

The University of Saskatchewan
Saskatoon, Canada
Department of Computer Science
487/819– Computer Vision and Image Processing

Assignment 4

Date Due: November 8, 2018

Total Marks: 36

1 Submission Instructions

- Assignments are to be submitted via the Moodle class page.
- Programs must be written in Python 3.
- No late assignments will be accepted. See the course syllabus for the full late assignment policy for this class.

2 Background

The purpose of this assignment is to solve a more challenging segmentation problem using a modern segmentation algorithm.

2.1 Assignment Synopsis

The dataset of this assignment consists of images of leaves on a cluttered background — the same dataset as in Assignment 3, but this time, the images are corrupted by noise! Since it is robust to noise, you'll use the random walker algorithm to segment the dataset. Performance will be gauged by **mean Dice coefficient**.

2.2 Images

Download the archive `original-noisy.zip`. This archive contains 30 colour images of leaves against various backgrounds. These are the same images from assignment 3, but they are now corrupted by noise. As before there are images of three different classes (shapes) of leaves. The first class has image numbers between 1 and 19; the second class are in the files numbered 78 through 113; and the third class is in the images numbered between 132 and 175.

Download `segmented.zip` which is a set of binary images representing the “ground truth” for each of the 30 images in `original.zip`. This is the exact same ground truth as from Assignment 3. As before, these binary images will be treated as the “right answer” when performing segmentation validation. White pixels denote the pixels that your segmentation algorithm should add to the leaf region.

3 Problems

Question 1 (36 points):

Detailed instructions are provided `asn4-q1.ipynb`.

Notice that on the grading rubric (see Moodle) there are some points for how well your algorithm performs. You should be able to achieve at a mean DSC of at least 0.7 – this is the bare minimum we are expecting for accuracy and will earn you only half of these “accuracy marks”. For full “accuracy” marks for you will need to obtain a mean DSC of at least 0.8. You will still get most of the marks for achieving a mean DSC of at least 0.75.

4 Files Provided

`asn4-qX.ipynb`: These are iPython notebooks, one for each question, which includes instructions and in which you will do your assignment.

`images-noisy.zip`: Original images to be segmented.

`groundtruth.zip`: Binary ground truth images.

5 What to Hand In

Hand in your completed iPython notebooks, one for each question.

6 Appendix A — Grading Rubric

Grading rubric is available on Moodle.