

< RT704 Assignment 3 >

The Glioma dataset used for Assignment 2 contains segmentation masks.

[20 pt] 1. Choose several testing images and then perform segmentation using the **region growing method** with different starting points. Show some good and bad cases depending on data and the starting points.

[20 pt] 1. For the same testing data used in 1, perform segmentation using the **Graph Cut method**. **Do not** implement all of the techniques. Please survey and use an open program at online. Show the foreground and background scribbles you used and results.

[60 pt] 1. Train a **U-Net** [1] segmentation model and test it. Here is an example of U-Net architecture (<https://idiotdeveloper.com/unet-implementation-in-pytorch/>). Concatenate multi-modal images and use it as an input. You can arbitrarily set the model with loss function, model complexity, optimizer, or etc. Report average dice similarity score (DSC) of testing dataset when the validation loss is minimum, and visualize image and segmentation prediction for some cases.

This is another example you can refer (<https://medium.com/@mhamdaan/multi-class-semantic-segmentation-with-u-net-pytorch-ee81a66bba89>)

Submit your report with the codes on LMS by 11/27. When you submit, make your zip filename “HW3_yourfirstname.zip”

[1] Ronneberger, O., Fischer, P., & Brox, T. (2015, October). U-net: Convolutional networks for biomedical image segmentation. In International Conference on Medical image computing and computer-assisted intervention (pp. 234-241). Springer, Cham.