ELE 492: Image Processing
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HW-2

Data: Download HW2images.zip from OGR.
Submission Details: Upload your report as a single .pdf file to the system. Include your code in the appendix of the report. Name it as HW2_yourID_yourName.pdf.
Late Penalty: If you submit late, you will lose 20pts for each day.
** All of the code should be written in Python and should be submitted with the HW.

1- **At the top of the HW, please sign this pledge**:

> I pledge that I have not received or given any aid in this homework. All the work presented below is my own work. (Name, lastname, ID, signature).

In this homework, you will use the **OpenCV library** for **template matching**.

2- Read tutorail 1:

https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_template_matching/py_template_matching.html

3- Read tutorail 2: https://www.sicara.ai/blog/en/object-detection-template-matching
and its description tutorial: http://ronny.rest/tutorials/module/localization_001/iou/
Note that IoU is a very common metric in object localization. You might also find other resources online.

4- Download the data, and write your own code to detect object 1, 2 and 3 in the full PCB image. Document your findings. Make sure your masks are the same size as the objects you want to detect for the best results. You can use IrfanView etc. for scaling and rotation.

5- Downscale the template objects and experiment with them. How does upscaling/ downscaling and rotation effect your results? For this question, it is enough to select one object and work with it. For instance, take object 1, downscale it multiple times, and also rotate them by say 5, 10, 45 degrees and observe the results.

Please remember that you might be chosen randomly to present your work. Be ready to display working code when asked to do so, and be able to describe all your work.

Finally, please enjoy the journey and let it show in your work. Good luck!
Dr. Seniha Esen Yüksel