

SGN-12006 Basic Course in Image and Video Processing

EXERCISE 10

09.11.2015-13.11.2015

This exercise consists of both lab exercises and homework. Complete the lab exercises and present your results for the TA. Prerequisite for submitting the homework is attendance in an exercise session. Homework should be submitted only online using Moodle2.

Follow the naming format 'ExN_surname_ID.pdf' (N is the number of exercise). Also please clearly write down your full name and student number in the document. The homework report should be no more than 1 page long and it should be done individually (no pairs allowed). Questions on this exercise should be addressed to TA's email address: (firstname.surname@tut.fi).

Lab exercises

1) Histogram Equalization for Color Images (2 points)

- Load the image *fruits.jpg* and apply histogram equalization on each R, G, and B components. (`histeq`)
- Write a function `intensityeq` which takes as an input a color image in RGB color space, converts it into HSV color space, applies histogram equalization on the brightness component and converts the image back to RGB color space. (`rgb2hsv`)
- Load images *fruits.jpg* and *festia.jpg* and apply your function on them.

2) Object Extraction (4 points)

Load image *lake.jpg* and extract the biggest lake.

Some hints:

- It might be difficult to manipulate the image in the original color space
- You may need a thresholding operation
- Labeling the image regions may also be helpful
- Useful Matlab commands: `graythresh`, `im2bw`, `bwlabel`



Figure 1: Qinghai lake (left) and the biggest lake extracted (right)

Homework

3) Understanding Color Image Formats (4 points)

a) In a simple RGB image, the R, G and B components have the horizontal intensity profiles shown below. Describe the image.

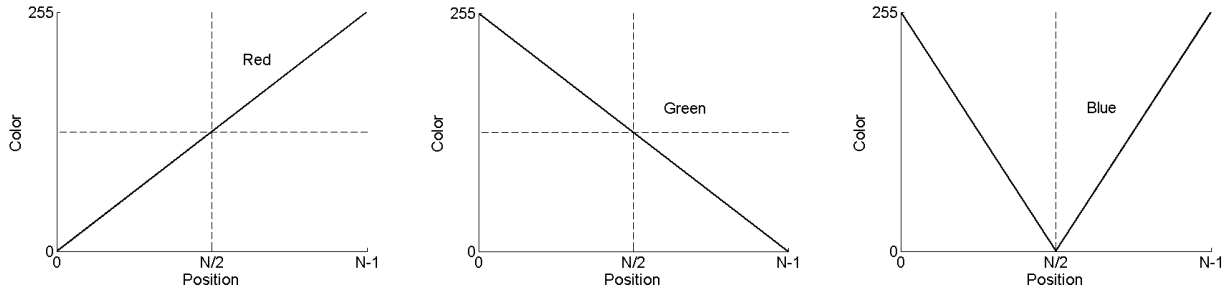


Figure 2: Horizontal intensity profiles of an RGB image

b) Draw horizontal intensity profiles for R, G and B components of the image below.

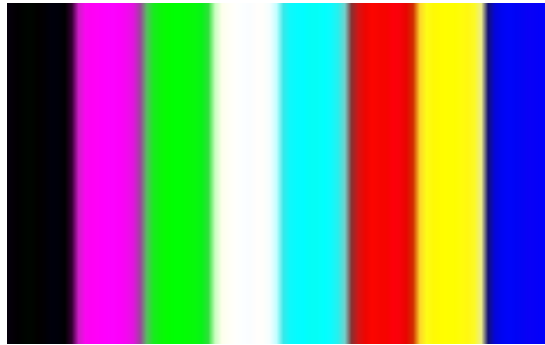


Figure 3: Color columns

c) Draw horizontal intensity profiles for H, S and V components of the image above.

d) The image below is a 256x256 RGB image. All the colors are pure. The image is converted into HSV color space and one of the components is blurred with a 25x25 averaging mask. Describe what the result would look like if the blurred component is H? S? V?

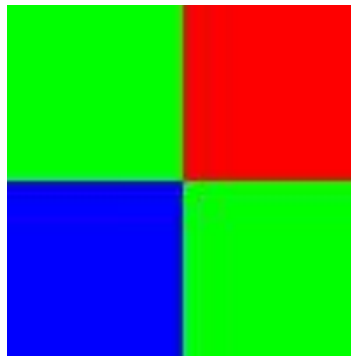


Figure 4: Color squares