IYTE, EE 431 Introduction to Image and Video Processing
Homework 3 Due: Dec 21 2016 ŞG

In this homework you will need to process color images using the updated *img_pro.c* and *img_pro.h* files in the COLOR folder of *SGimproV1.2b* package. Firstly, study the example program *example-color.c* to see how you can handle color images.

PART A

Develop a computer program that reads RGB images from "PPM" format image files and blurs one or more of the R,G,B components using a Gaussian filter. Gaussian filter masks with different support sizes should be generated from sequential application of the weighted averaging filter that approximates Gaussian filter: [1 2 1]. This filter should be applied to rows and columns (recall separability property of Gaussian filter) to create the same effect as the filter:

1 2 1
2 4 2
1 2 1

The procedure described above should be repeated as many times as it is necessary to create the desired filter support.

The name of the executable program should be **"rgbgauss.exe"**. It should take five arguments:

- **rgbgauss [Rflag 1] [Gflag 2] [Bflag 3] [num. of iter.] [ppm file]**

Three flag variables take values 0 and 1. For instance, if Rflag takes the value "0" the R component of the image is not filtered. If it takes the value "1" the R component is filtered as described above. G and B components are also filtered similarly. If all flag values are 1's, the output should be a blurred color image. If only one or two of the flags are 1, you should observe an interesting glowing artifact. Number of iterations entered in the command line may actually be considered as the radius of the effective Gaussian filter mask.

PART B

Implement a modified vector approach to color edge detection (similar to the method discussed at the end of the "color" lecture.) This program should calculate the edge magnitudes as described in class and display them in a color scale which is determined by the values entered in the command line. The colors displayed should be controlled in HSI space. The highest gradient magnitude in the image should be displayed by red hue, the lowest (above threshold) should be displayed by blue and the values in between should be represented by the colors between blue and red (hint: consider the circular arcs in the color gamut for fixed saturation and intensity values).

The name of the executable program should be **"color_edge.exe"**. It should take three arguments:

- **color_edge [variable 1] [variable 2] [variable 3]**

[variable 1] is a threshold value. Edge magnitude values under the threshold value should be displayed as black (or white if you wish) pixels. **[variable 2]** and **[variable 3]** are the desired saturation and intensity values.