EAST WEST UNIVERSITY

Department of Computer Science and Engineering

Lab-report:07

Course Name: Digital Image Processing
Course Code: CSE438
Section No: 03

Submitted To:

Prof. Dr. Ahmed Wasif Reza

Department of Computer Science and Engineering

East West University

Submitted by:

Student's ID: 2020-3-60-012

Student's Name: Sadia Islam Prova

Date of submission: 7-5-24

Problem 1: Detect the tumor from the images using the segmentation approaches listed below: (Outline the segmented object to highlight the tumor. You can crop the image for accurate segmentation.)

i) Similarity approaches:

a) Local/Regional Thresholding

b) Global Thresholding

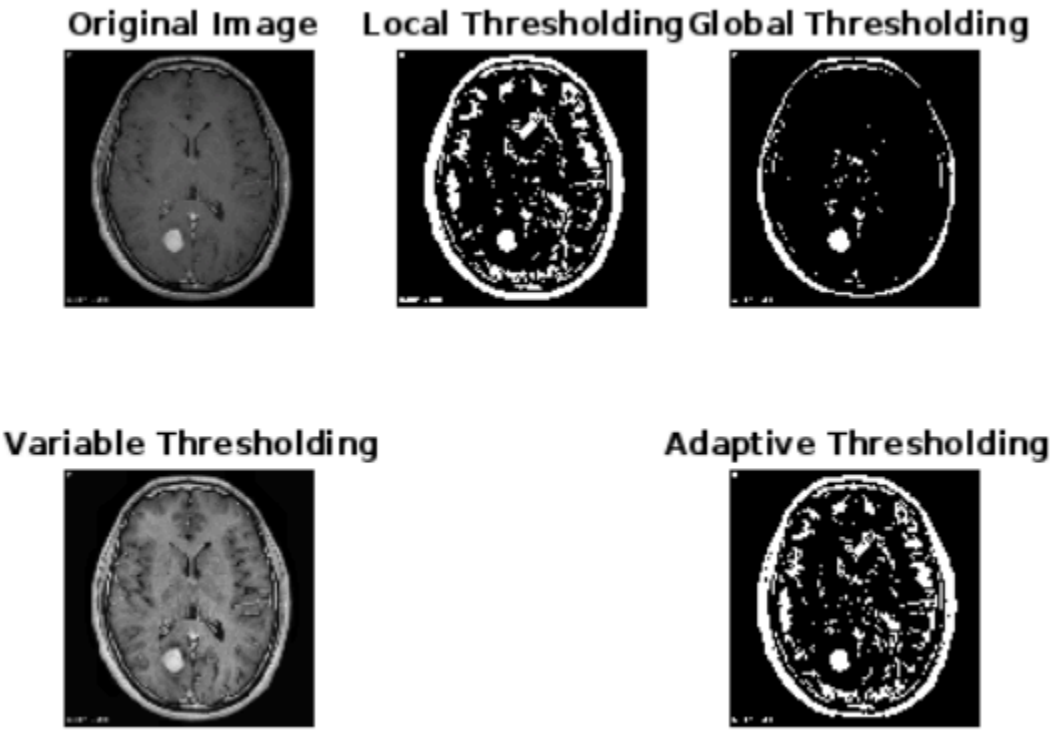
c) Variable Thresholding

d) Dynamic/Adaptive Thresholding

Code:

```
img = imread('tumor.PNG');
gray_img = rgb2gray(img);
filtered_img = medfilt2(gray_img, [3, 3]);
local_thresh_img = adaptthresh(filtered_img, 0.5, 'NeighborhoodSize', 51);
local_thresh_img = imbinarize(filtered_img, local_thresh_img);
global_thresh_img = gray_img > 100;
variable_thresh_img = adapthisteq(gray_img);
adaptive_thresh_img = imbinarize(gray_img, 'adaptive', 'Sensitivity', 0.5);
figure;
subplot(2, 3, 1), imshow(img), title('Original Image');
subplot(2, 3, 2), imshow(local_thresh_img), title('Local Thresholding');
subplot(2, 3, 3), imshow(global_thresh_img), title('Global Thresholding');
subplot(2, 3, 4), imshow(variable_thresh_img), title('Variable Thresholding');
subplot(2, 3, 6), imshow(adaptive_thresh_img), title('Adaptive Thresholding');
```

