

Coding Exercise: 1- Image Basics¹

Chapter 1: Image Basics²

JARRIAN VINCE G. GOJAR³

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¹A coding exercise for Chapter 1 of the Study Guide on the course Graphics and Visual Computing.

²This chapter covers the basics of images.

³<https://github.com/godkingjay>

Sorsogon State University - Bulan Campus

Coding Exercises

Instructions: Write a program that solves the following problems. Submit your code to the Google Drive folder provided by the instructor.

Exercise 1

1. Write a Python program to read an image from a file using OpenCV and display it using Matplotlib.
2. Using the image from no. 1, convert the image from BGR to RGB color space then display it using Matplotlib.



Figure 1: Sample Input Image

3. Using the image from no. 2, convert the image into grayscale and display the image.



Figure 2: Sample Grayscale Image

4. Using the image from no. 3, process the image to '2-bit' and display the image.
5. Using the image from no. 4, save the output image in PNG format with the name 'e1_output.png' and display the image.

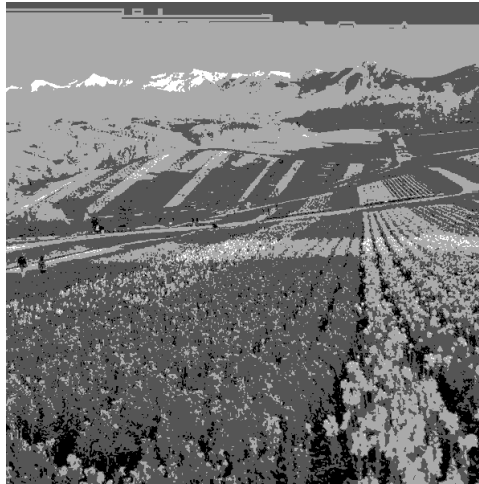


Figure 3: Sample Output Image (e1_output.png)

Exercise 2

1. Write a Python program to read an image from a file using OpenCV and display it using Matplotlib.



Figure 4: Sample Input Image

2. Using the image from no. 1, convert the image from BGR to RGB color space then display it using Matplotlib.
3. Using the image from no. 2, convert the image from RGB to HSV color space.
4. Using the image from no. 3, change the 'red' color in the image to 'orange' using the HSV color space then display the output image using Matplotlib.
5. Using the image from no. 4, change the 'green' color in the image to 'yellow' using the HSV color space then display the output image using Matplotlib.
6. Using the image from no. 5, change the 'blue' color in the image to 'purple' using the HSV color space then display the output image using Matplotlib.
7. Save the output images from no. 4, 5, and 6 with the following names:



Figure 5: Sample Output Image with Red to Orange Color Change (e2_output_ro.jpg)



Figure 6: Sample Output Image with Green to Yellow Color Change (e2_output_gy.jpg)



Figure 7: Sample Output Image with Blue to Purple Color Change (e2_output_bp.jpg)

(a) 'e2_output_ro.jpg'

(b) 'e2_output_gy.jpg'

(c) 'e2_output_bp.jpg'

Submission of Coding Exercises

Instructions:

1. Go to the Google Drive folder provided by the instructor:

BSCS 3-1:

<https://drive.google.com/drive/folders/11qG86bAVEdTOC0yHMOIBIh7DGykCcW0w?usp=sharing>

BSCS 3-2:

<https://drive.google.com/drive/folders/18TQ013kG0R8wB1lsHKj6-uW0Lehjotoo?usp=sharing>

2. Inside the folder, create another folder for your group with the following format:

Group Number - LastName1_FirstName1, LastName2_FirstName2

Example: **Group 1 - Doe_John, Smith_Jane**

3. Inside the sub-folder, create another folder with the name:

Chapter 1- Coding Exercise 1- Image Basics

4. Inside the folder, upload the file of your submission.

Fill in the template provided in the following link and upload it inside the folder:

https://docs.google.com/document/d/1KewKPlz7awp_bs603Jwmhy1uSJO-sY_m/edit?usp=sharing&oid=112709378145681657270&rtpof=true&sd=true

5. The activity must be submitted **on or before October 19, 2024**.
6. Late submissions will not be accepted.