Preprocessing

Description

The goal of this assignment is to demonstrate your ability to perform image preprocessing operations.

Assignment

This assignment is made up of 5 separate programs. If you want to put them into a single program, make sure each operation works on the original input image.

Program 1

1. Read an image file (PNG format file will be supplied)
2. Separate the image into three components (red-green-blue)
3. Perform a histogram stretch (contrast enhancement) on the green component using the 10^{th} and 90^{th} percentile bins as cutoff points
4. Write the resultant image to an image file (BMP, PNG, other "standard" uncompressed format)

Program 2

1. Read an image file (PNG format file will be supplied)
2. Separate the image into three components (red-green-blue)
3. Perform a binarization on the green component using the mean value as the threshold
4. Write the resultant image to an image file (BMP, PNG, other "standard" uncompressed format)

Program 3

1. Read an image file (PNG format file will be supplied)
2. Separate the image into three components (red-green-blue)
3. Perform a binarization operation on the green component using the Otsu optimal threshold algorithm to compute the threshold
4. Write the resultant image to an image file (BMP, PNG, other "standard" uncompressed format)

Program 4

1. Read an image file (PNG format file will be supplied)
2. Separate the image into three components (red-green-blue)
3. Perform a 3x3 median filter operation on the green component with reflection image padding at the edges

4. Write the resultant image to an image file (BMP, PNG, other “standard” uncompressed format)

Program 5

1. Read an image file (PNG format file will be supplied)
2. Separate the image into three components (red-green-blue)
3. Perform a 3x3 outlier filter operation on the green component with a threshold value of 50 and with reflection image padding at the edges
4. Write the resultant image to an image file (BMP, PNG, other “standard” uncompressed format)

Deliverables

- One image file for each program (five image files total)
- The mean value of the resultant image for each program
    - If your program prints these you may produce a screen shot of the running program or you may type them into your Blackboard text submission
- All source code files
- A brief reflective essay describing your degree of success, what difficulties you had, how you overcame those difficulties, and what you learned from this assignment.
- Place all of your files in a ZIP or RAR archive and attach to the assignment in Blackboard. No email submissions.