Output:



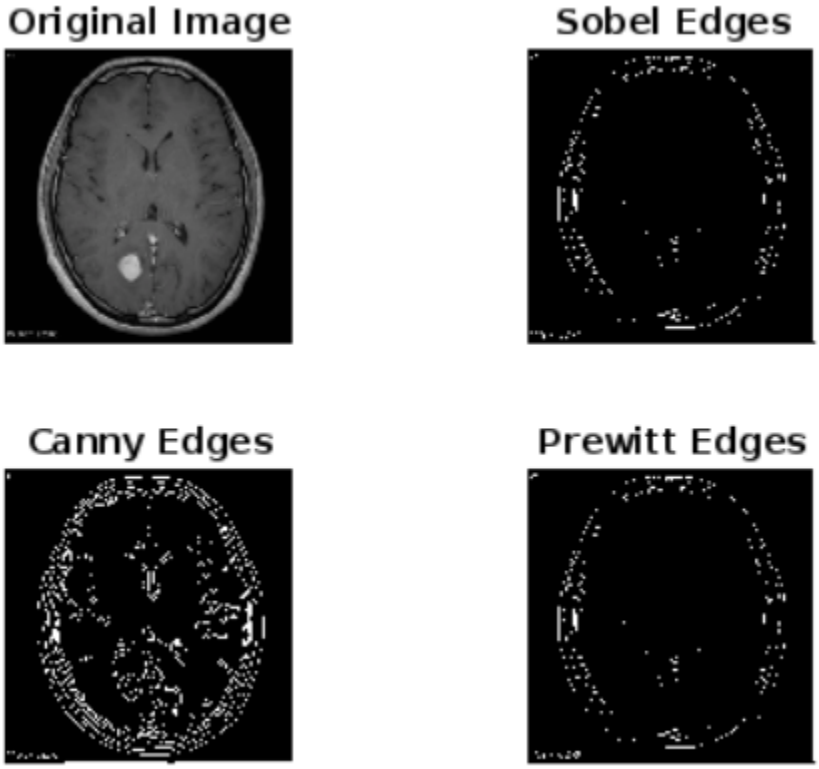
ii) Discontinuity approaches: Edge Detection (Sobel, Canny, Prewitt)

Code:

```
img = imread('tumor.PNG');
gray_img = rgb2gray(img);
sobel_edges = edge(gray_img, 'sobel');
canny_edges = edge(gray_img, 'canny');
prewitt_edges = edge(gray_img, 'prewitt');
figure;
subplot(2, 2, 1), imshow(img), title('Original Image');
subplot(2, 2, 2), imshow(sobel_edges), title('Sobel Edges');
```

```
subplot(2, 2, 3), imshow(canny_edges), title('Canny Edges');
subplot(2, 2, 4), imshow(prewitt_edges), title('Prewitt Edges');
```

Output:



Problem 2: Show in a table how the Similarity and Discontinuity techniques compare.

Here's a comparison table showing how similarity and discontinuity techniques for tumor detection compare:

Similarity techniques	**Discontinuity techniques**
Grouping pixels based on similarity.	Identifying boundaries based on intensity changes.
Directly creates uniform regions.	Creates boundaries enclosing uniform regions
Simpler to implement for well-defined regions.	Effective for images with clear edges.
Sensitive to noise and variations in illumination.	May struggle with blurry or weak edges.
Image consists of regions with similar properties (color, intensity).	Image has sharp transitions between objects.