

BLG 453E Homework 4 Report

17.12.2017

Ece Naz Sefercioğlu
150130140 |

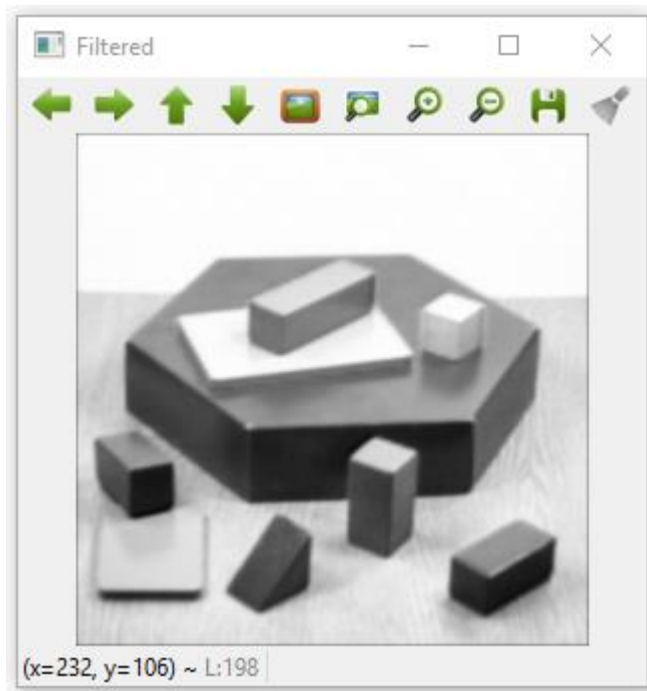
1-

How to run:

Run hw4_q1.py

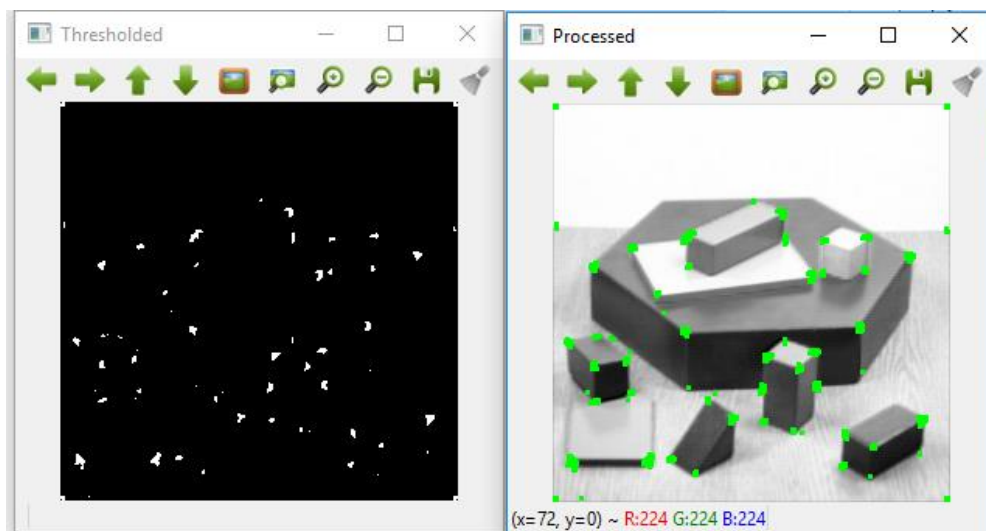
a)

b)



c) Implementation of harris corner detection done by calculating value $R = \det(G) - k \cdot \text{trace}(G)^2$ and thresholding it.

d)



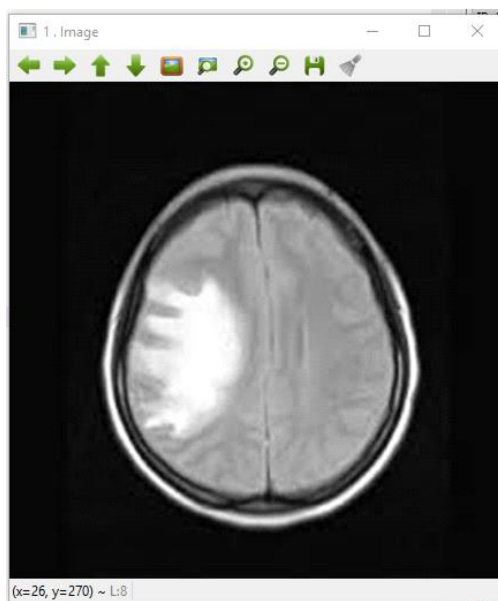
2-

How to run:

