UNet-3D

Dataset setup

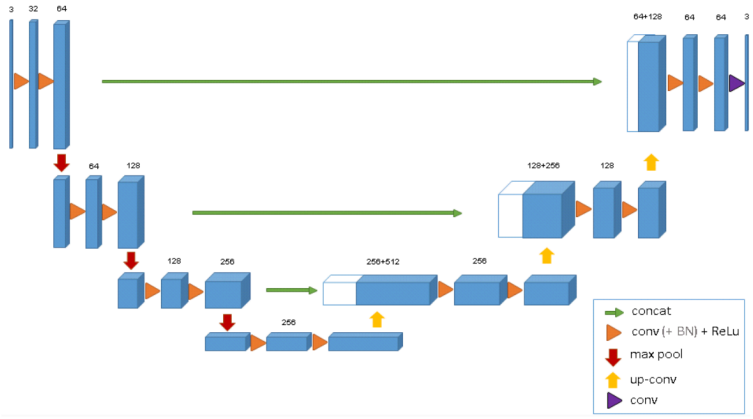
- Reader1: 402 images
- Reader2: 86 images

- Test set: 86 images in reader2's review list
- Train set: 252 images, 0.8*(402-86)
- Validation set: 64 images, 0.2*(402-86)
- 3 classes: 0 for background, 1 and 2 for left and right lungs

Data preprocessing

- Intensity clipping (-250, 0)
- Resampling (1.7, 1.7, 1.7)
- Centric Cropping (128, 256, 256)

UNet-3D model



Model architecture of 3D UNet.
Copied from UNet-3D paper (https://arxiv.org/pdf/1606.06650.pdf).

- Analysis path
    1. 5 resolution steps
    2. Number of filters from 16 to 512
    3. Feature map from (128, 256, 256) to (4, 8, 8)
- Synthesis path
    1. Reverse operation from analysis path

