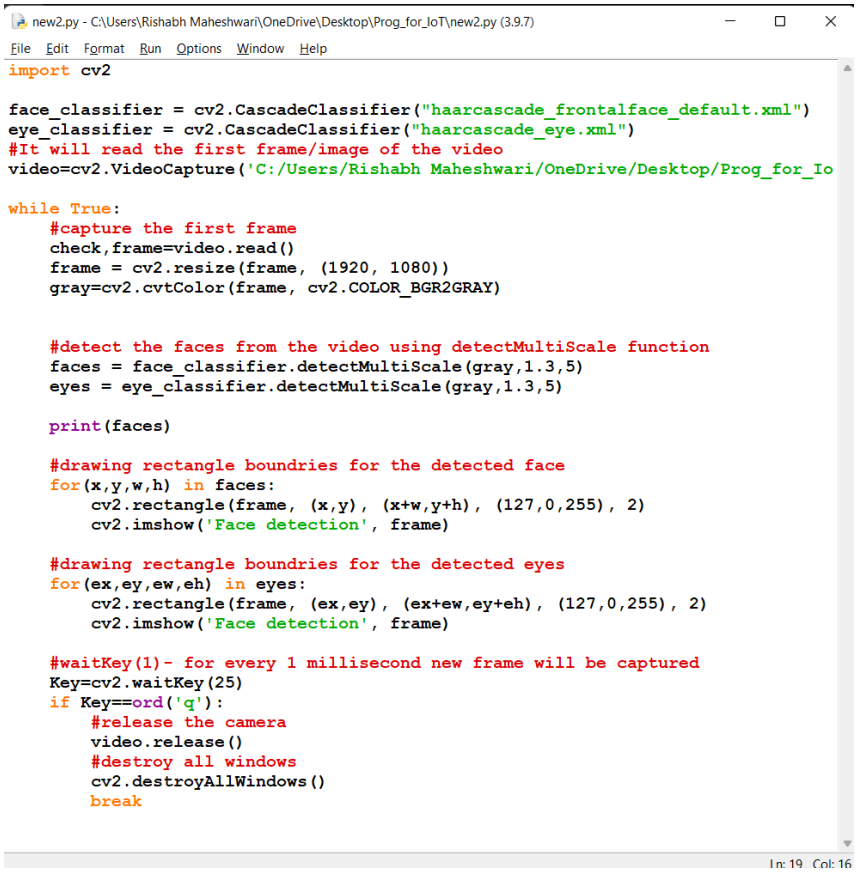
2. For reading an Image and Saving its black & white (0) or contrast Image (-1) the code and output is as follows



3. For capturing image from Camera or live Video Streaming the code and output are as follows.



4. For face detection using Open CV haar cascade classifiers python code is as follows



Output: