

# Biological Image Processing and Informatics

Spring 2023

## Reading Assignment #2

Assigned on APR-20-2023

**Due on May-12-2023 by 10PM in Education Cloud**

### **A. Overview**

This reading assignment aims to introduce two important image segmentation techniques: graph cut based image segmentation and deep learning-based segmentation.

### **B. Instructions**

Write a report for each of the following two papers. The page limit for each report is two. The total number of reports to be submitted is two. Please note the minor changes to report format in Section C.

P. F. Felzenszwalb & D. P. Huttenlocher, Efficient graph-based image segmentation, *International Journal of Computer Vision*, vol. 59, pp. 167-181, 2004.

Olaf Ronneberger, Philipp Fischer, Thomas Brox, U-Net: Convolutional Networks for Biomedical Image Segmentation, *Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Springer, LNCS, Vol.9351: 234-241, 2015, available at arXiv:1505.04597 [cs.CV]

For each paper, briefly summarize its main conclusions. For each main conclusion, briefly explain its technical meaning and how it is derived. Within the page limit, be sure to provide adequate technical details in writing the summaries. Specifically, identify the key equations and explain their technical meaning.

### **C. Report format**

#### **C.1 General formatting requirements**

Page size: letter

Line space: single

Page margins: **0.5** inch on each side (top, bottom, left, right)

Font size: **11 or 12** points font for the main text; **9 or 10** points for listed references

#### **C.2 Detailed requirements**

Please write your report using the following structure of organization.

##### Title

Choose a title for your report. Remember to number the assignment.

##### Author information

Please list your name here.

Section 1: Short summary

Use this section to give a concise summary of key messages/ideas in the reference articles.

Section 2: Introduction/background

Use this section to provide relevant background information.

Section 3: Detailed summary

Use this section to provide a more detailed summary of important information in the references.

Section 4: Discussions

Use this section to provide your opinions and critical comments on the subject.

Section 5: Specific questions

Use this section to address specific questions asked, if any.

Section 6: References

List all references here. Be sure to format properly.

**D. Some general guidelines on report writing**

1. The single most important guideline regarding preparing a report is to think independently and use your own words. Avoid literal duplication of words from the references since otherwise it could run the risk of unintentional plagiarism  
[http://www.studentaffairs.cmu.edu/acad\\_integ/acad\\_integ\\_text.html](http://www.studentaffairs.cmu.edu/acad_integ/acad_integ_text.html).  
If you must cite the original text, clearly mark your citation using quotation marks.
2. Organize your report into sections and use section titles. This substantially improves readability.
3. Avoid long paragraphs. Instead, try to break them up into logically coherent short paragraphs.
4. Pay attention to details. Be sure to cite your references properly. If you are not sure how to make citations, follow the format of a research journal.

**E. References for further reading**

[A1] J. Shi & J. Malik, Normalized cuts and image segmentation, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 22, pp. 888-905, 2000.