Assignment A2: Pixels

CS 4640
Fall 2019

Assigned: 29 August 2019

Due: 12 September 2019

For this problem, handin the A2 report PDF as well as any Matlab functions used to address the problems.

Some notes:

- No scripts

- Functions must have CS4640 prefix

- Indent headers correctly (5 spaces indented lines) and put required info

- Do not exceed 72 characters per source line

1. Consider the test image d45.jpg. The goal is to output a binary image with 1's where a pixel is text or marking, and 0's wherever a pixel is background or noise. This will be a preprocessing step to later functions which try to understand the document (e.g., classify letters, etc.). Explore various thresholding methods described in the text and provide your results on how well they perform. This means you must develop performance measures and provide ground truth. Pick the best method and implement it in a Matlab function called *CS4640_text_thresh*, described below, and apply it to image d56.jpg and report the performance on that image. Remember to discuss issues that you see during the study of these techniques.

2. Consider image d45.jpg again. Using the histogramming methods described in the text, develop methods to extract the text and markings as in question 1. Describe the performance of these. Implement a Matlab function called *CS4640_text_hist* based on the best method.

3. Consider image map1.jpg. Develop color histogramming techniques to segment the semantic areas of the image. Describe the performance of these methods. Implement a Matlab function called *CS4640_text_histc* based on the best method.


```
function text = CS4640_text_thresh(im)
% CS4640_text_thresh - extract text and markings from an image
% On input:
%     im (MxN array): gray level input image
% On output:
%     text (MxN array): binary image of text and markings
% Call:
%     text = CS4640_text_thresh(d45);
% Author:
%     <Your name>
%     UU
%     Fall 2019
%
```


```
function text = CS4640_text_hist(im)
% CS4640_text_hist - extract text and markings from an image
% On input:
%     im (MxN array): gray level input image
% On output:
%     text (MxN array): binary image of text and markings
% Call:
%     text = CS4640_text_hist(d45);
% Author:
%     <Your name>
%     UU
%     Fall 2019
%
```

```matlab
function text = CS4640_text_histc(im)
% CS4640_text_histc - extract text and markings from an image
% On input:
%     im (MxN array): gray level input image
% On output:
%     text (MxN array): binary image of text and markings
% Call:
%     text = CS4640_text_histc(d45);
% Author:
%     <Your name>
%     UU
%     Fall 2019
%
```