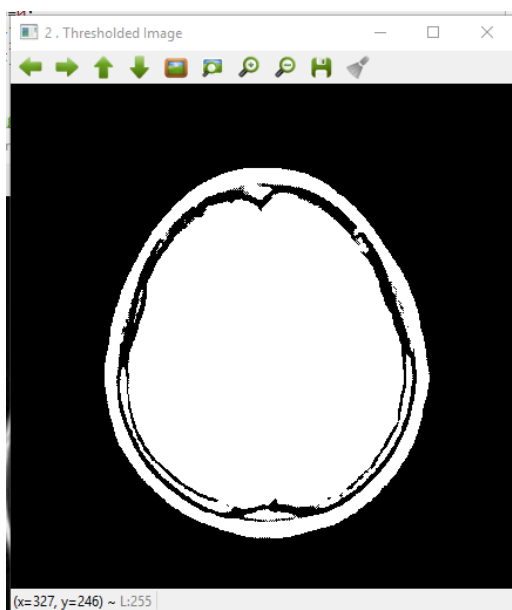
Run hw4_q2.py

Training data point input will be asked for Knn, 10 for tumor segment and 10 for healthy segment. Then program will run, at the end there will be 8 image outputs.

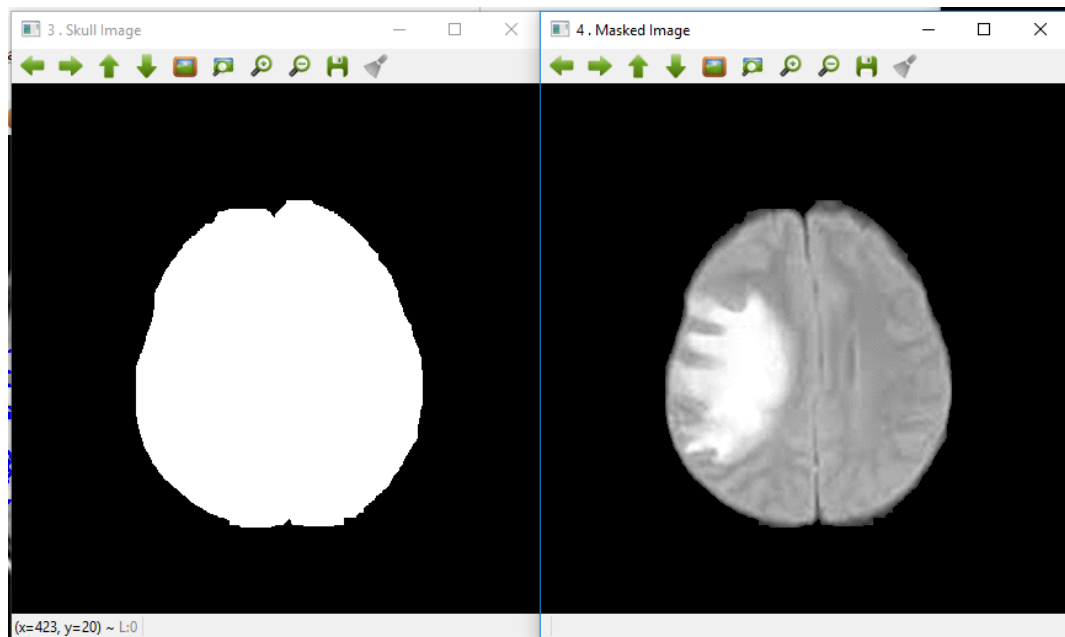
a)



