Lab 6 – Python and OpenCV 2

Prior to commencing with the tasks, ensure that you:

1. Install the Raspberry Pi Camera Module **prior** to plugging in the Pi.
2. Synchronise the time on the Pi, either by connecting to a different network, i.e. a Hotspot, or by using: `sudo date -s 'YYYY-MM-DD hh:mm:ss`
3. Clone the Lab6 Repository from GitHub Classroom **into the ee347 folder**, using this link. Open the ee347 folder in VSCode and work from there. **Do not move the .venv folder.**
4. Commit and Push to GitHub after each task. Each task should be completed in the individual taskX.py scripts provided.

Tasks

1. Load task1.mp4 and display it in an OpenCV window.
2. Load task1.mp4, convert it to grayscale, and save as task2.mp4.
3. Using the OpenCV draw functions (line, rectangle, circle), load task1.mp4 and draw a moving progress bar on the bottom of the video preview.
4. Load task1.mp4, run Gaussian blur on the video and save as task4.mp4.
5. Use the Raspberry Pi camera to capture a video and save it as task5.mp4. Use q to end the recording.
6. Copy the code from task 5 and save the video as a numpy file. Ensure the storage space used is minimised without loss of data.
7. Load task1.mp4 and use haarcascades to detect **all** faces in the video. Draw a bounding box around the faces and display the output in a preview window.
8. Using the Raspberry Pi Camera, capture frames and use haarcascades to detect **one** face in the frame. Display the frame with the bounding box, and in a separate window, display the cropped face.
9. Create a camera application, with both video recording and image capture functionality. The application must display when a recording is in process (i.e. a red dot in the top corner), however, this should not be visible on the output video. The application should be capable of capturing multiple images and videos **without overwriting**.
10. Update your camera application to include face cropping functionality for both image capture and video recording.

Note: Ensure your output .mp4 and .npy files are added to the .gitignore file, or you may have difficulties pushing to GitHub.