

Module title: Image Processing
Name of the assignment setter: Dr Boguslaw Obara
Method of submission: DUO.

1 General Requirements

The assignment has been made to demonstrate that students do understand the principles of Image Processing.

Implementation:

- Use Python 2.7 and Python OpenCV or any other Python library to read image data, access image pixels, and write image data.
- Do not use already implemented mathematical morphology functions in libraries, such as OpenCV (e.g. 'cv2.erode').
- Make sure that your code can be run on a Durham University Linux system terminal.
- Test your programs on an image 'lena.png' provided on DUO.

Students will be marked based on the quality of the code and usability of the program when compared with the the state-of-the-art implementations.

2 Mathematical Morphology

2.1 Erosion (25%)

Implement grayscale erosion with a square structuring element of a size 5x5 pixels.

2.2 Dilation (25%)

Implement grayscale dilation with a square structuring element of a size 5x5 pixels.

2.3 Opening (15%)

Using your erosion and dilation implementations, implement a grayscale opening with a square structuring element of a size 5x5 pixels.

2.4 Closing (15%)

Using your erosion and dilation implementations, implement a grayscale closing with a square structuring element of a size 5x5 pixels.

2.5 Code Quality (20%)

Full principles of readable and reusable code apply. Each function/class should include:

- A good help text explaining the function/class usage. Try using headers!
- Enough comments to aid the user in understanding the algorithm.

Avoid code redundancy making the code easier to read and keeping it organized.

3 Submission:

To submit your work create a directory named by your username (e.g. abs123). Place all required files in this directory. ZIP (not .rar or .z7) this entire directory structure and submit it via DUO (late submissions will be penalised following department's policy).

You must submit the followings:

- Full Python programs source code for your solution to the above tasks.

- Working programs meeting the above specifications. Your programs should be run using the following command line: `'python script.py lena.png lena_script.png'`, where 'script' should be replaced by 'erosion', 'dilation', 'closing' or 'opening'.

The submitted zipped directory should contain only the following files:

- erosion.py
- dilation.py
- opening.py
- closing.py

4 Plagiarism:

You may use program source code from the provided course examples, the OpenCV library itself or any other source BUT this usage must be acknowledged in the comments of your submitted file. Automated software tools will be used to detect cases of source code plagiarism in this assignment exercise. This will include automatic comparison against code from previous year students but will also take account of common code examples given out as part of the course. Attempts to hide plagiarism by simply changing comments/variable names will be detected. Plagiarism is not fair on those who work hard on this assignment without resorting to plagiarising the work of others. The Department will always seek to address any instances of plagiarism following the rules set down by the University.

You should have been made aware of the Durham University policy on plagiarism. Anyone unclear on this must consult the course lecturer prior to submission of this assignment.