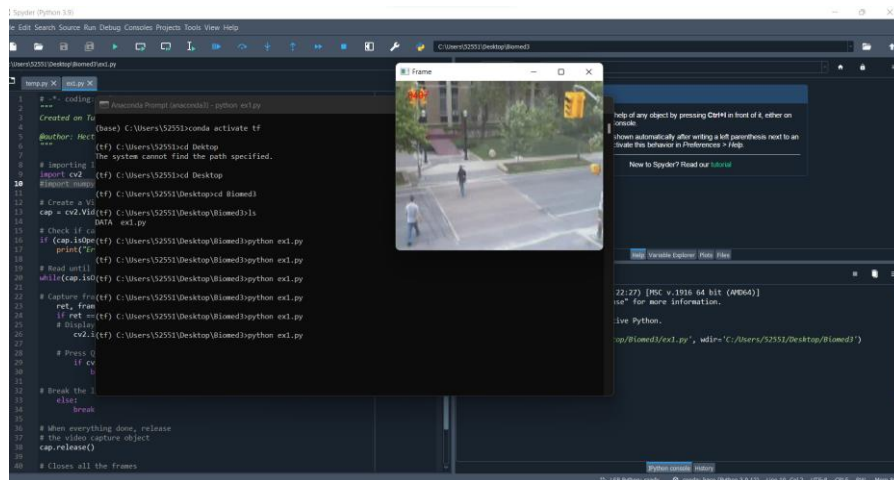


# Homework 3: Hector Jair Morales Gomez

## 1. VIDEO SEQUENCES READING

Choose a video sequence (fly.avi or STGEORGES.avi) and play it from Matlab or Python

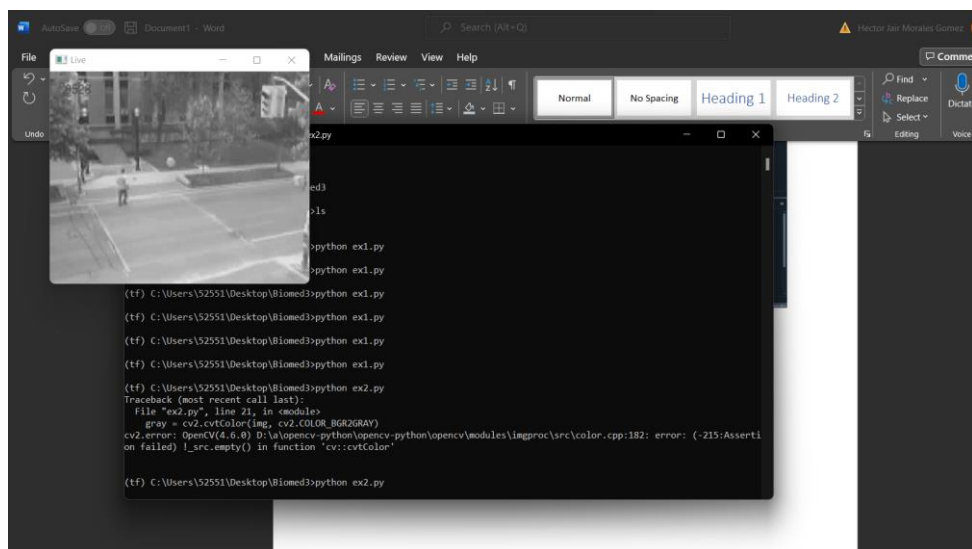
For this homework I'm using Python, because I'm more familiar with OpenCV on this language. I selected STGEORGES.avi. The code for each exercise is available on GitHub. I'm using as IDE Spyder so this time I won't produce a Jupyter report, but I will attach proof that each one of my codes is working. The first exercise went smoothly. I can play the video with no problem:



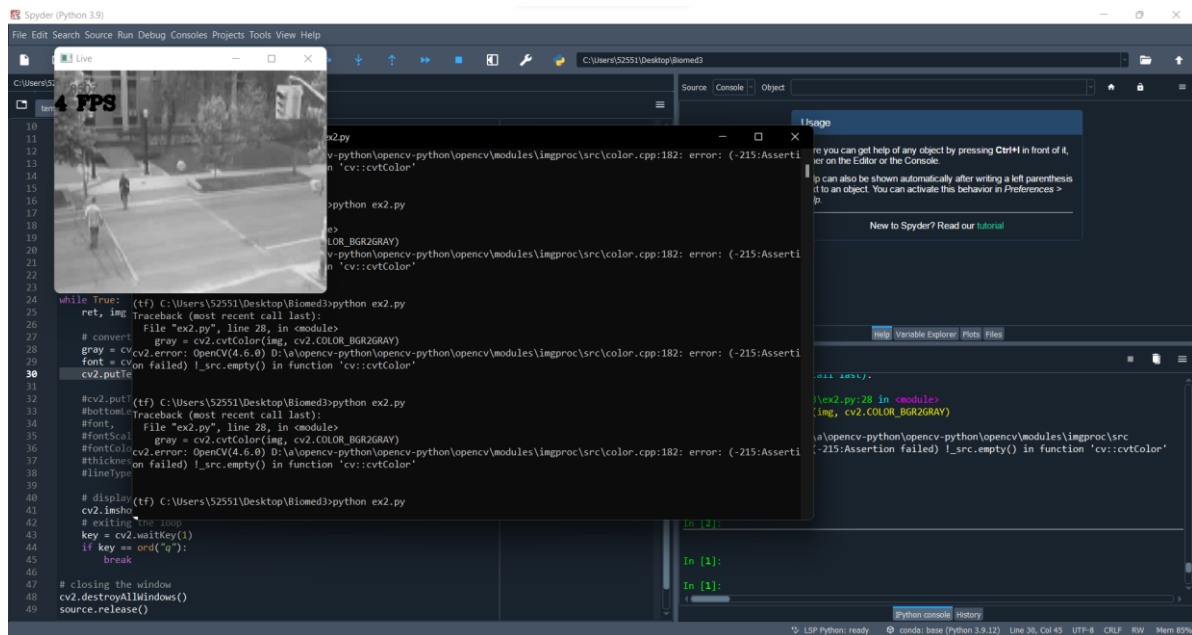
## 2. SOME TRANSFORMATIONS

- Transform your video images into grayscale images
- Play the obtained video
- Play the video after reducing the frame rate (/2 or /3)

First and second bullet point went smoothly:



Now, we know that our video has 8 fps, reducing its fps to  $/2$  means changing the fps to 4, as expecting it looks like it's moving slower:



### 3. CREATE A VIDEO FROM A SET OF 2D IMAGES

- Create two (avi) sequences from the given images (PIETON and TAXI)
- Play the obtained videos



There are no TAXI images on the DATA file that was sent to us. The code for this exercise is available on the GitHub repository. I uploaded the video created with the PIETON images to: [Youtube](#).