Results

- 100 epochs
- Learning rate 0.001 with learning rate decay
- Adam optimizer

- Batch size 1
- Evaluation metric: dice coefficient

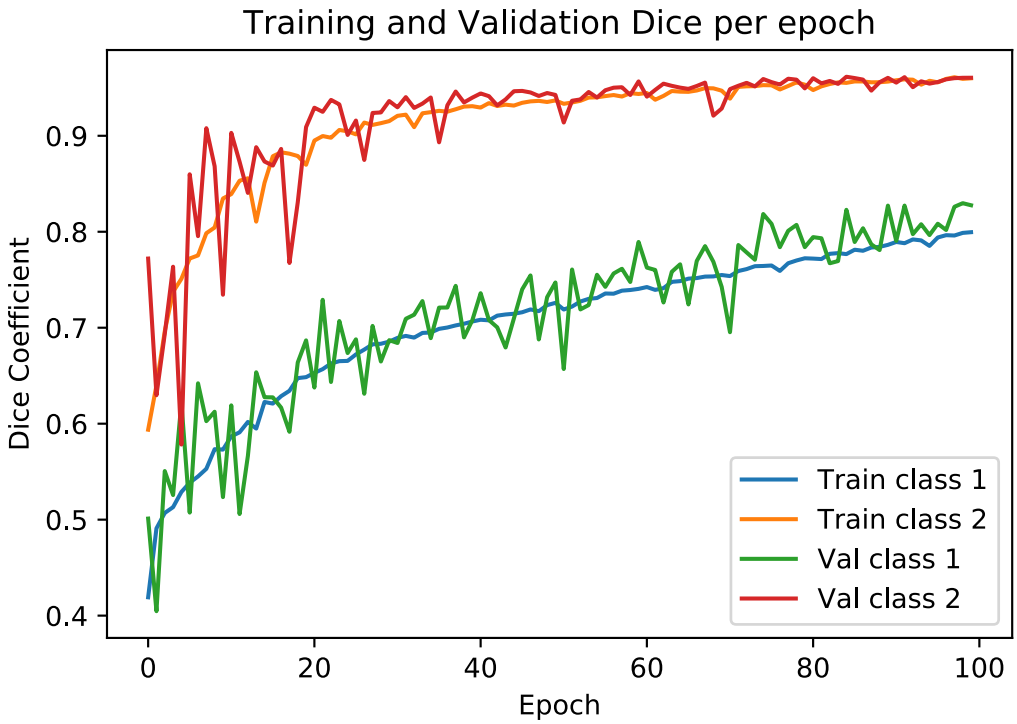
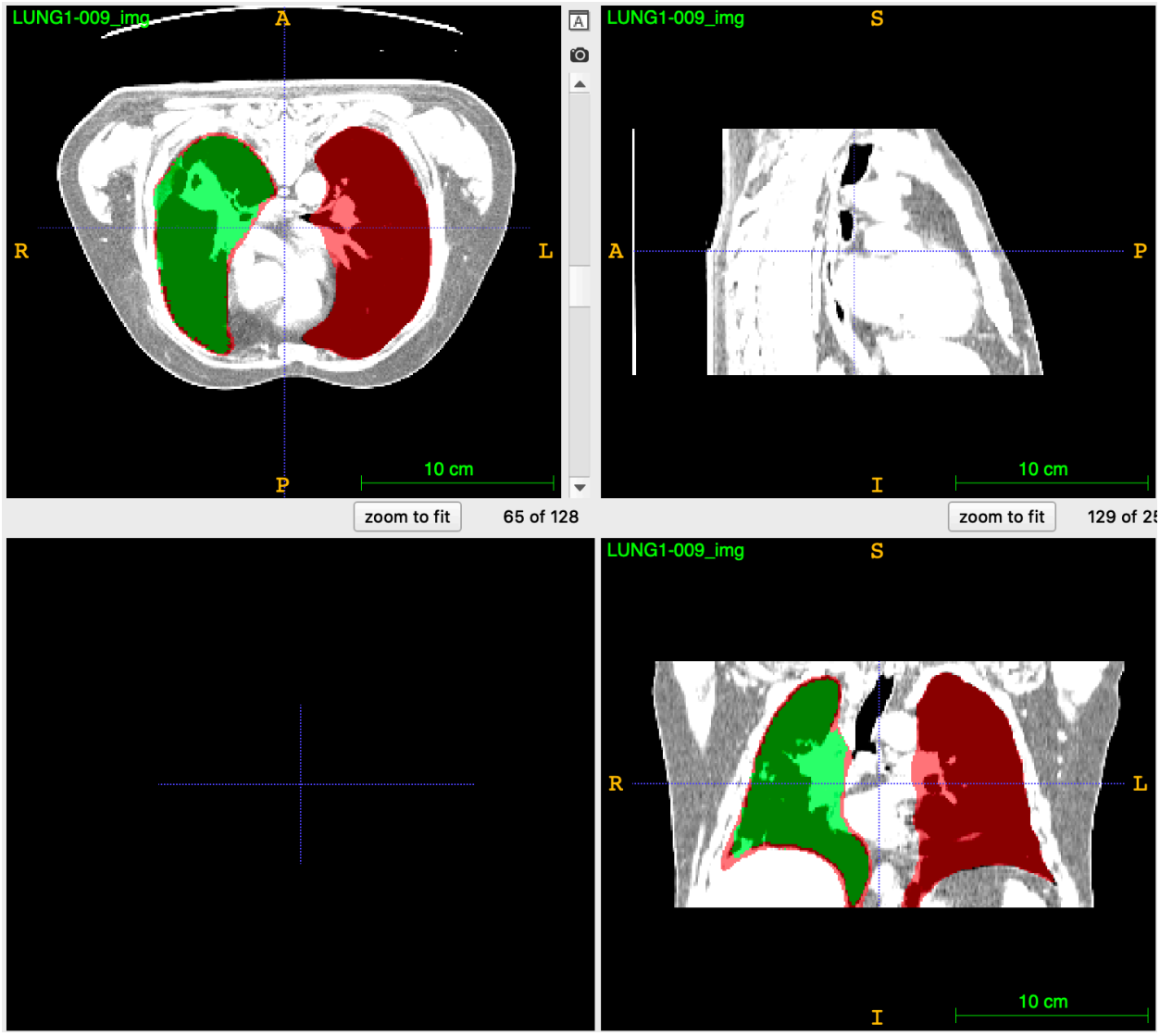


Figure 1. Dice coefficient for training and validation set per epoch.

