

MATLAB ASSIGNMENT 3

Use a combination of image processing techniques learned so far to write a MATLAB script whose goal is to produce a quantitative estimate of the amount (in %) of soft metastasis that might be present in the image of a tissue. Your script should take as input a color image and produce a single line of text.

Batch process utilized to obtain all the *.tif files within the directory

```
clear;close all;clc;  
images = dir('*.tif');  
images(1).name;
```

Process all the files found in the directory

```
numImg = length(images);  
imgMatrix = zeros(numImg,1);  
for x=1:numImg;
```

Utilize function to estimate the amount of soft metastasis in the image

```
    imgMatrix(x) = MetsFunction_HW3(images(x).name);  
  
Image (MetsA.tif): 9.9%  
  
Image (MetsB.tif): 1.56%  
  
Image (MetsC.tif): 0.0798%  
  
end
```

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MetsFunction_HW3

```
function metsFraction = MetsFunction_HW3(imgName)
```

Read the image file

```
rgbImg = imread(imgName);
```

Set a layer using the green plane set at the index of 2

```
gLayer = rgbImg(:, :, 2);
```

Computes a global threshold using the new green layer created, then converts it to a binary image

```
tissueMask = ~im2bw(gLayer, graythresh(gLayer));
```

Removes large marks/artifacts around the tissue

```
tissueMask = imclearborder(tissueMask);
```

Removes small marks/artifacts containing fewer than 200 pixels around the tissue

```
tissueMask = bwareaopen(tissueMask, 200);
```

Fills the holes in the binary image

```
tissueMask = imfill(tissueMask, 'holes');
```

Set a layer using the red plane, set at index 1, to find metastasis

```
rLayer = rgbImg(:, :, 1);
```

Apply a mask to remove artifacts around the tissue

```
rLayer(~tissueMask) = 255;
```

Set the separation threshold to 85% to distinguish the dark spots in the image

```
threshold = round(mean(mean(mean(rgbImg))) * 0.85);
```

Convert to binary image using the red layer and threshold value to select the darkest spots

```
metsMask = ~im2bw(rLayer, threshold/255);
```

Calculates the percentage of the dark spots in the image

```
metsFraction = nnz(metsMask)/nnz(tissueMask);
```

Prints the file names and their calculated percentages of soft metastasis in the cell tissues in the images

```
fprintf('Image (%s): %.3g%% \n', ...
```

```
imgName,100*metsFraction);
```

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