

UNet-3D

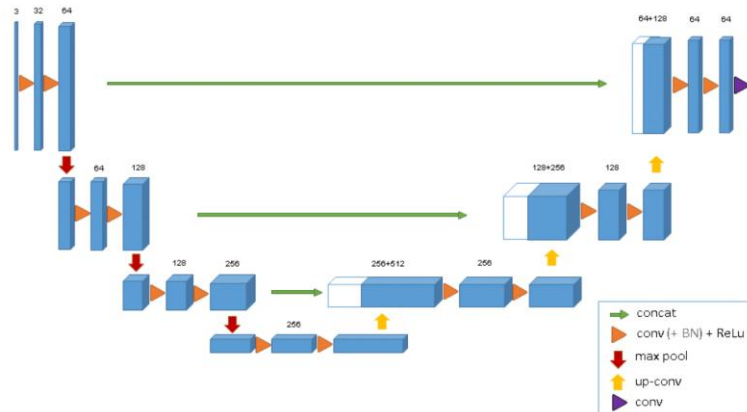
Dataset setup

- Reader1: 402 images
- Reader2: 86 images
- Test set: 86 images in reader2's review list
- Train set: 252 images, $0.8 \cdot (402-86)$
- Validation set: 64 images, $0.2 \cdot (402-86)$
- 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) using NearestNeighbor interpolator
- 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

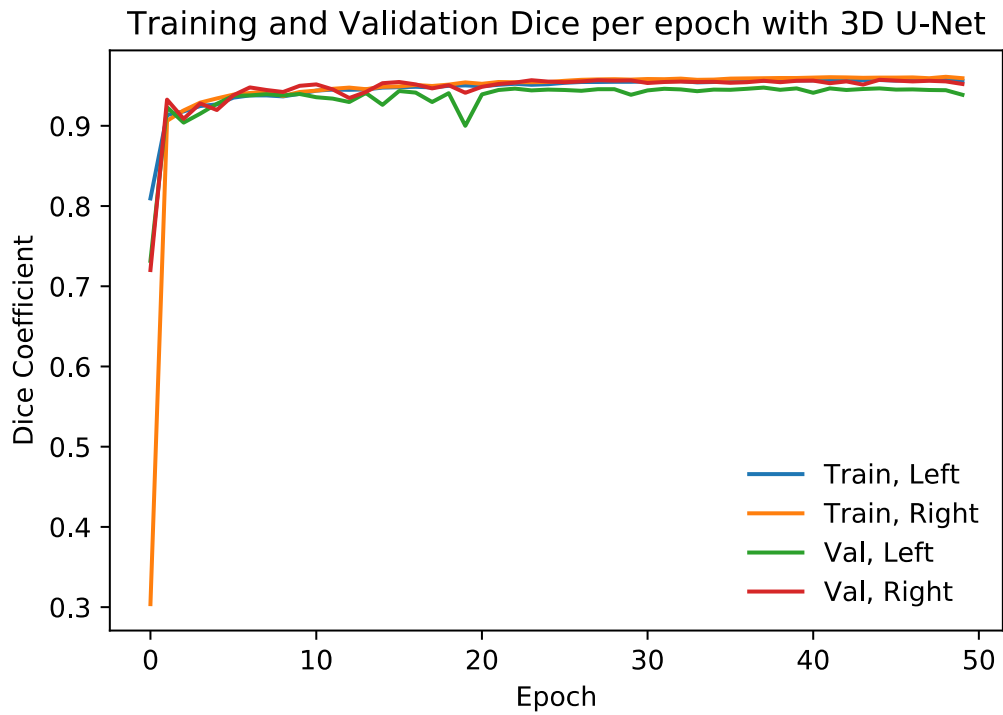
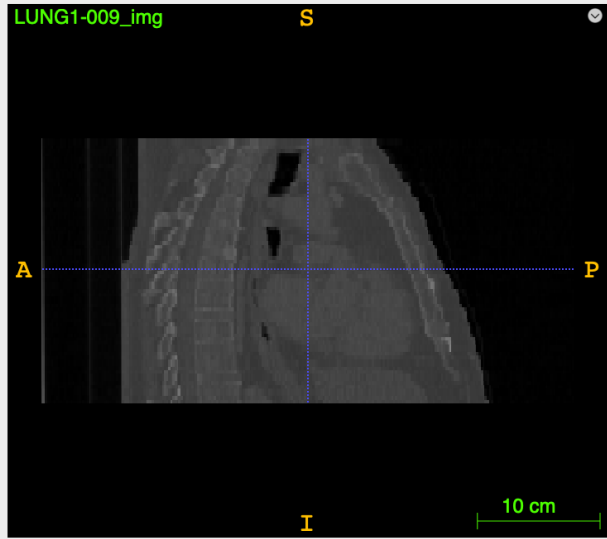
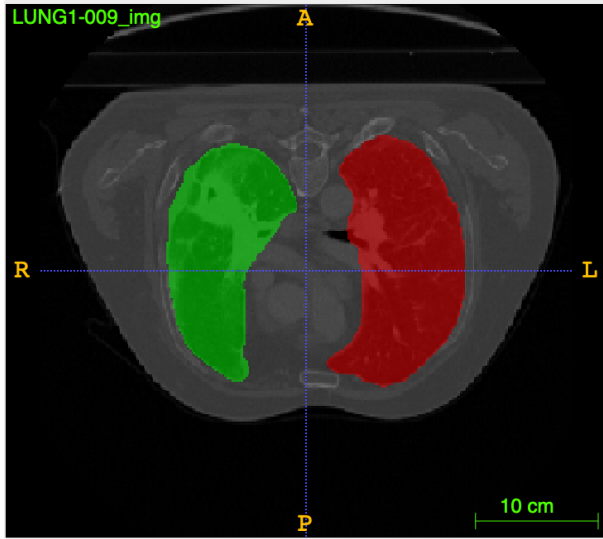