### 4. OBJECTS TRACKING ON PIETON VIDEO SEQUENCE

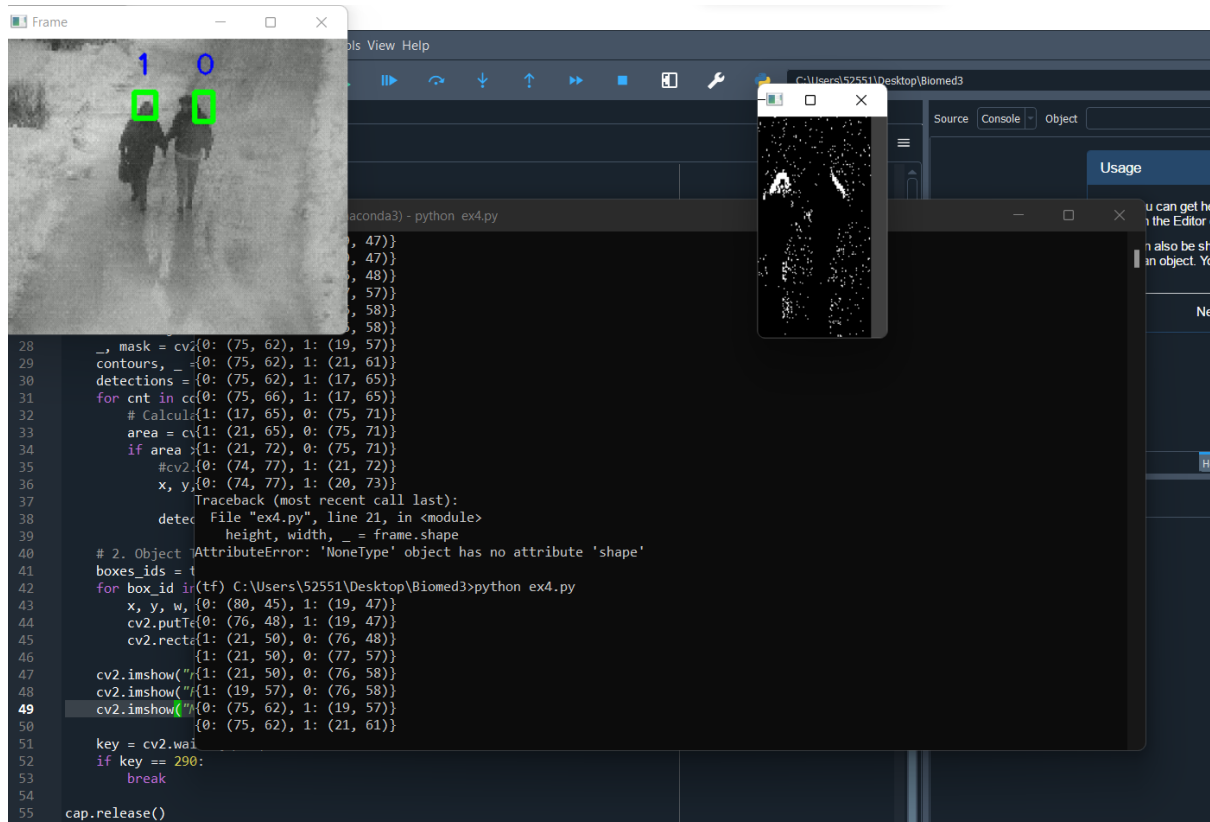
The aim of this section is to automatically segment the two persons on the images and follow their trajectories. Propose a solution to resolve this problem.



A pre-processing step can be required, and a minimal user-interaction can be allowed (for example to indicate the object to track).

The object can be visualized on the original image with its superimposed contours (obtained after the segmentation) or using a box including it.

Applying some thresholding to generate a mask over a region of interest I was able to track the motion of the two subjects. My ideas for improvement given that I'm unable to cover the whole object (I'm only able to follow the heads) is find a better set of parameter for the thresholding in combination with the eliminate background function of OpenCV. I also think that my code would work better on images with higher spatial resolution.



Once again, I uploaded the result to [Youtube](#). Even though there is a lot of room for improvement, my code tracks successfully both subjects till the end of the video without interruption.

## 5. CREATE SYNTHETIC IMAGES WITH MOVING OBJECTS

- Create a new sequence of  $nb$  synthetic images ( $n \times m \times nb$ ) and simulate the movement of a given object (circle, square...). The idea is to apply some transformations on the object (translations, rotations...).

- Save the obtained sequence and play it

For the last task I created a series of synthetic images of a given object and I applied the translation matrix:

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ t_x & t_y \end{bmatrix}$$

After animating the resulting images, I created a video using the code of exercise 3 to obtain the final video: [Youtube](#). I did a cartoon animation of red cells and white cells moving inside an artery.



