

COMP9517

T2, 2019

Assignment 1: Specification

Maximum marks achievable: 10 marks

Submission: The assignment files should be submitted online. Instructions for submission will be posted closer to the deadline.

Deadline for submission is week 3 Sunday **June 23rd, 23:59:59**.

You should submit a short and concise report answering the questions listed below, and the Python source code files.

Problem: Investigate the effectiveness of different image filtering and thresholding algorithms on different images

In this assignment, the investigation will be conducted in 2 stages:

Stage 1: Image filtering and thresholding (7 marks)

Objective: Compare and analyse the effects of filtering (median and Gaussian filtering) and thresholding (global, Otsu and adaptive thresholding) algorithms

Two images to be experimented on:

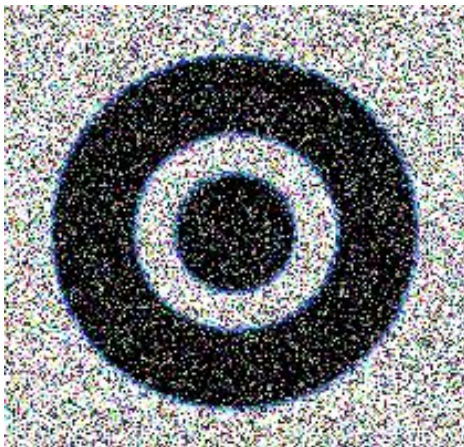


image1.png



image2.png

To do:

1. Test the performance of global, Otsu and adaptive thresholding on the original images
 - a. Which thresholding algorithm performs the best for each image?
2. Apply median filtering on the original images, and then test the performance of global, Otsu and adaptive thresholding on the filtered images
 - a. Which thresholding algorithm performs the best for each image?
 - b. What parameters are optimal for the median filtering?

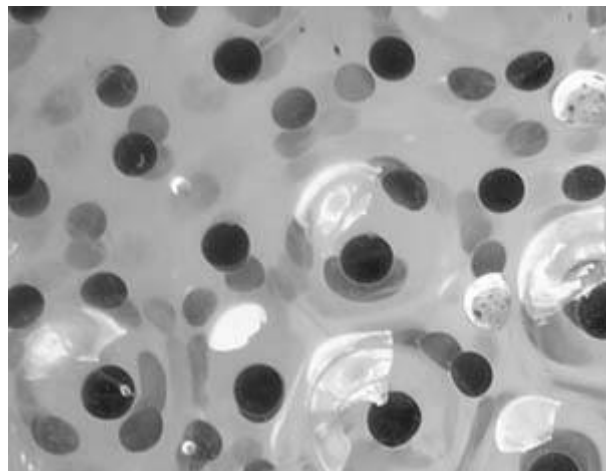
3. Apply Gaussian filtering on the original images, and then test the performance of global, Otsu and adaptive thresholding on the filtered images
 - a. Which thresholding algorithm performs the best for each image?
 - b. What parameters are optimal for the Gaussian filtering?

Present the visual results and discussion your findings to the questions in the report. Give some brief theoretical analysis about the different effects of filtering and thresholding algorithms on the two images, i.e. why do these algorithms achieve different results on the two images?

Stage 2: Use filtering and thresholding for segmentation (3 marks)

Objective: Segment (i.e. separate) the cells (dark and light gray round-like objects) from the background using simple image filtering and thresholding

One image (image3.jpg) to be experimented on:



To do: Find a combination of the filtering (median, Gaussian) and thresholding (global, Otsu and adaptive) steps that can achieve a good segmentation result

Present the visual segmentation results and describe how the segmentation was performed in the report. Pseudo code is acceptable as the description. Need to include the choice of parameters. Give a brief discussion about why the designed method could work.

Note: a visual segmentation result is an image of the same size as the input image, with pixels of the segmented cells shown as black and the background pixels shown as white.

REFERENCES

- [1]. https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_tutorials.html