Figure 1. Dice coefficient for training and validation set per epoch.

Dice Coefficient on Test set

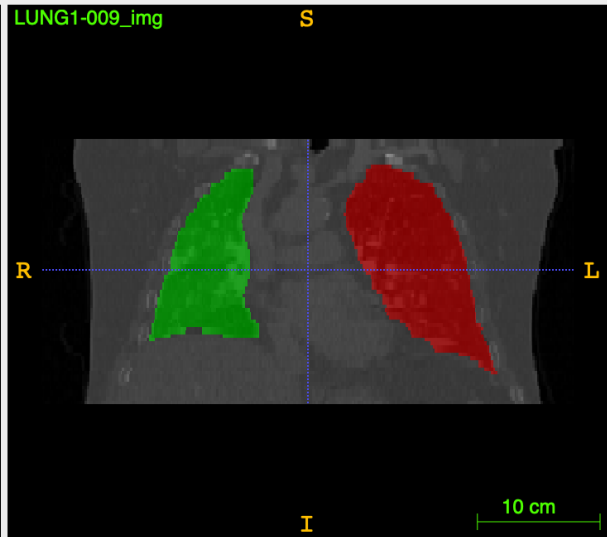
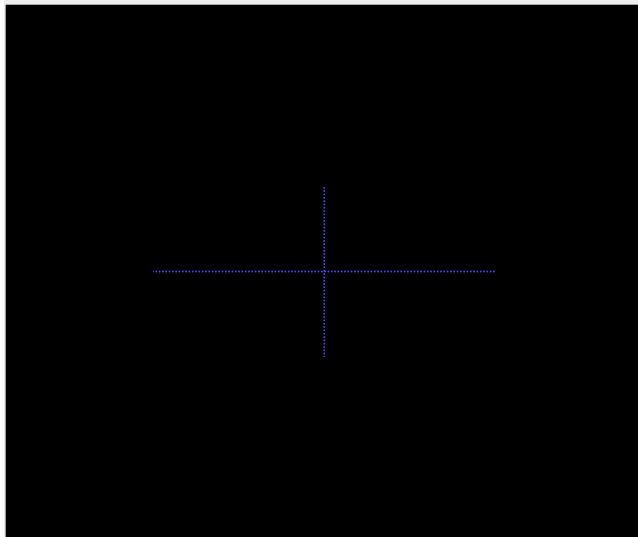
	Class 1	Class 2
Unet-3D vs Reader 1	0.949 (0.054)	0.956 (0.044)
Reader 2 vs Reader 1	0.978 (0.114)	0.983 (0.107)

