UNet-2D

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) using NearestNeighbor interpolator
- Centric Cropping (128, 256, 256)
- Splitting training images and masks into 2D slices, for each 3D image, we will have 128*(1, 256, 256) 2D images and masks.
- Shuffling all of these 2D slices and training the 2D U-Net model.

UNet-2D model

We follow the same architecture as 3D U-Net but change all 3D convolution and de-convolution operations to 2D version.

Results

- 100 epochs
- Learning rate 0.001
- Adam optimizer
- Batch size 64
- Loss function: dice loss
- Evaluation metric: dice coefficient

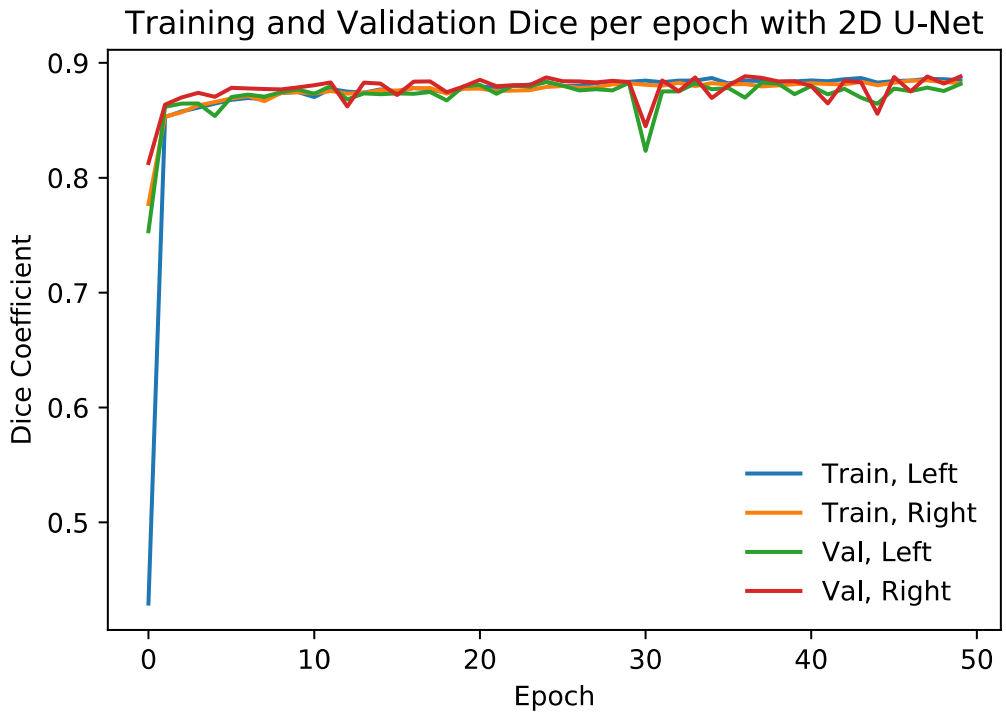
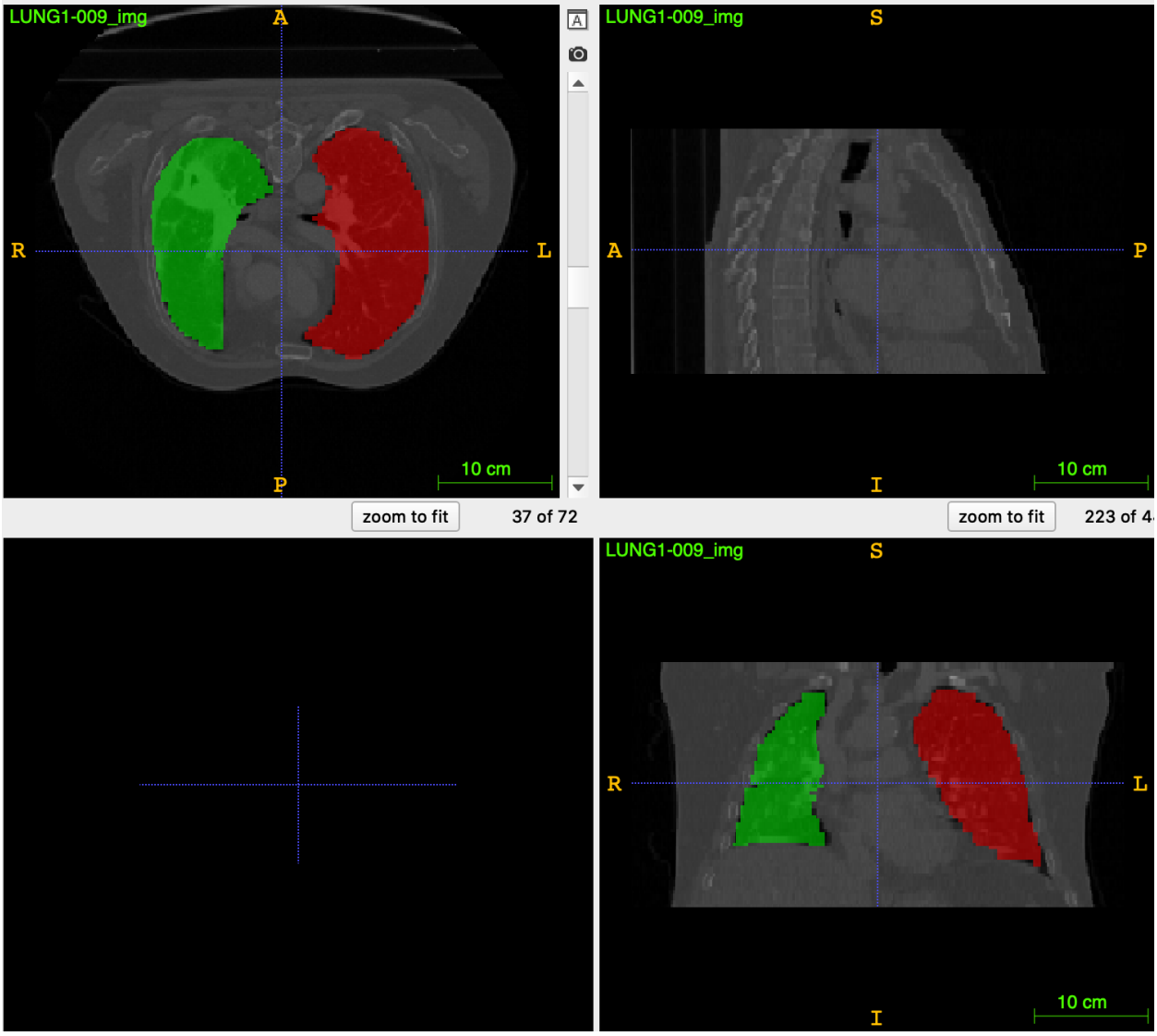


