Image processing

ASSIGNMENT 5: MORPHOLOGICAL FILTERING (2024)

For this assignment you must write a short report in any word processor of your choice (MSWord, Latex, ....) where you explain your methods and show your results. All input and output images must be shown (preferably so that they can be compared on the same page). PLEASE print you images fairly large.

Add the code in an Appendix.

1(a) The image diatoms.jpg contains diatoms in various shapes and sizes. Apply suitable thresh- olding in order to separate the diatoms from the background. It may be profitable to do some preprocessing (smoothing or point transformation) in order to improve the thresholding result since some of the diatoms with dark interiors do not segment out well. (See the General hint below.)

1(b) Apply suitable morphological filtering with suitable structuring elements to the binary image to separate out various shapes. One may, for example, separate out the following: (1) round diatoms, (2) elongated diatoms, (3) star shaped ones, (4) triangular ones. You may choose any types or combinations. More successful separation of more classes will earn more marks. Also display your results in full colour (i.e. multiply the relevant binary image with each of the colour panels and assemble).

General Hint: When shapes have holes in them, it is often beneficial to remove the holes. One way to do this, is to do region growing on the inverse image, starting with seed points in the four corners of the binary image.