Assignment #7

Semantic Segmentation on BCSS

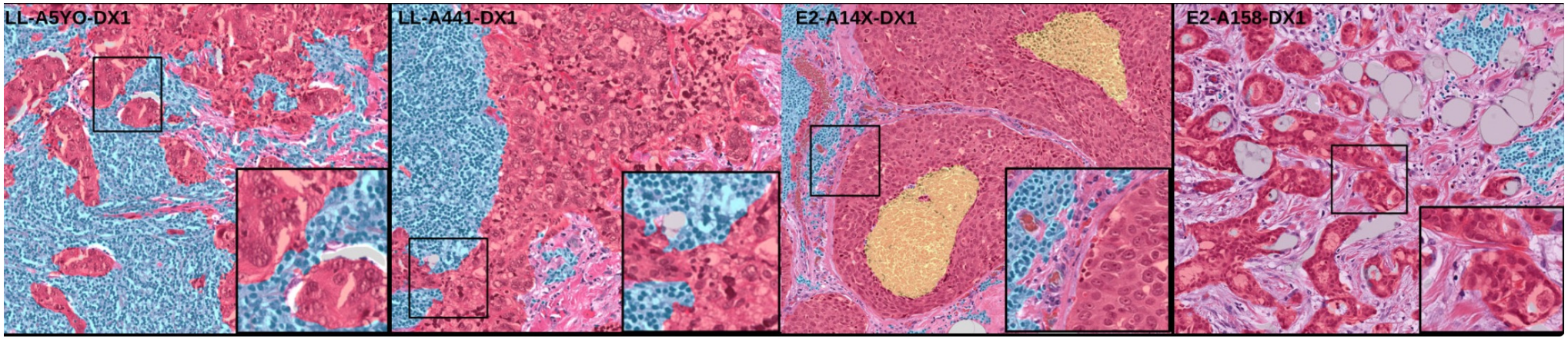
Due on Dec 27, 23:59 (11:59 pm)

Overview

- Semantic segmentation is a computer vision task that aims to classify each pixel in an image into specific objects or regions.
- In this assignment, you will implement a segmentor to classify the specific types of breast cancer lesions.
- The segmentor implemented in this assignment is U-Net, and you are required to construct it from scratch

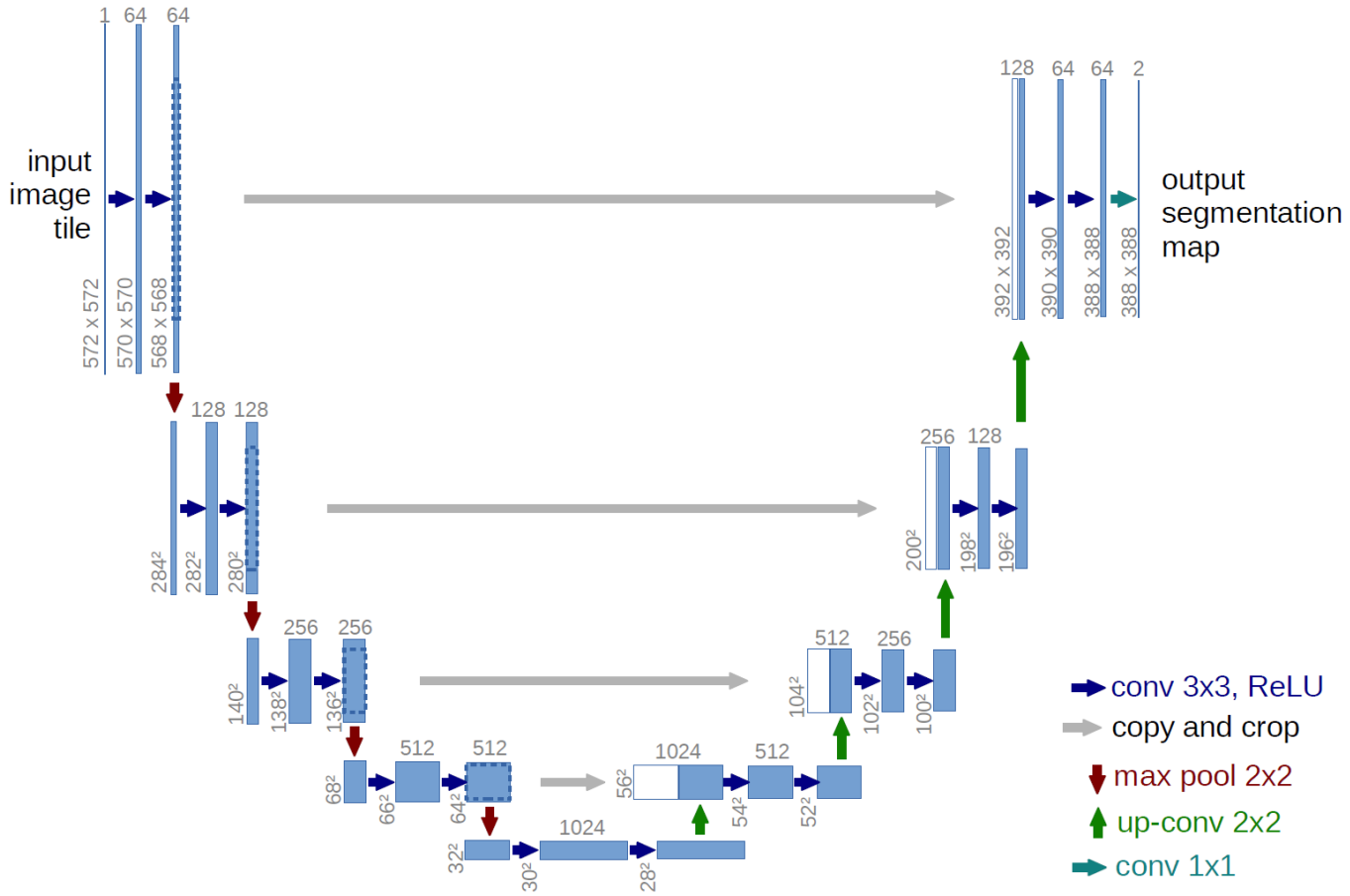
Dataset

- The BCSS dataset contains over 20,000 segmentation annotations of tissue region from breast cancer images from TCGA.
- We divide each slide into 224 x 224-pixel regions, resulting in a total of 40,210 images. This dataset comprises a training set of 30,760 images, a validation set of 5,429 images, and a test set of 4,021 images.
- It has 3 classes: ‘Tumor’, ‘Stroma’, ‘other’.
- Your model will be evaluated on the test set using the mIoU metric .



U-net

- U-net is a fully convolution neural network for image semantic segmentation. Consist of **encoder** and **decoder** parts connected with **skip connections**. Encoder extract features of different spatial resolution (skip connections) which are used by decoder to define accurate segmentation mask. Use **concatenation** for fusing decoder blocks with skip connections.



Things you cannot do

- You cannot submit results predicted by others.
- You cannot copy trained models from others.
- You cannot copy code from others, internet, GitHub …
- You cannot collect more images to train your model in order to boost performance.
- You cannot use any libraries for constructing the U-net architecture.

Any violation will result in 0 score!

Submission

- Submit your predictions on the test images to Kaggle for evaluation
  - https://www.kaggle.com/t/13040d09b42940ba90f96cca324ee90d
  - Remember to your SID as the Team Name
- Evaluation metric: mIoU
- Submit your code and report to the CU.
- Report
  - Briefly explain the U-net architecture and how to improve the model effect.
- File name: A7.ipynb, report.pdf

Grading

- 85% Kaggle competition (0.5 * public + 0.5 * private)
- 15% Report