Computer Vision

Assignment 0

Instructions:

- The goal of the assignment is to introduce you to several computer vision tasks and the use of OpenCV package.
- You need to upload a single zip containing 1) your report 2) your code that you wrote and 3) its output images. The file should be uploaded in the moodle portal.
- **Make sure that the assignment that you submit is your own work. Any breach of this rule could result in serious actions including a F grade in the course.**
- The experiments and report writing takes time. Start your work early and do not wait till the deadline.

Deadline: 18th Jan 2023 23:59

Installing OpenCV

The first step of doing this assignment is to install the OpenCV package on your computer. OpenCV is an open source library for developing computer vision applications.

To install: `pip install opencv-python`

Tasks

1. **Image Manupulation:** Take the two images from the link . Create a (big) T-shaped hole in the first image, and fill it with details from the second image. An example of the output is given below

2. **Video <-> Images**: Write a program to convert a given video to its constituent images. Your output should be in a specified folder. Write another program that will merge a set of images in a folder into a single video. You should be able to control the frame rate in the video that is created. Consider a small video, 5-10 secs would be enough.
3. **Capturing Images**: Learn how to capture frames from a webcam connected to your computer and save them as images in a folder. You may use either the built-in camera of your laptop or an external one connected through USB. You should also be able to display the frames (the video) on the screen while capturing.

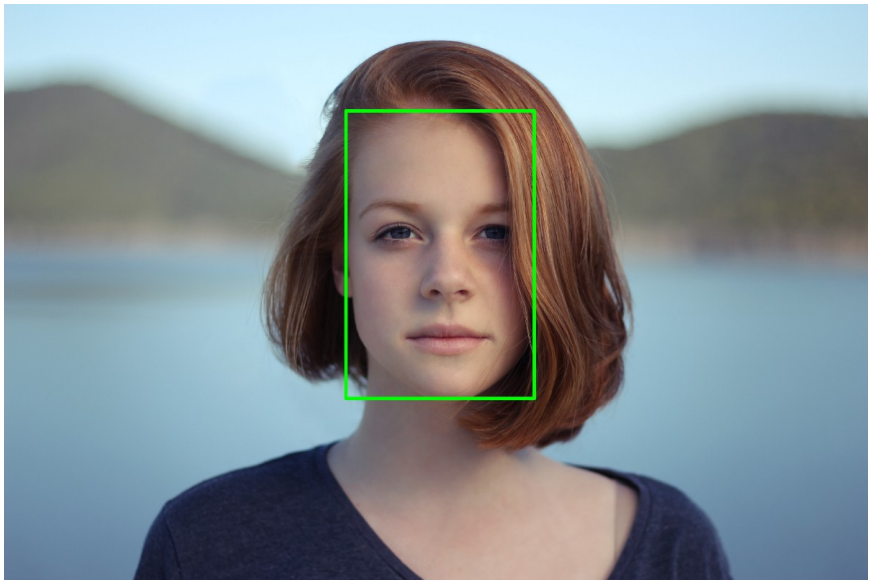
Additional Tasks

You may also try the following problems if you are interested. You need not submit them as part of this assignment.

- **Chroma Keying**: Read about the technique of chroma keying. Following are a few good starting points:
  - Introduction: http://en.wikipedia.org/wiki/Chroma key
  - Alvy Ray Smith and James F Blinn, ”Blue Screen Matting”, SIGGRAPH’96.

Create an interesting composite of two videos using this technique, possibly with one video including yourselves.

- **Face Detection**: Extend your part 3 by creating bounding boxes around the all the faces present in the video frame and display this annotated frames on the screen while capturing.



Hint: OpenCV contains a built-in face detector that will find the locations of faces in a given image

Submission

Submit a zip file as mentioned at the top.

The zip file should contain:

- A description of the problem, solution, and experiments you performed.
- Challenges you faced and learnings from the experiments.
- Code

You are expected to write the complete code for the assignment yourselves. DO NOT COPY ANY PART FROM
ANY SOURCE including your friends, seniors or the internet.