

CS512 Assignment 2: Report
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Abstract

This programming assignment deals with simple image manipulation using OpenCV. Here user have a choice to capture an image or read the image. Then user can perform operations on the image by pressing specified keys.

Problem Statement:

The program should be designed to perform simple image manipulation using OpenCV for a given image. It should load an image by reading it from a test image provided by the user or capture directly from a camera. The user should be allowed to perform manipulation to the image by pressing specific keys on the keyboard such as a help key. The read image should be read as a 3 channel color image and should work for any size image.

Proposed Solution:

The program should perform a simple manipulation of a image. To get specific output user must enter specific keys. The program developed using OpenCV functions. The program is tested with various images of small size and larger sizes and resolutions.

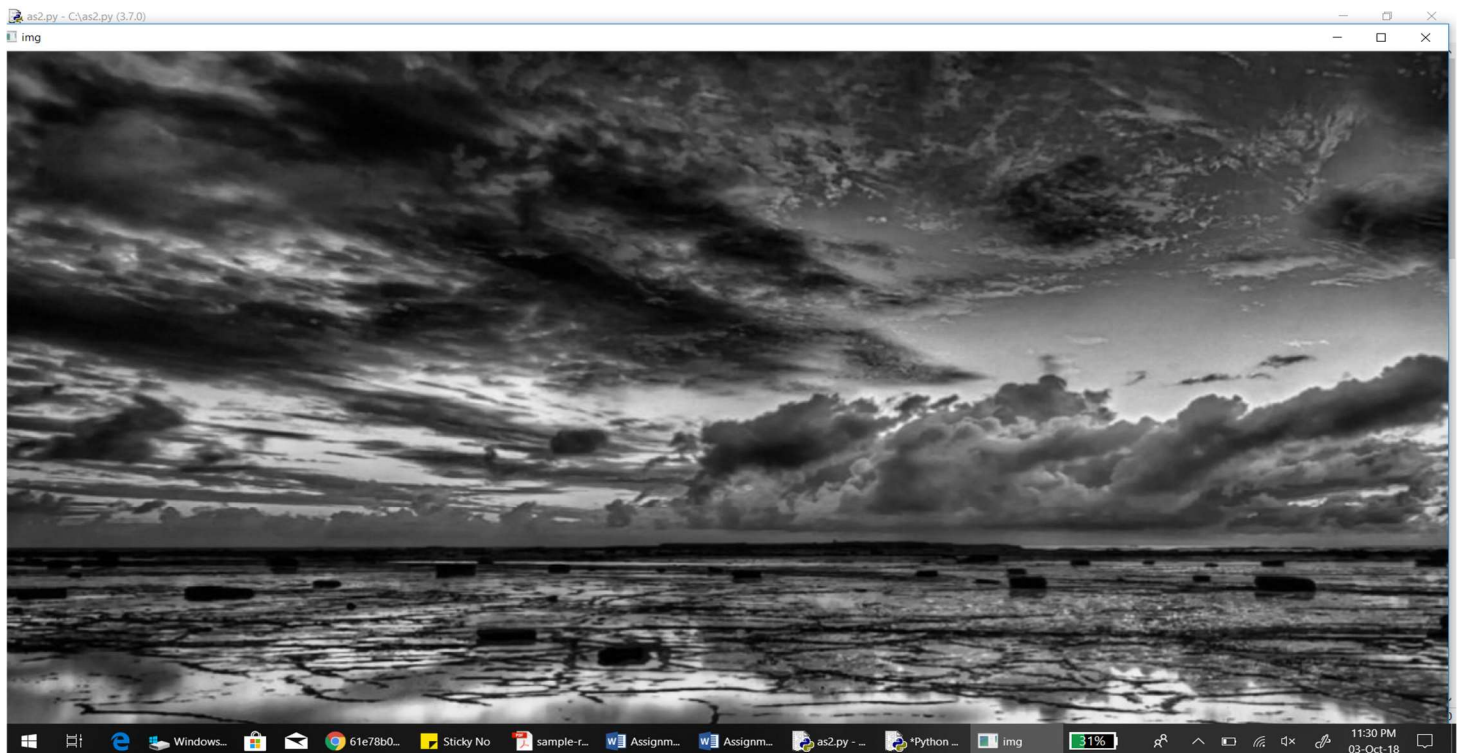
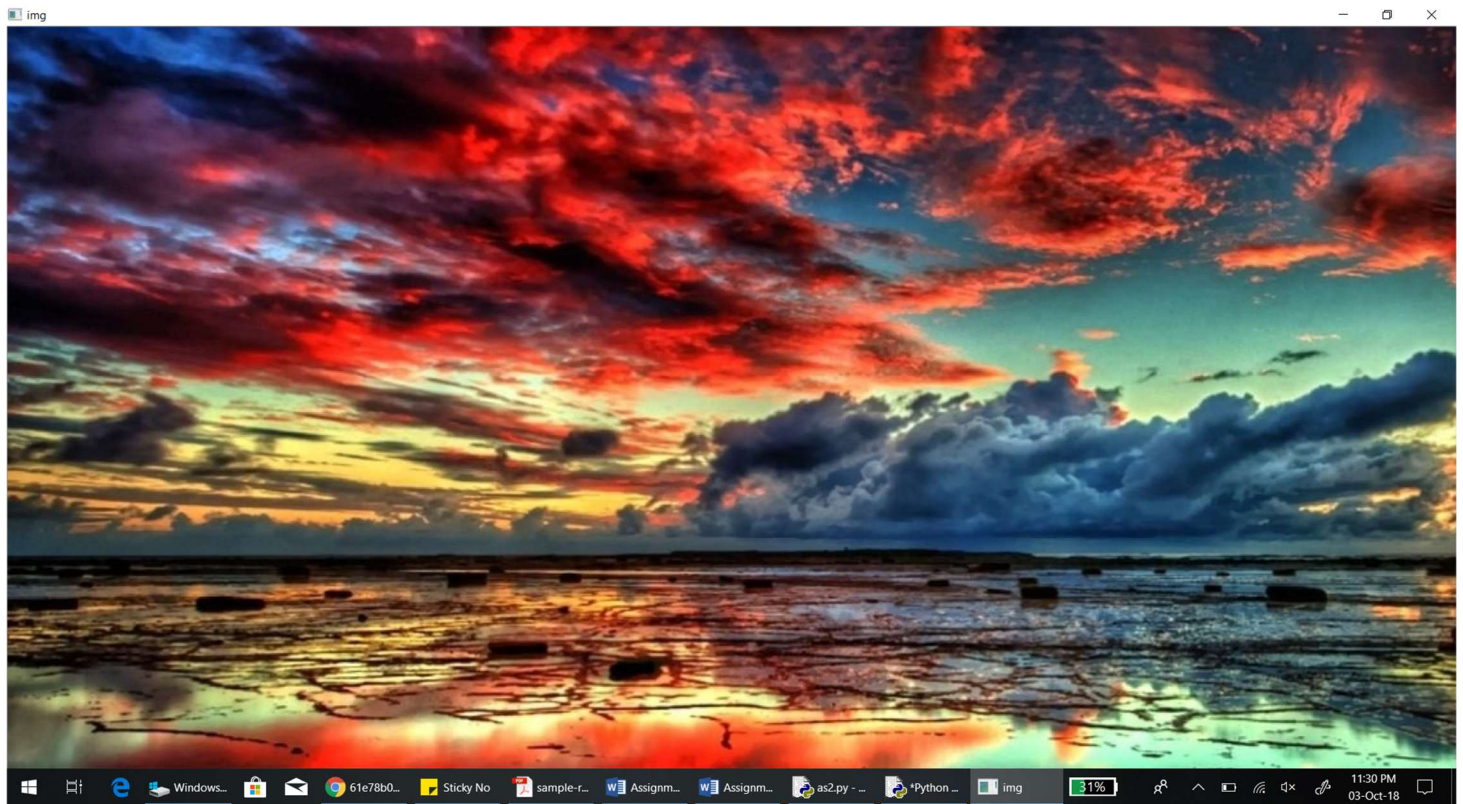
Implementation Details:

