

COMP27112 Lab 3 Queries

Samuel Belkadi (n61655sb)

March 20, 2023

1 Queries

1.1 Is Otsu's method successful in thresholding all the images?

When performing Thresholding with Otsu's method on some of the images, we can observe an inappropriate threshold value, resulting in poorly segmented images. It is obvious for the images: *fundus.tif*, *glaucoma.jpg*. A reason for that could be that images do not have a representative histogram, or foreground and background regions with similar grayscale values.

1.2 How would you modify the thresholding algorithm to address any problems?

In order to improve the thresholding algorithm, we could:

- use adaptive thresholding techniques calculating a local threshold for each pixel based on its surrounding neighborhood. This approach can be useful to solve problems such as uneven lighting or contrast.
- use multiple thresholds to segment the image into more than two regions. This approach can be useful to solve problems when images has multiple objects or complex backgrounds.
- make preprocessing on our image, such as enhancing the contrast of an image before thresholding. This approach can be useful to better identify the foreground and background regions and therefore improve the accuracy of the algorithm.

It could be good practice to combine some techniques to have accurate thresholding on complex images.

1.3 What metrics are there for assessing the success of thresholding?

In order to assess the success of thresholding, we could:

- Accuracy: the percentage of pixels that are correctly classified as either foreground or background. A high accuracy indicates a good separation of the foreground and background.
- Precision and Recall: Precision is the percentage of correctly identified foreground pixels out of all the pixels identified as foreground, while Recall is the percentage of correctly identified foreground pixels out of all the actual foreground pixels.
- Entropy: the principle is to measure the amount of information contained in an image. It can be used to assess the quality of the thresholding result by comparing the entropy of the original image and the thresholded image. A good thresholding result should have a lower entropy than the original image, meaning that the image has been simplified by removing information.