Homework #1: Warm Up

Assigned: 04.03.2024 Due: 15.03.2024

1 Objective

The purpose of this homework is to make you ready for the upcoming assignments. In the assignments, you will use Matlab/Octave with Image Processing Toolbox and/or Python. But this is not a Matlab/Python programming course and you will not learn programming in Matlab/Python in the lectures, except a brief introductory tutorial. So, **it is your own responsibility to learn Matlab and/or Python programming**.

2 Preparation

Task 1 - Installation

- Obtain and install Matlab with Image Processing Toolbox on your PC. (You can use GNU Octave as a substitute.)
- Install Python. The following packages will be needed: Pillow, numpy, matplotlib, and scikit-image. You may also prefer using OpenCV.

Task 2 – Matlab/Python Programming

If you are not familiar with Matlab and Python programming, try learning how to program in Matlab and Python, using online tutorials and material provided in class. You should learn at least scalar, vector, and matrix operations, basic loops, control structures, plotting, and functions.

3 Assignment

For this first assignment, you must do the homework in both Python and Matlab/Octave. Your task is to write the necessary codes for generating the output in Figure 1. There are four images in the figure:

- original RGB image (top-left)
- grayscale version of the original image (top-right)
- Rotated version of the original image (bottom-left)
- histogram of the grayscale image (bottom-right)

Task 3 – Basic Image Processing in Matlab/Octave

Write the necessary Matlab/Octave code to generate Figure 1.

You are also given 4 sample images in the images folder. Download those images and using Matlab *imfinfo* command, inspect the main properties of those images.

Task 4 – Basic Image Processing with Python Pillow
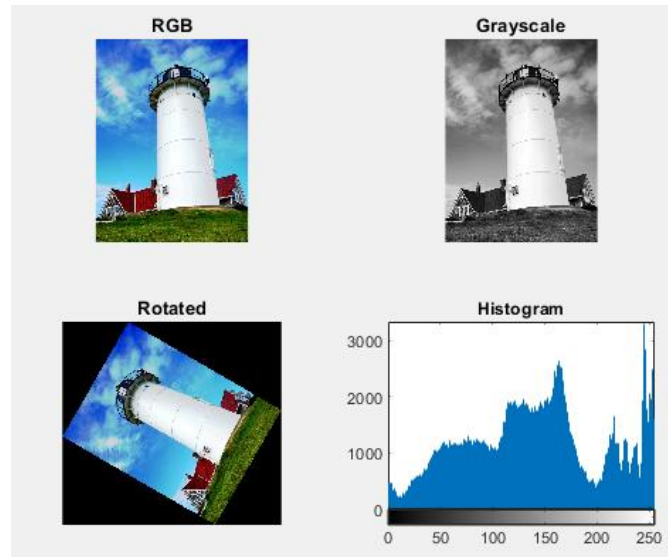
Write the necessary Python code to generate Figure 1.

Figure 1: The output of your codes for both Task 3 and Task 4 must be like this figure. (You may use any RGB image as input.)

Task 5 – Report

Write a brief report on what you have learned, what you have obtained as output, the difficulties you have faced, etc. Also include your programming environment settings (OS, Matlab/Octave, Python, and Pillow versions etc.). Use the provided report template.

4   Submission

- This homework will be done individually.
- For Task 1 and Task 2, you will not submit anything.
- For Task 3 and Task 4, you will submit your source codes in separate files called **HW1_Task3.m** and **HW1_Task4.py**, respectively.
- At the top of your source files, write your name, surname, and student ID as a comment.
- Your submission directory will include the following files:
  - HW1_Task3.m
  - HW1_Task4.py
  - Image files you used
  - IDIP_HW1_Report_ID_Name_Surname.pdf
- Place all your files in a zip archive with name **HW1_StudentID_Surname_Name.zip** and submit through the MS Teams submission module.
- If you have further questions, you can send me an e-mail.

4.1   Late Submission Policy

Deadline for homework submissions is **23:59** at the specified date. For each additional day, a **25% cut-off** will be applied.

Dr. Zeynep ÇİPİLOĞLU YILDIZ