Image Processing and Computer Vision - Lab 5

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The Plan

1. Intro to Image Processing
2. CCD, CMOS, and Optical Systems
3. Intro to OpenCV
4. Fourier Transform (and Friends)
5. Image Segmentation
   - today (07/05)
6. Car Lane Detection
7. Face Detection and Tracking
8. Neural Network Introduction

Image Segmentation

- Today
  - 1,5 hours
- Text of the exercises/tasks
  - on the Teaching Portal
- You need a webcam and a still image
  - the image is on the Teaching Portal
- Goal
  - Experiment with common image segmentation algorithms (like Canny) and the morphological operators

Image Segmentation

- Two exercises:
  1. Edge detection
  2. Dilation and erosion
- It is a good idea to “*remove some noise*” before applying the image segmentation methods

Edge Detection: Canny

```
edges = cv2.Canny(image, min_threshold,
max_threshold)
```

- where `min_threshold` and `max_threshold` <u>usually</u> have a 1:3 ratio
- Any edges with intensity gradient more than `max_threshold` are sure to be edges and those below `min_threshold` are sure to be non-edges, so discarded.

Edge Detection: Sobel

```
x = cv2.Sobel(image, cv2.CV_16S, 1, 0,
                      ksize)
y = cv2.Sobel(image, cv2.CV_16S, 0, 1,
                      ksize)
```

- you can compute Sobel along x and/or along y

Edge Detection: Sobel

- After computing Sobel, to show the result of both operations on screen, you need to:
  - `x = cv2.convertScaleAbs(x)`
    [repeat for y]
  - perform a linear blending between `x` and `y`
  - display the result of the previous step

Morphological Operators

- Dilate

```
ris = cv2.dilate(src, kernel, iterations)
```

- Erode

```
ris = cv2.erode(src, kernel, iterations)
```

- `kernel` can be a matrix of 1s (`np.ones(m,n)`), e.g., 2x2 or 3x3

Image Segmentation

- Hints, insights, links, etc. are in the text of the exercises
  - I am here for you…
  - … please ask if you need any help or clarification

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