Berliner Hochschule für Technik

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Learning from Images
Getting ready

WiSe 2025/26

The bla assignments in this course are all based on Python and several libraries such as the Computer Vision Frameworks OpenCV http://opencv.org/, scikit-learn http://scikit-learn.org/ and PyTorch https://pytorch.org/. This exercise serves as an installation tutorial to get all set up.

For all assignments applies to following honor code inspired by the honor code of Stanford University: *You may consult any papers, books, online references, or publicly available implementations for ideas and code that you may want to incorporate into your strategy or algorithm, so long as you clearly cite your sources in your code and your writeup. However, under no circumstances may you look at another group's code or incorporate their code into your project or assignment.*

Please implement your own solution. You will hand in your results via Moodle. **This exercise will not get graded.**

Exercise 1: Gitlab

If you have not setup your own gitlab repository already please make yourself comfortable with the Gitlab Server at the Beuth HRZ (https://gitlab.bht-berlin.de/). You can login with your HRZ credentials. Gitlab will give you a nice interface to initialize and organize all your repositories.

For a secure data exchange I recommend to generate and provide a ssh-key to the system. More information on this can be found in the help-area.

Exercise 2: Installation Anaconda, OpenCV3, scikit-learn and PyTorch

Please install the anaconda toolbox (https://www.anaconda.com/download). This normally goes in your user folder e.g. /Users/kristian/anaconda3 under MacOS. Anaconda is a useful toolbox and package management system for scientific computing, computer vision, data science and machine learning in python. I recommend the command line installation but that is up to you.

Note: Please install a python environment using the environment configuration *lfi_environment.yml*. We need specific OpenCV versions. If you choose to use an environment / package manager other than Anaconda, it's certainly feasible. However, ensure that you've installed the appropriate package versions as listed in the *lfi_environment.yml*. You find the necessary information and files in Moodle. **Important: Copying the source code and commands from the .pdf isn't working and will lead to errors**.

```
$ conda env create -f lfi_environment.yml
```

The environment was successfully installed when python can be startet and you get the following commandline output.

```
$ python
Python 3.10.6 (main, Oct  7 2022, 15:17:23) [Clang 12.0.0 ] on darwin
[Clang 10.0.0 ] :: Anaconda, Inc. on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> import cv2
>>> import torch
>>> import sklearn
>>> import matplotlib
>>> sift = cv2.SIFT_create()

```

To make sure everything is correctly set up please run the following script *test.py* that can be found in the Moodle system.

```python
import numpy as np
import cv2
import torch
import sklearn

# be aware that the parameter of videocapture is the device id 0 or 1 or 2
# depending on your computer
cap = cv2.VideoCapture(0)
orb = cv2.SIFT_create()
blur_flag = False


while(True):
    # Capture frame-by-frame
    ret, frame = cap.read()

    # Our operations on the frame come here
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

    if cv2.waitKey(100) & 0xFF == ord('q'):
        break
    if cv2.waitKey(100) == ord('b'):
        print("BLUR")
        blur_flag = not blur_flag

    if blur_flag:
        kernel = np.ones((7,7),np.float32)/49
        gray = cv2.filter2D(gray,-1,kernel)

    # Display the resulting frame
    cv2.imshow('frame',gray)


# When everything done, release the capture
cap.release()
cv2.destroyAllWindows()
```

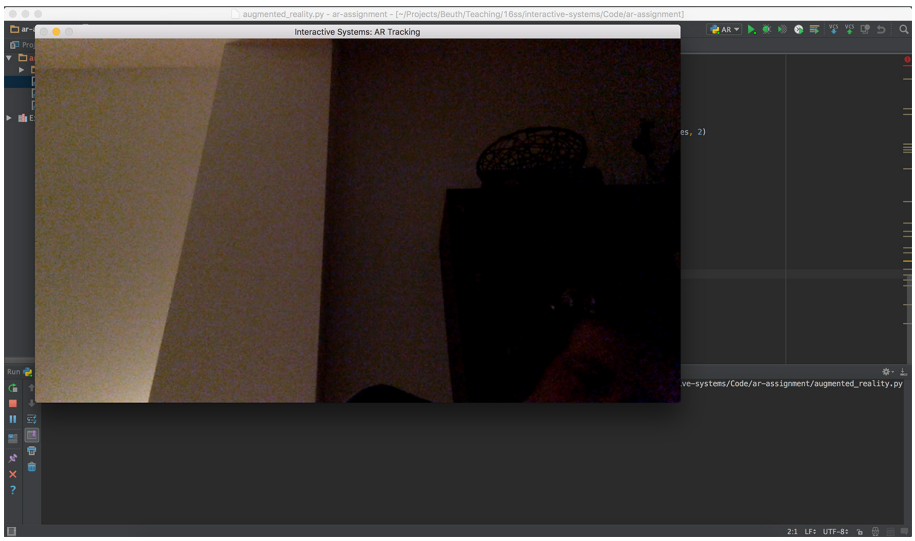

Figure 1: Webcam image

In the beginning of the course we will be using OpenCV. Please make yourself comfortable with the library. You can find useful tutorials and code examples here: https://docs.opencv.org/4.x/d6/d00/tutorial_py_root.html der kommenden Übung die Einzelheiten ab.