

Weekly Reports

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Outline

- The main purpose and the tasks I have finished this week
- Things I want to do next week

The main purpose and The tasks I have finished this week

As last week said, Our main purpose is to build a 3D segmentation network aiming to get a pixel-wise label of the lung node, and to expand suggest annotation technique to 3D space to reduce the burden of label.

This week, I mainly read some papers and put effort into tasks above. There are 2 tasks I have finished this week:

- Reading some papers about 3D biomedical image segmentation I have read 3 articles about the task. They are [1], [2] and [3].

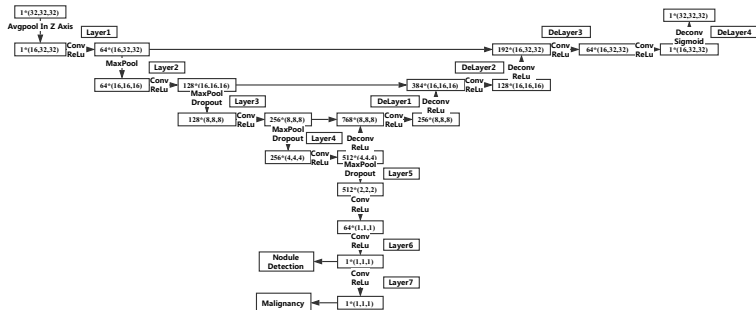
The first article aims to segment the lesion in brain. The net structure is the common FCN, but it raises a efficient training strategy which join the processing of adjacent image patches into one pass through network which can reduce the training burden.

The second article use the merge operation to improve 3D-Unet, which I want to try in our net in the further experiment.

The third article also use the common FCN, but it represents a strategy and a loss function which adapt the net into multi-organ segmentation task.

The tasks I have finished this week

- Build our net for training I have finished building our net structure as this:

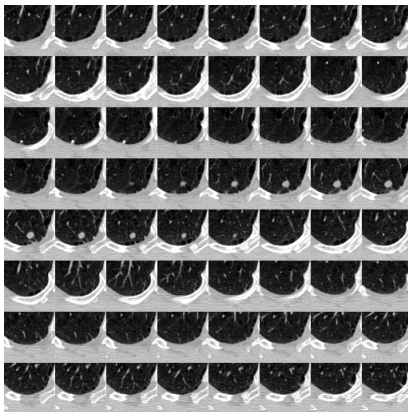


The tasks I have finished this week

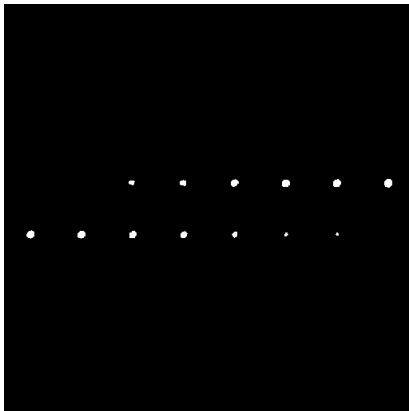
- Just as the picture shows, the left half of the net is the same as the 2nd kaggle's structure, and we use part of it into our segment network.
- Our train strategy is to train the left part first, and fix the parameter to train the right part until converging.

The tasks I have finished this week

- I also spend 3 days finishing the important but cumbersome task: generating the training data. An example of data is like this :



The tasks I have finished this week



Some ideals I want to practice next week

Next week, I mainly want to begin the training process of our network. The details of how to load data, how to choose loss function and optimize function is waiting for try. And if our network doesn't work well, I want to use some ideals in the articles I mentioned above.



Konstantinos Kamnitsas, Christian Ledig, Virginia F. J. Newcombe, Joanna P. Simpson, Andrew D. Kane, David K. Menon, Daniel Rueckert, and Ben Glocker. Efficient multi-scale 3d CNN with fully connected CRF for accurate brain lesion segmentation.

CoRR, abs/1603.05959, 2016.



Baris Kayalibay, Grady Jensen, and Patrick van der Smagt.

Cnn-based segmentation of medical imaging data.

CoRR, abs/1701.03056, 2017.



Holger R. Roth, Hirohisa Oda, Yuichiro Hayashi, Masahiro Oda, Natsuki Shimizu, Michitaka Fujiwara, Kazunari Misawa, and Kensaku Mori.

Hierarchical 3d fully convolutional networks for multi-organ segmentation.

CoRR, abs/1704.06382, 2017.