Computer Vision: Lab 1 – Introduction to OpenCV

Prerequisites: Python basics, numpy, pandas, matplotlib, etc.

Installation:

1. If you have a compatible NVIDIA GPU card (Preferably > GTX 1050Ti or equivalent Quadro card), then you need to first install the NVIDIA Driver along with CUDA SDK Toolkit 11.8 (do not install the latest version as it will not be supported by the PyTorch latest stable version). You may install the cuda sdk together with the NVIDIA Driver using the .run file, if you are on a Linux system. Check of the installation of cuDNN for improved training performance on GPU.

2. Setup the Anaconda virtual environment with OpenCV 4.x.x and latest Pytorch stable version (CPU or CUDA version as per your laptop compatibility).

Image I/O, Geometric Functions and Event Handling

1. In this lab, you have to go to through the following tutorials given on the OpenCV site.

https://docs.opencv.org/4.x/d6/d00/tutorial_py_root.html

The following tasks need to be completed for this assignment:

a) Take an image as input and display it with imshow function. Also, use matplotlib to display the same image.

b) Display the dimensions, dtype and number of channels of the image data structure.

c) Check how to convert and image to grayscale using openCV functions.

d) For a coloured BGR image, check which channel corresponds to the respective channel of Blue, Green and Red.

2. Experiment with the drawing functions in the imshow window. Create some interesting design / game interface using the openCV functions.

3. Experiment with keyboard events. How to listen and identify key events and create animation using loops in the imshow window.