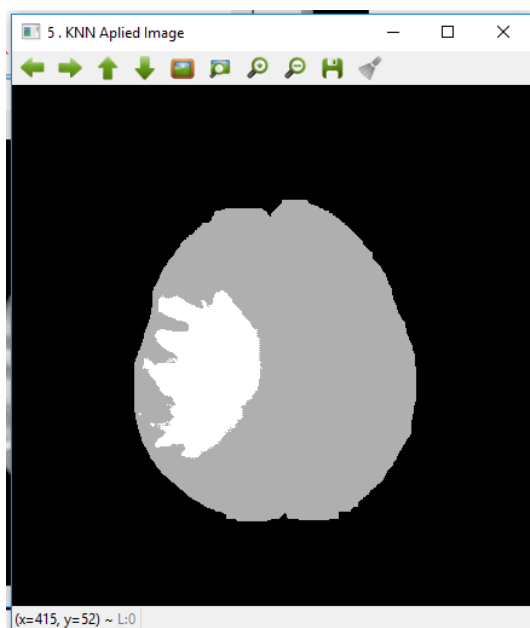
b) image is thresholded for pixel value 50.



c) Skull region is remove by 3 erode following 3 dilation operation with a kernel of 5x5.

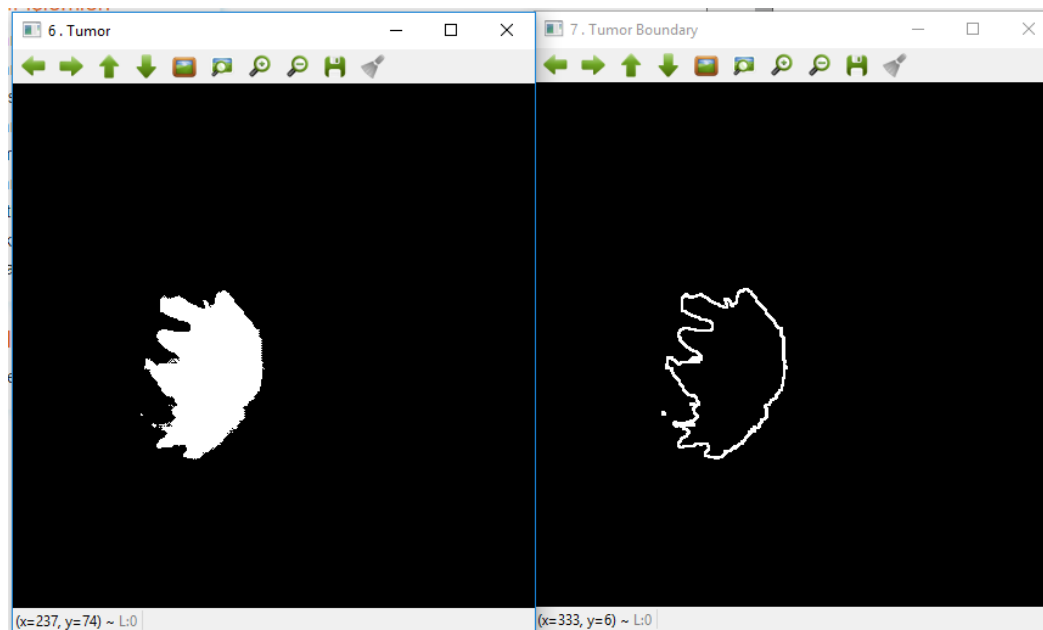


d)



Knn is caculated by nearest 3 neighbours, a dataset of 20 points and 2 classes. Implemented on masked image by omitting masked parts. Distance is calculated by difference in value and difference in pixel distance by weighting them with an alpha value. Pixel value is chosed to have higher weight than pixel distance for a healthy output.

e)



Tumor boundary calculated by using morphological gradient with a kernel size of 3x3

f) Output Image:



2.2- Answer with K Means Implementation

How to run:

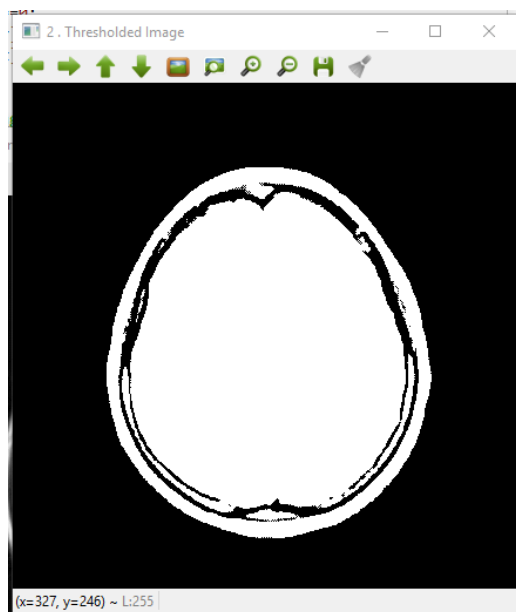
Run hw4_q22.py

Program will run, at the end there will be 8 image outputs.