Dice Coefficient on Test set

	Class 1	**Class 2**
Unet-3D vs Reader 1	0.8248607	0.94415303
Reader 2 vs Reader 1	0.97833153	0.98346537

Examples of predicted masks


LUNG1-009_img
A
R
L
P
10 cm
zoom to fit
65 of 128
LUNG1-009_img
S
A
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zoom to fit
129 of 25
LUNG1-009_img
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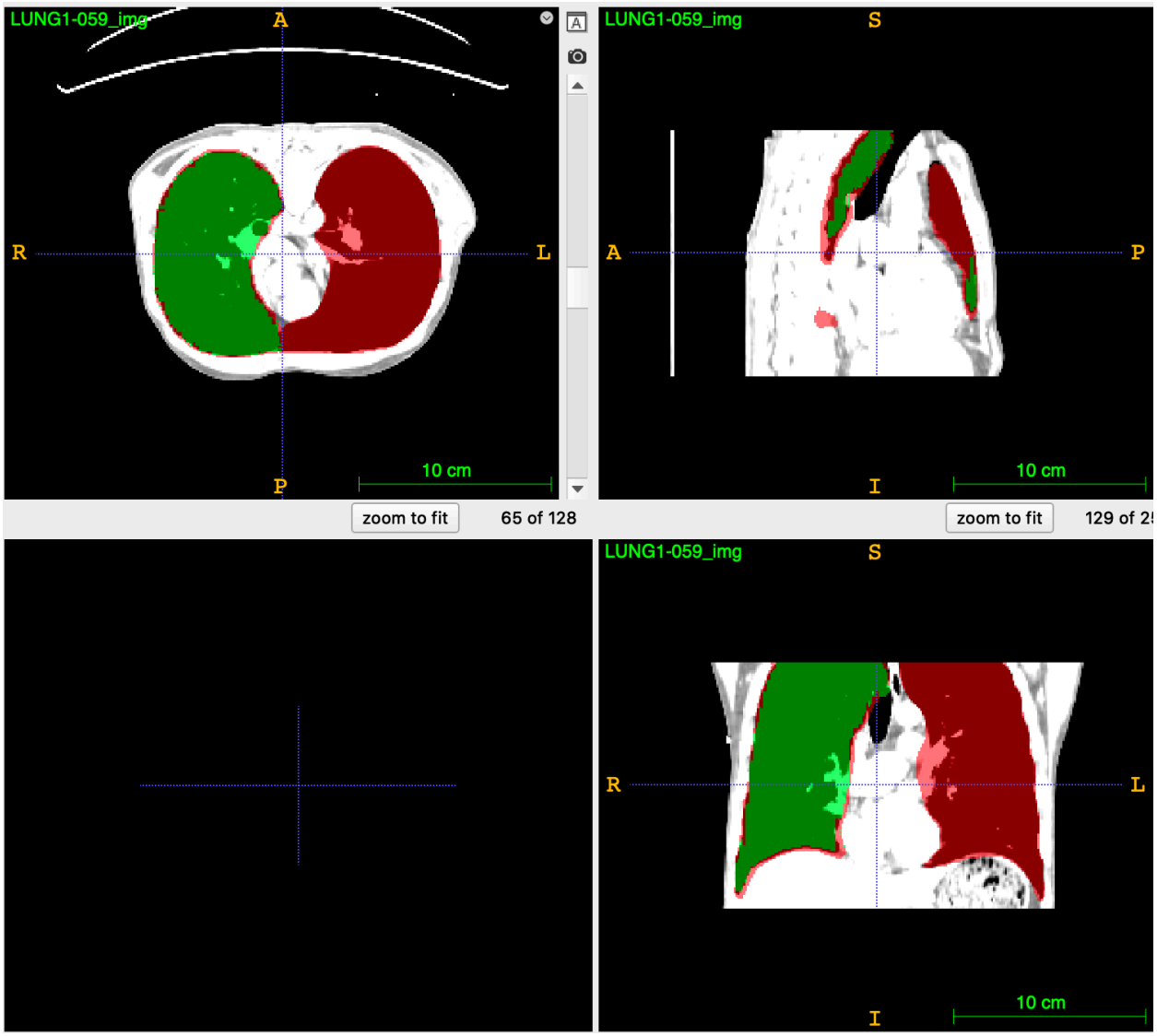
LUNG1-009


LUNG1-059_img
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