CS5190 Spring 2024 - Assignment 3

Total points: 25 + (10 Extra Points)

Due date: Friday, April 12, 2024

In this assignment, please select any one of the following two options to work on. 10 extra points will be considered if completing both options.

- **(Option 1) Hough Transform for Line and Circle Detection**

In the folder of assignment 3, there is an image "figure1-assignment3.jpg". **Write a program that detects pool table and balls using Hough Transform**. Note: you are allowed to use any OpenCV functions for this task.

a. (10 pts) Generate an image showing detected lines (show four main lines of the interior border like the following result) of the pool table overlaid on the top of the original image, as shown in Figure 1.
b. (10 pts) Generate an image showing detected balls overlaid on the top of the original image.
c. (5 pts) Generate an image showing the location of four corners of the pool table overlaid on the top of the original image.

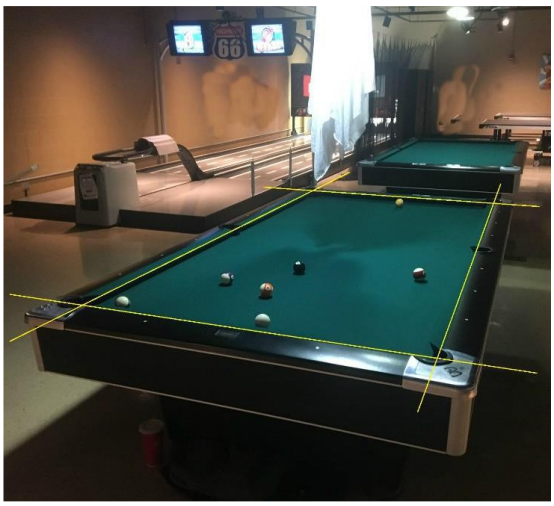

Figure 1. An example of expected result of task a in this option

- **(Option 2) Image Pyramids**

(25 pts) In the folder of assignment 3, there are three images "figure2-assignment3.jpg", "figure3-assignment3.jpg", and "figure4-assignment3.jpg", showing two input images and one mask for this task, w. **Write a program to create a composite image of the two images with the mask, based on image pyramids.** Figure 5 shows an example of expected result. Note: you are allowed to use any OpenCV functions for this task.

Figure 2: Input Image 1

Figure 3: Input Image 2

Figure 4: Input Mask

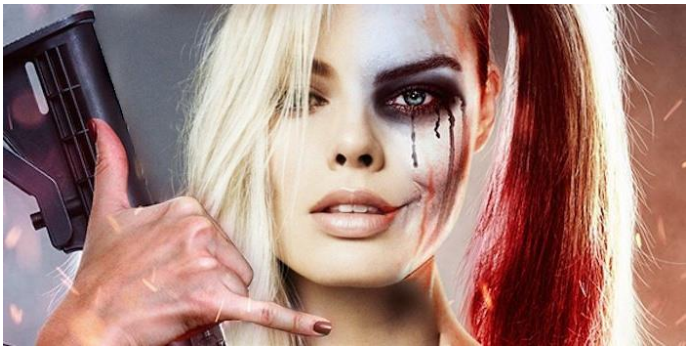

Figure 5: Expected Result

What to Submit?

1. Python source codes **in ".ipynb" format**. Please note that
    a. don't use .py format
    b. use **relative file paths** to load (save) images from (to) disk.
    c. comment some important code lines,
2. Input images used.
3. Output images generated.
4. Please zip all documents as yourname_assignment3.zip and submit it to Canvas.