Lab 5

Detect an object in an image based on its shape

Part A: Detecting Circles in an Image

Goal:
Identify objects in an image whose contours have a circular shape.

Idea:
1. Load Image (folder "images").
2. Isolate objects with a circular shape.
3. Draw red circles at the centers of these isolated objects and draw green circles around these isolated objects.
4. Visualize the result.

Hints:
1. OpenCV comes with a built-in method for detecting circles.
2. Finding the right parameters for the above method can be key to getting good results for you solution.
3. Post-processing the results from the built-in method can also improve overall results.
4. There should be only one circle per object and no circles for non-circular objects.
5. Initially train your solution on the image "circles_simple.png".
6. The quality of your solution will be graded based on your results from "circles_target.jpg".

Example:

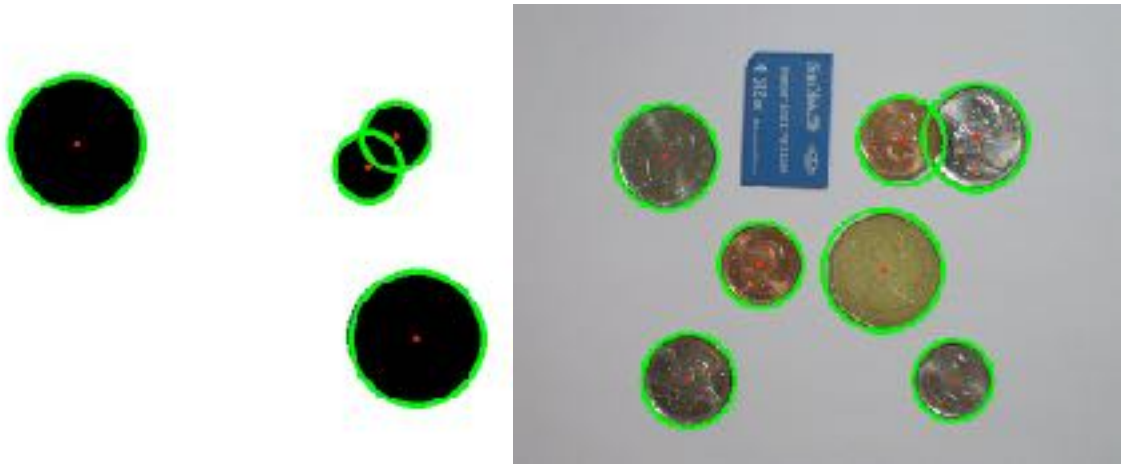

Figure 1. Circle Detection Results
(left: circles_simple.png. right: circles_target.jpg)

Part B: Detecting Lines and Line-Intersections in an Image

Goal:
Identify object-contours in an image which resemble a straight-line and identify the points at which they intersect with each other

Idea:

1. Load image (folder "images").
2. Isolate object contours resembling a straight line.
3. Draw a green line across the image along each of these isolated contours.
4. Calculate the intersections point between the each line.
5. Draw a small red circle around each of these intersection points.
6. Visualize the result.

Hints:

1. OpenCV comes with a built-in method for detecting lines.
2. Some pre-processing of the original image is required before using the above method.
3. Post-processing the results from the built-in method can improve overall results.
4. There should be only one line per straight object side and no lines for circular objects.
5. Initially train your solution on the image "lines_simple.png".
6. The quality of your solution will be graded based on your results from "lines_target.jpg".

Example:

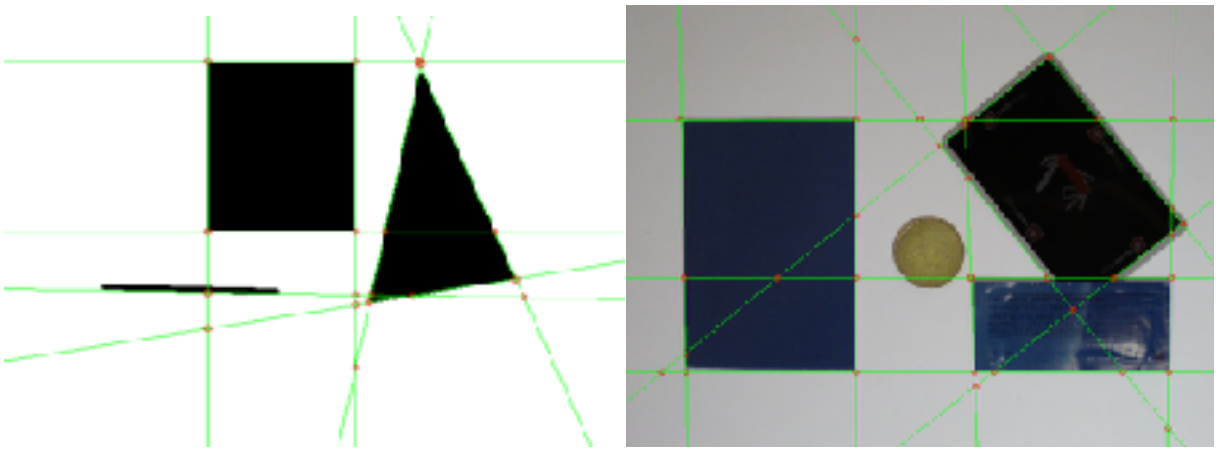

Figure 2. . Line Detection Results
(left: lines_simple.png. right: lings_target.jpg)

Helpful Methods:

Helpful Methods	**Description**
Circle Detection	Link
Line Detection	Link
Drawing Functions	Link
Feature Detections	Link
Image Filtering	Link