Sensor Technology and Image Analysis Lab 1

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1. Objectives

The objective of this lab is to get started with python and opencv for image processing.

2. Opencv installation

Use pip to install OpenCV on windows. Follow the steps:

- Step 1: Open Command Prompt. For windows system, on the left end of the taskbar, click the Start icon and type *cmd*, select Command Prompt (or Go to the terminal option at the bottom of the Pycharm IDE window).

- Step 2: Install opencv. In the Command Prompt, run the command:

```
1 pip install opencv-python
```

(You may get error if python is not installed in your machine. In this case, you have to install python first. Check if python is installed by running the command:

```
1  python --version
```

in the Command Prompt window.)

- Step 3: Check if opencv has been installed successfully. Open Python IDLE and type following codes in Python terminal (if you use python IDLE) and run

```
1 import cv2
2 print(cv2. __version__)
```

3. Getting started with images

3.1. Read, display and save images

```
1 import cv2 as cv
2 import sys
3 img = cv.imread(cv.samples.findFile("img.tif"))
4 if img is None:
5     sys.exit("Could not read the image.")
6 cv.imshow("Display window", img)
7 k = cv.waitKey(0)
8 if k == ord("s"):
9     cv.imwrite("savedImg.tif", img)
```

3.2. Basic operations on images

3.2.1. Get image properties

Check the properties of the given images, such as number of rows, columns and channels. These properties can be accessed by yourIMG.shape. The property of image data type can be accessed by yourImg.dtype.

```
1 yourImg=cv.imread('img.tif')
2 #check image properties: number of rows, columns, channels, image data
    type.
3 #You need to do
```

3.2.2. Modify pixel values and set ROI

Learn to access and modify pixel values, set region of interest (ROI). For instance, the value of the first pixel can be accessed by valuePix1=yourImg[0,0].

```
1 #You need to do
2 #write your code to get the value of the first pixel
3
4 #Write your code to assign a new value for this pixel
5 #select the ROI
6 ROI=img[50:100,50:100]
7 # you cen check the shape of the ROI
```

4. Additional resource

You will find more information in [1].

References

[1] OpenCV-Python Tutorials, `https://docs.opencv.org/4.x/d6/d00/tutorial_py_root.html`, 2022. [Online; accessed 2022-11-08].