Examples of predicted masks

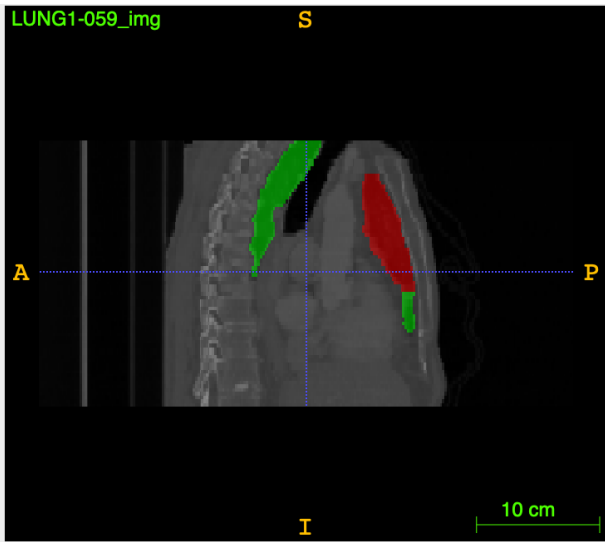
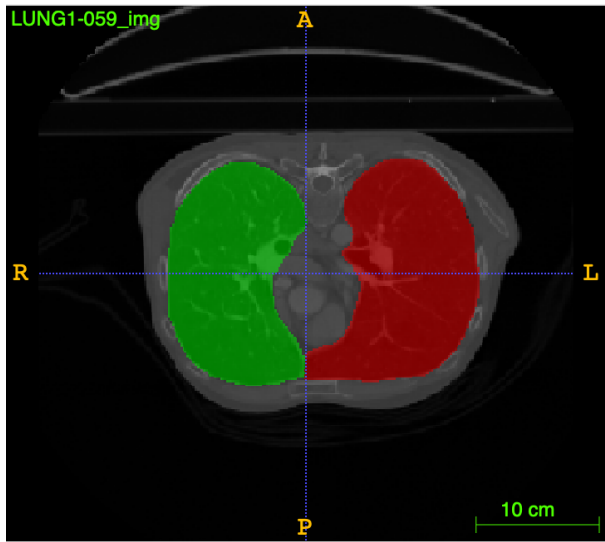


zoom to fit 37 of 72

zoom to fit 223 of 44



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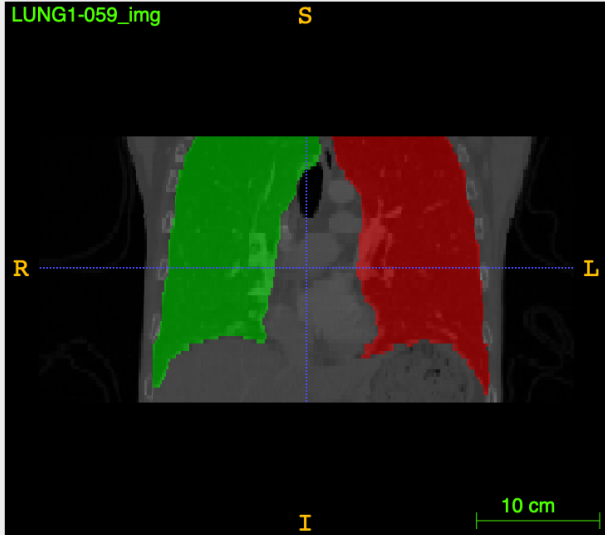
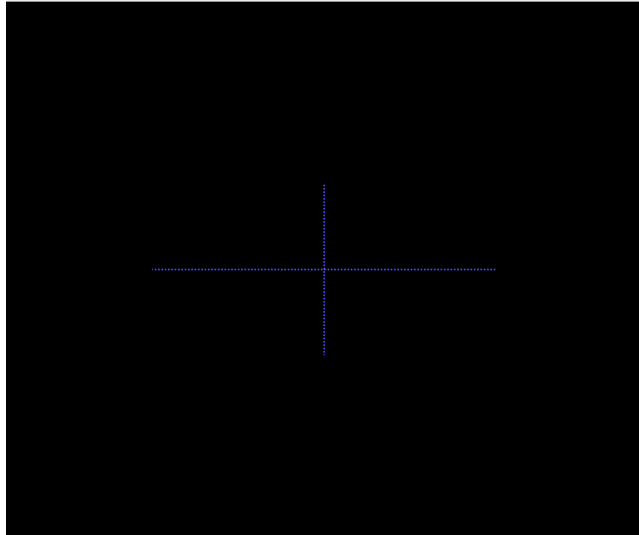


zoom to fit

37 of 72

zoom to fit

223 of 4



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