Figure 1. Dice coefficient for training and validation set per epoch.

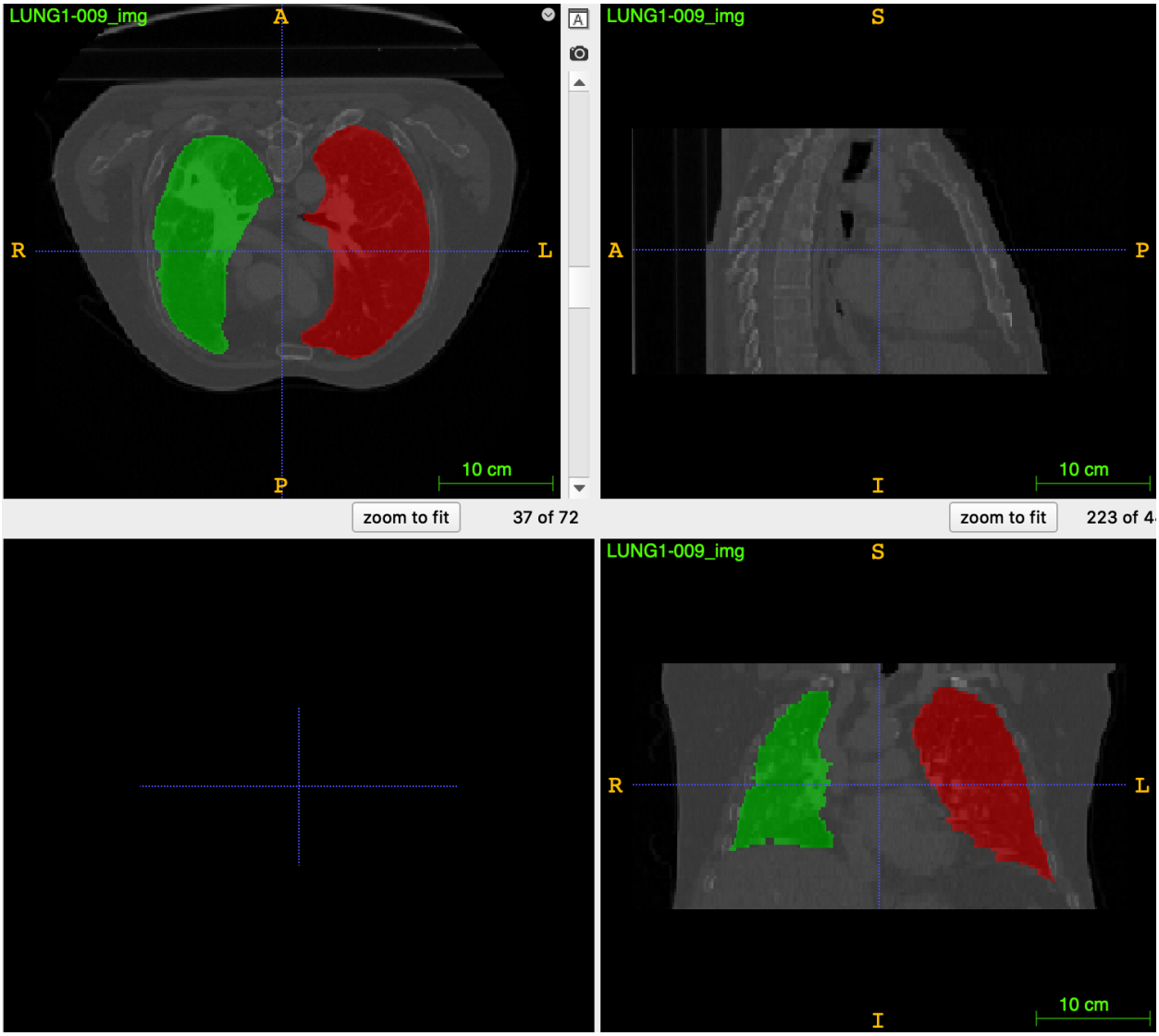
Dice Coefficient on Test set

	Class 1	**Class 2**
Unet-2D vs Reader 1	0.942 (0.104)	0.943 (0.102)
Reader 2 vs Reader 1	0.978 (0.114)	0.983 (0.107)

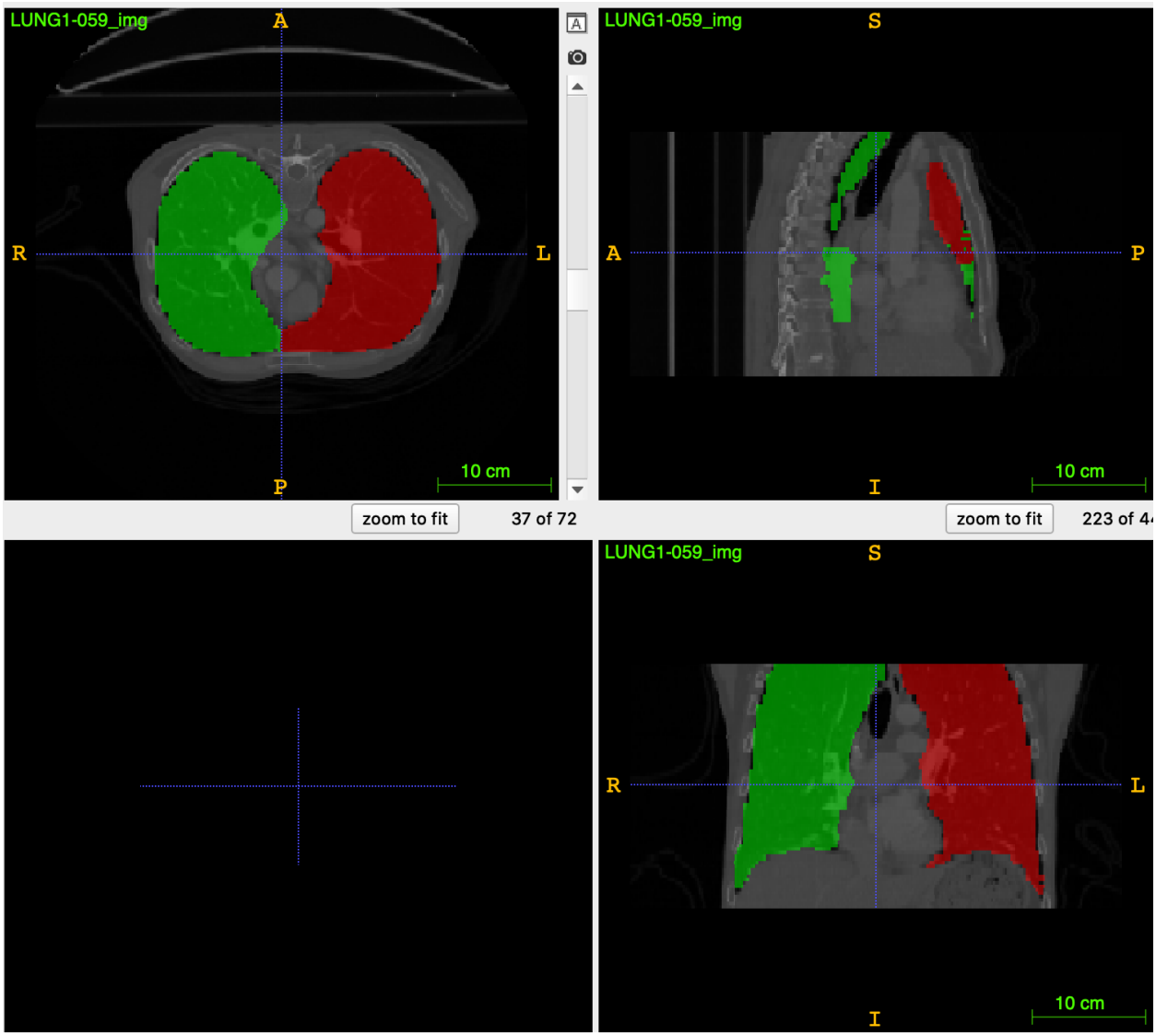
Examples of predicted masks



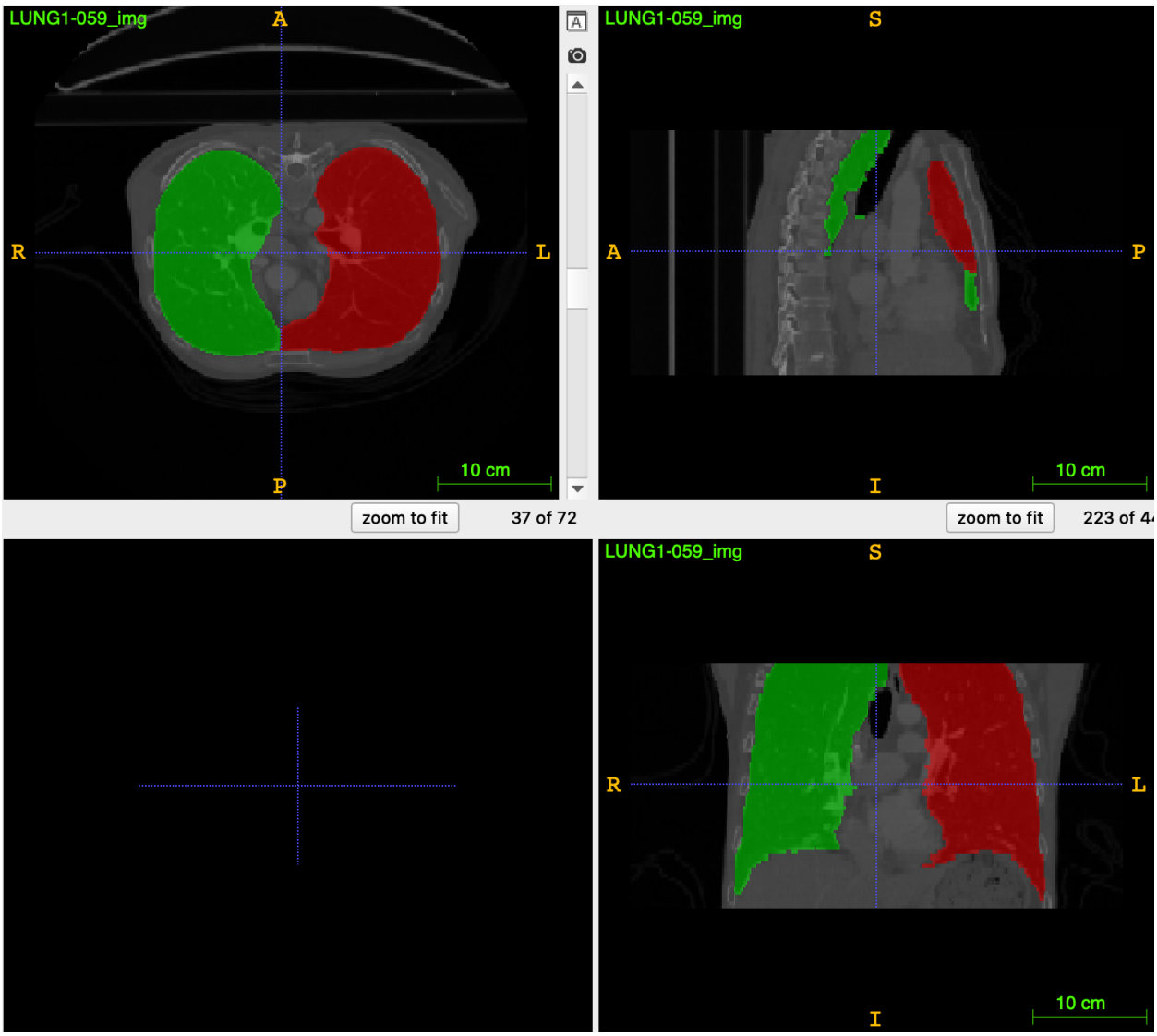
LUNG1-009. Real mask



LUNG1-009. Predicted mask by U-Net 2D



LUNG1-059 real mask



LUNG1-059. Predicted mask by U-Net 2D