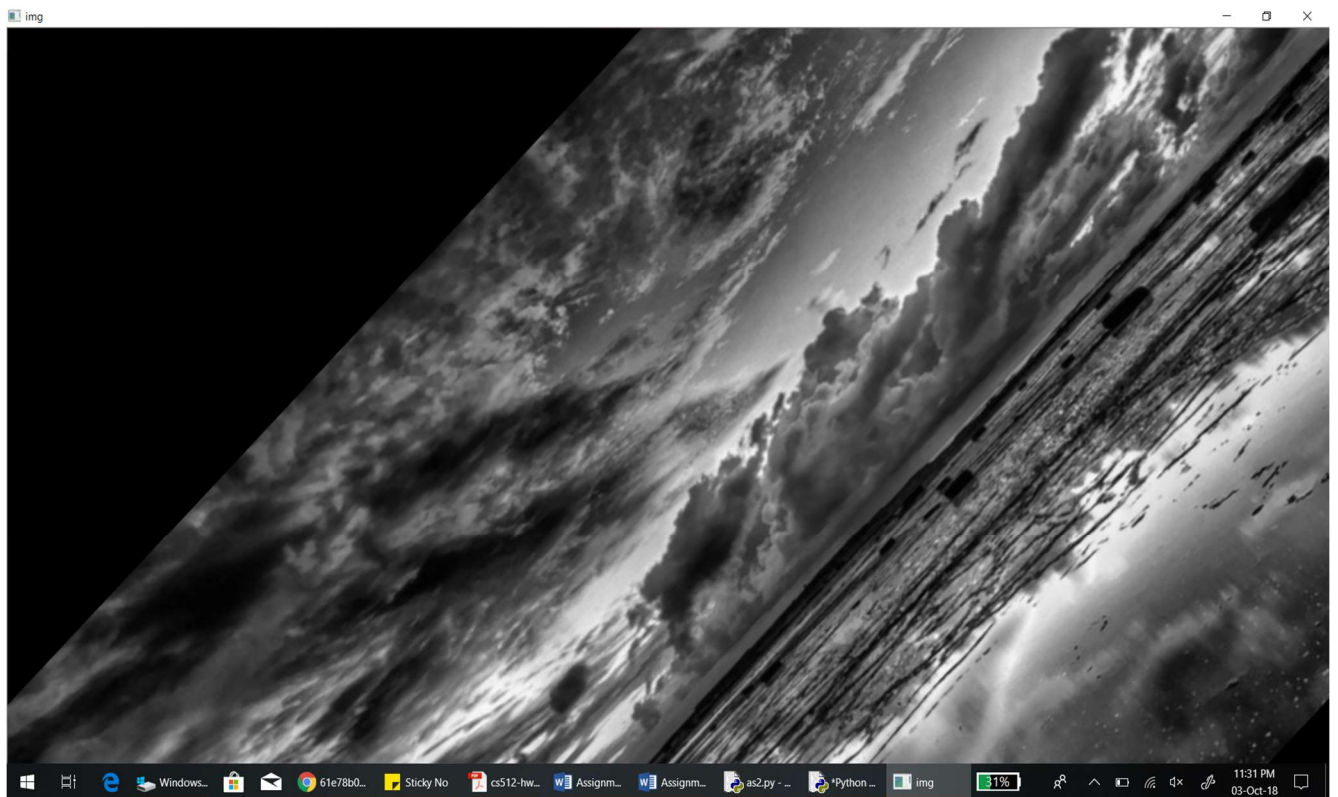
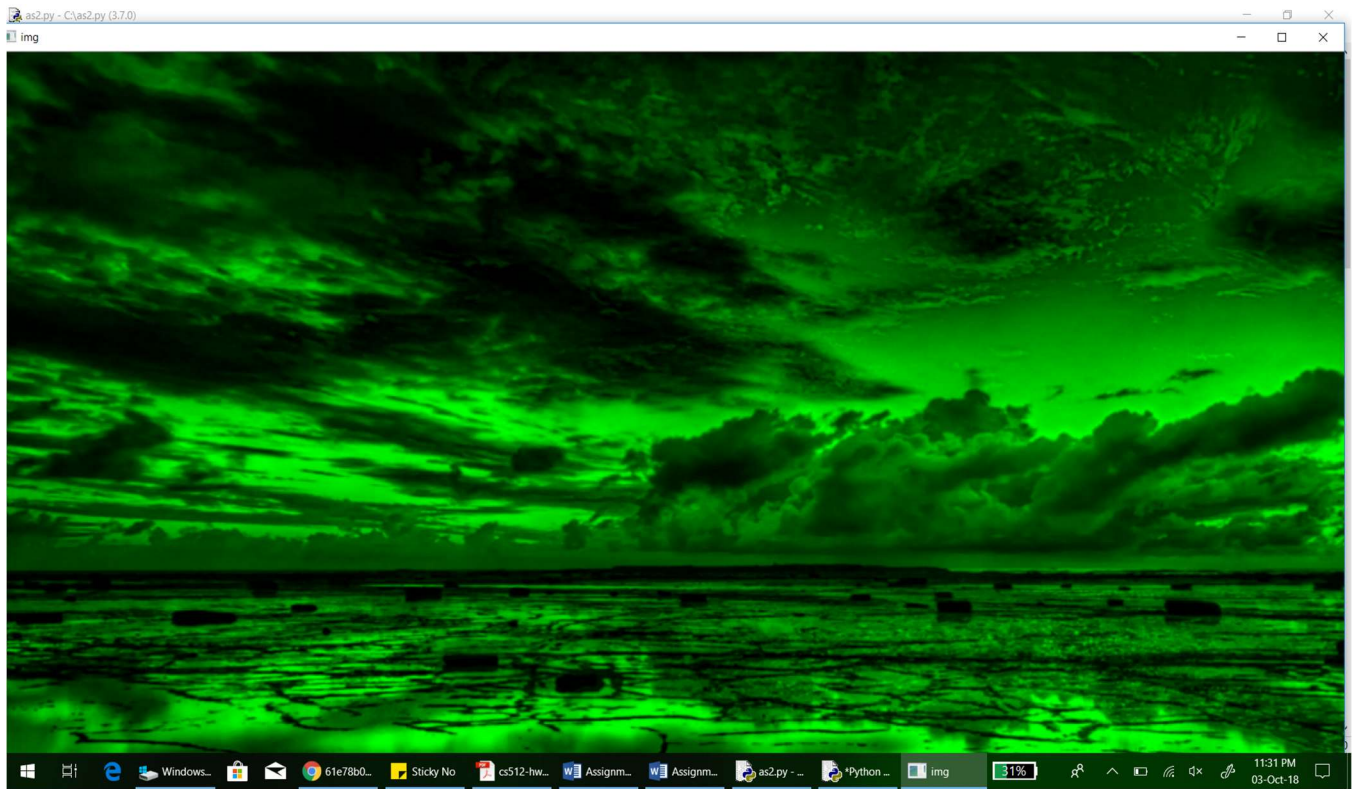
In this program simple manipulation is performed through OpenCV functions. When we press specific key it gives specific output. First we used imread() function to read an image from a file. When we key 'i' it reloads the original image. For saving the image we use imwrite() function of OpenCV. To convert the colored image into grayscale we use OpenCV color conversion function that is cvtColor(). When pressing 'c' we cycle through color channels of image and select random from any of the r,g,b. Through blur function we smooth the image. And we can also smooth using filter. When we press 'd' we downsample the image by factor of 2 using OpenCV's pyrdown function. After that we implemented smoothing and downsample together. Then we implemented x derivative filter and normalized it to value between 0 and 255. We also implemented y derivative filter and normalized to value between 0 and 255. Then we found magnitude of gradient and normalized it between 0 and 255. The gradient is computed using x and y derivatives of image. We find gradient vector of image for every N pixel using sobel filter. Then we rotate the image. We ask user to enter the angle at which we want to transfer the image using OpenCV's cv2.getRotationMatrix2D and cv2.warpAffine function.

Results:

So, we get manipulation of image that is required through specific keys . When user press specific key he will get specific output and he can also see list of specific keys that he can enter by pressing 'h'. So user can do rotation, grayscale, downsample, smoothing, normalize it

Screenshots:





References:

- 1) Stack overflow
- 2) opencv.org
- 3) Google Search