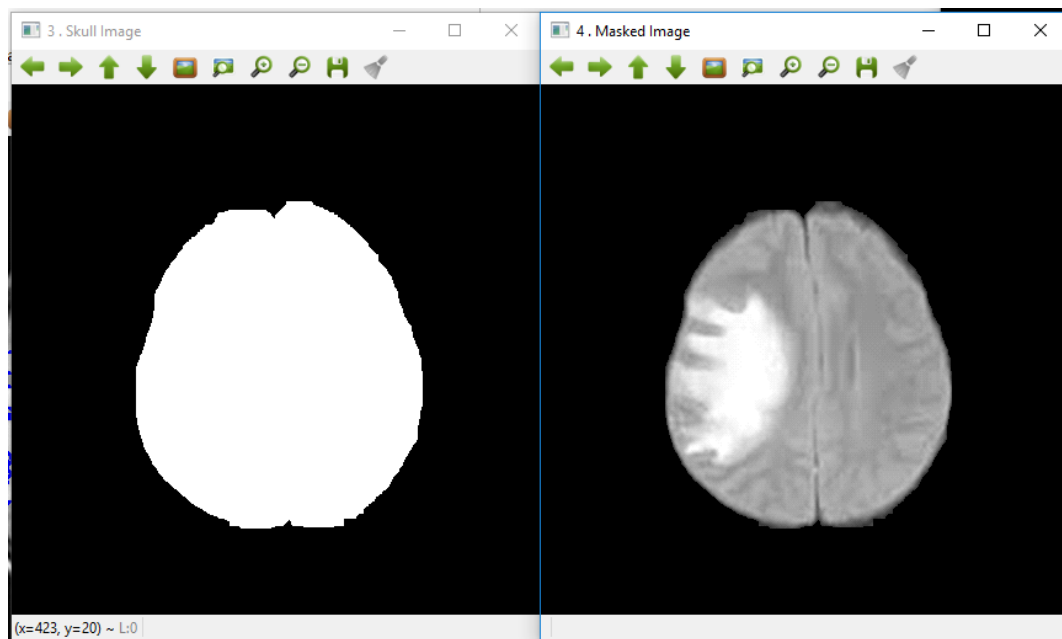
a)



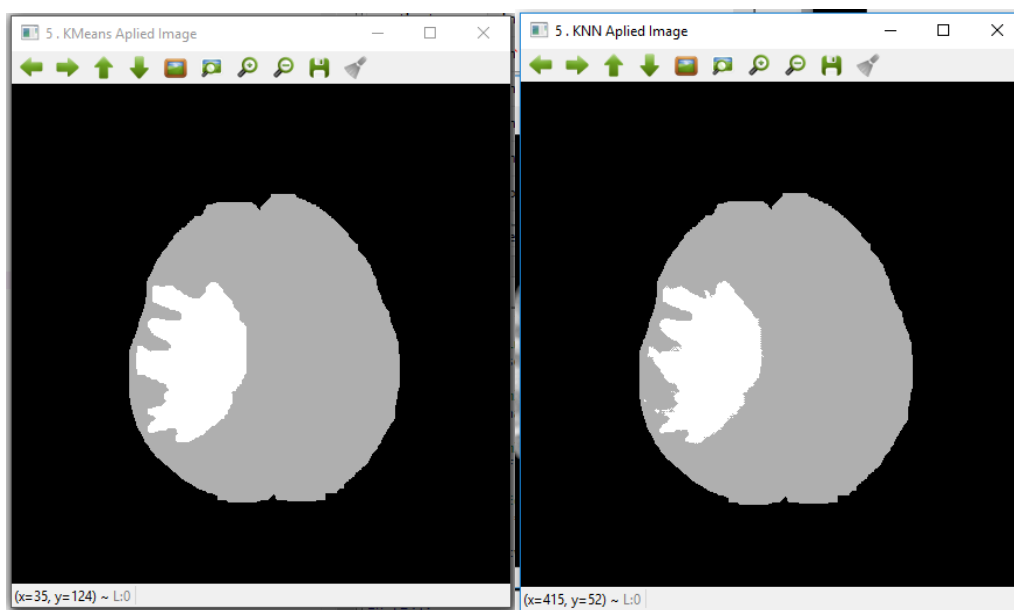
b) image is thresholded for pixel value 50.



