CSE152 – Computer Vision – Assignment 0 (SP16)
Instructor: Ben Ochoa
Maximum Points : 20
Deadline : 11:59 p.m., Wednesday, 6-April-2016

Instructions:

- This assignment should be solved, and written up individually

- There is no physical hand-in for this assignment.

- Coding for this assignment should be done in MATLAB

- All code developed for this assignment should be included in the appendix of the report.

- In general, MATLAB code does not have to be efficient. Focus on clarity, correctness and function here, and we can worry about speed in another course.

- Submit your assignment electronically by email to Akshat Dave [`akdave@ucsd.edu`] with the subject line *CSE152-Assignment-0*. The email should contain one attached file named [`CSE_152_HW0_<student-pid>.zip`]. This zip file must contain the following two artifacts:

  1. A pdf file named [`CSE_152_HW0_<student-pid>.pdf`] containing your writeup. Please mention the author's full name and student identity in the report.

  2. A folder named [`CSE_152_HW0_<student-pid>_code`] containing all your matlab code files

1 Introduction

The purpose of this assignment is to gain some familiarity with MATLAB programming. MATLAB is intuitive and easy to use. Even if you do not understand a command or a feature of the language, you can simply consult the reference manual that comes with the program. The following two tutorials are available for your reference:

- `http://cseweb.ucsd.edu/classes/wi13/cse152-a/hw0/matlab_intro.m`

- `http://www.math.utah.edu/lab/ms/matlab/matlab.html`.

2 Image channels [10 points]

You are required to write a program that does the following:

1. Reads in an image I.

2. Resizes the image I to I_s of dimensions 256×256 pixels using bilinear interpolation.

3. Tiles the image to form a 4×1 grid to show the colour channels in the order `<all, red, green, blue>`.

Test your program and present your results for the image `cleese.jpg` provided on the course website [5 points]. A sample is shown for the image `appleby.jpg` in Fig. 1 (you need to include only the results of `cleese.jpg`). Your program should be short (5 to 10 lines). Additionally, write a short paragraph explaining your results. Does your program produce the correct output? Does the red, green and blue channel separation make sense? [5 points]
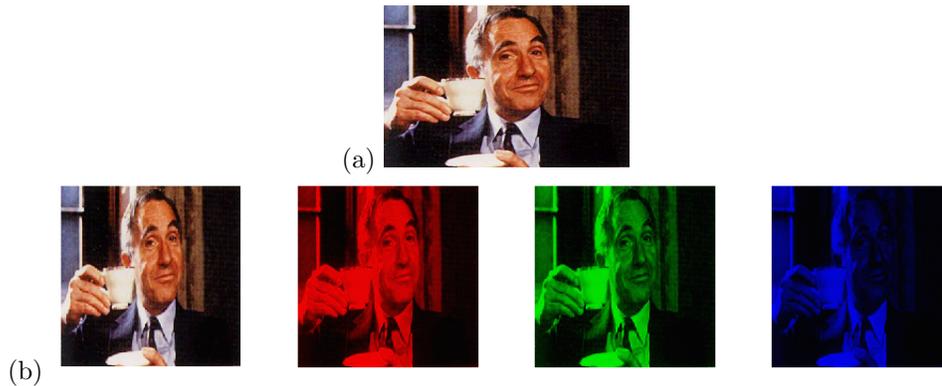
Figure 1: (a) sample input image `applby.jpg` (b) sample output of the program on `appleby.jpg`, channels from left to right are `<all channels, red channel, green channel, blue channel>`

3 Image rotation [10 points]

Consider an image I. Write a function to rotate the I by θ radians anticlockwise, $\theta \in \{0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}\}$. Do not use `imrotate.m` or any other library function. Tile the output image similar to Fig 2. You should run your function on the `starbucks-ring.jpg` image provided on the website and provide results only for that.
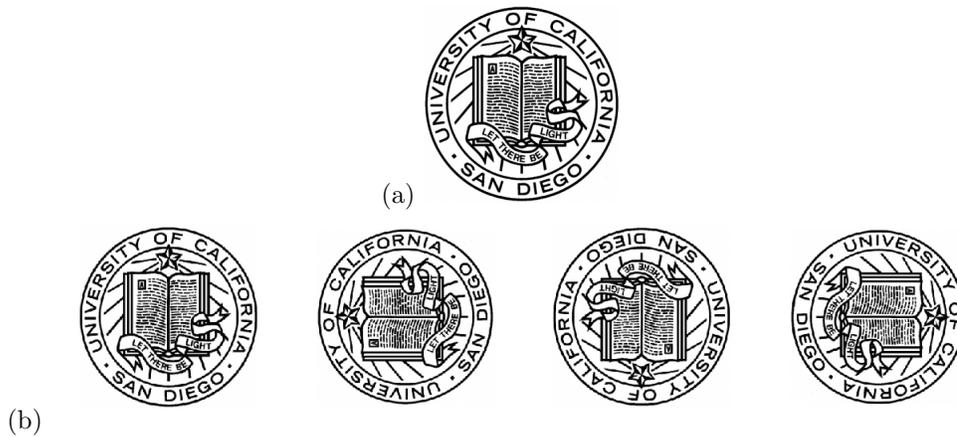

Figure 2: (a) sample input image `ucsd.png` (b) sample output showing $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$ radian rotation anticlockwise.