Python Course

Exercises #1

Purpose

Install and test the development environment that you will use during the course. Use the linked websites and Developer Command Prompt to execute the instructions. You will perform tests after each installation step to verify if the item has been correctly installed. It is extremely important to install Python 3.8 and OpenCV 3.4 to ensure that all exercises and assignments codes will work correctly on your computer.

Windows Installation

You need the C++ build tools in order to install and run certain Python packages. You can adapt your development environment to use Minimalist GNU for Windows (MinGW). But the most straightforward way is to use Visual Studio to install all the dependencies.

Install Visual Studio

- Download and install Visual Studio
- Run the Visual Studio bootstrapper .exe.
- In the Workloads tab, choose Desktop development with C++. This workload will install all runtimes and components that you need for your development environment.
- You have to check the following optional packages:
  - Just-in-Time debugger.
  - VC++ 2019 toolset (x86,x64).
  - C++ profiling tools.
  - Windows 10 SDK for Desktop C++ x86 and x64.
  - Visual C++ tools for CMake.
  - C++/CLI support.

- In the Individual components tab, Code tools item, choose Git for Windows. This will install a distributed version control system on your system.
- Finally, click in the Install button to start the installation process.

Install Python

All the material was prepared using Python 3.8. Any version greater than 3.6 should work.

- Download Python
- Run the installer and tick the **“Add Python to PATH”** option.
- Install

Verify the installation by opening CMD and running ‘python --version’. This should print “Python 3.8.5”

Install Packages with Pip

In order to install packages with pip, use the “pip install {package}” command. If that doesn’t work, try “python -m pip install {package}”.

- pip install numpy
- pip install imutils
- pip install cython
- pip install pillow
- pip install matplotlib

Install OpenCV

- Download “opencv_python-4.4.0-cp39-cp39-win_amd64.whl” from this website.
- Change directory “cd” into the folder you downloaded the “.whl” file to.
- Run “pip3 install opencv_python-4.4.0-cp39-cp39-win_amd64.whl”
- Hint: Use your **Tab** key to autocomplete file and folder names

Cloning The Repository

In order to have a local copy of the project on your system, you have to clone it from Github. If you directly clone my repository, **you won't be able to directly save your changes on Github.**

Instead, fork my repository by clicking the "Fork" button on the top right. This will create a copy of my repository in your account. Then clone your own repository yo your local machine. Doing so lets you directly push to your copy of the repository.

Running Scripts

You can run a Python file (.py) by running **'python {fileName}'**. The current directory has to be the folder that contains the .py file. On some systems, you might have to specify the version of Python as **'python3 {fileName}'.**

Test Installations

Test all the dependencies by running the 'testDependencies.py' script.

- python testDependencies.py

This has to print out the versions of the required dependencies. Your versions might be different than mine. In my case it prints out:

1.18.3

0.5.3

7.0.0

3.2.1

4.2.0

Run The Examples

Run all the scripts except "**ex_101.py**". Examine the code that provides the functionality.

Solve Exercise 101

Complete the “ex_101.py” script so that the webcam video is displayed in grayscale. The program should quit when the user hits “q”. The video should also be saved to the outputs folder as **‘grayscale.mov’**.

Hint: Look at the **‘recordVideo.py’** and **‘convertImage.py’** files for clues.