c) Skull region is remove by 3 erode following 3 dilation operation with a kernel of 5x5.



d)

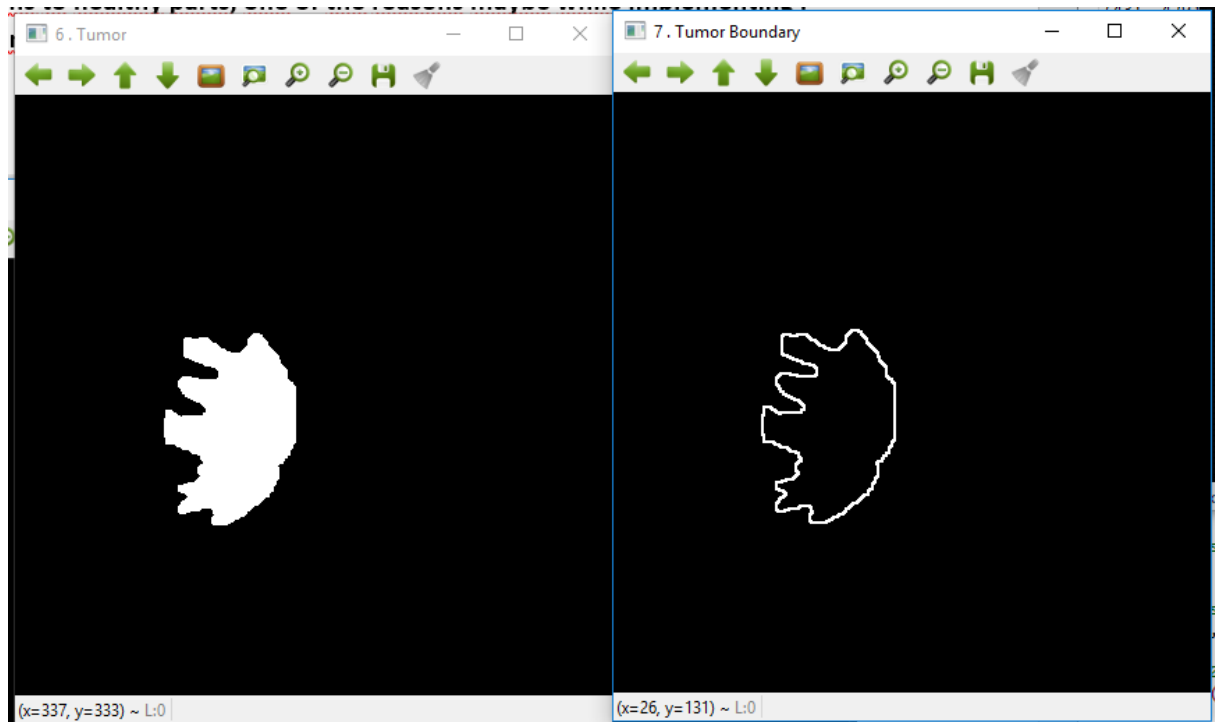


Kmeans is caculated by finding two random points for first mean value of healthy and tumor segments. After each iteration, pixels are classified regarding to distance and means are calculated for each cluster. Distance is calculated by difference in pixel value. Until the convergence happened, means did not change anymore, calculations are repeated. Kmeans is implemented on masked image by omitting masked parts leaving us to two clusters. To denoise the image opening morphological operation is used.

*Random points may cause errors in different runs as they may be too close to each other, preventing convergence.

- Knn output left for comparison. We see Kmeans does better job on identifying tumor with more blended regions to healthy parts, one of the reasons maybe while implementing i also take pixel distances into consideration for Knn.

e)



Tumor boundary calculated by using morphological gradient with a kernel size of 3x3

f) Output Image:

