Project 1: Introduction to Matlab

CPE 428-01

Team Spaceman

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**Procedure**

Part A

1. Take a picture of team members with a webcam and store the image in the MatLab folder (C:\usr\MatLab).
2. Find an picture of a landscape on the internet, preferably one with a decent resolution, and store the image in the MatLab folder.
3. Open and display the group image and display it in MatLab.
4. Convert the image to grayscale using rgb2gray.
5. Find the maximum and minimum intensity values in the grayscale image and their corresponding spatial coordinates.
6. Record the size of the grayscale image file in bytes and note the quality of the image.
7. Write code to reduce the resolution of the original grayscale image. Display the image and note the quality. Determine the lowest resolution that allows acceptable viewing. Record and compare the size of this image to that of the original image.
8. Repeat steps 3-7 for the landscape picture.

Part B

1. Download the bacteria image off of Blackboard and store it in the MatLab folder.
2. Apply a threshold to the image to separate the bacteria from the background. Display the grayscale image and the binary image. Compute the total area of the bacteria in the image.
3. Label pixels belonging to each bacterium with a unique label. Display the labeled image.
4. Compute the area of each bacterium in the binary image. Would you say all the bacteria belong to the same family?

**Results**

Part A: Group Picture

Max: 255(1,541)  
Min: 1(10,199)  
Size: 426x640  
Lowest acceptable resolution: 30% of original, 128x192

Part A: Landscape

Max: 255(1,1207)  
 Min: 0(1,1261)  
 Size: 800x1200  
 Lowest acceptable resolution: 10% of original, 80x128

Part B

Total area of bacteria: 4193 pixels

Area of each bacterium:  
1. 246  
2. 1  
3. 175  
4: 162  
5: 202  
6: 188  
7: 243  
8: 54  
9: 162  
10: 237  
11: 241  
12: 292  
13: 247  
14: 180  
15: 166  
16: 185  
17: 253  
18: 204  
19: 204  
20: 201  
21: 240  
22: 90

Do all bacteria below to the same family: Yes