

UNet-2D

Dataset setup

- Reader1: 402 images
- Reader2: 86 images

- Test set: 86 images in reader2's review list
- Train set: 252 images, $0.8 \cdot (402 - 86)$
- 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)
- Centric Cropping (128, 256, 256)
- Splitting training images and masks into 2D slices, for each 3D image, we will have $128 \cdot (1, 256, 256)$ 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 deconvolution operations to 2D version.

Results

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

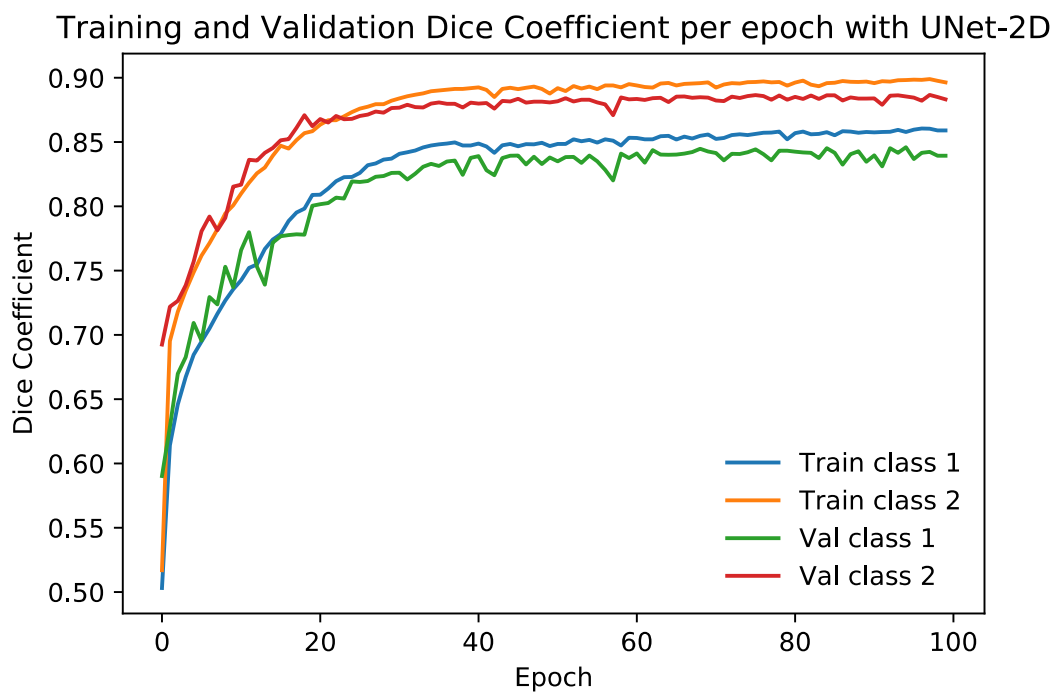
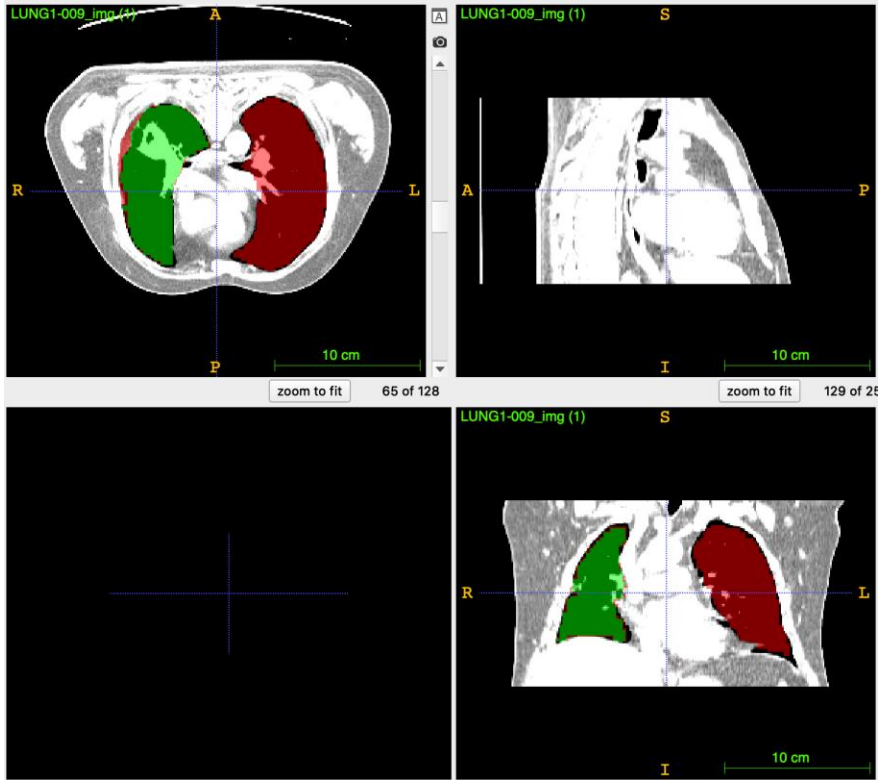


Figure 1. Dice coefficient for training and validation set per epoch.

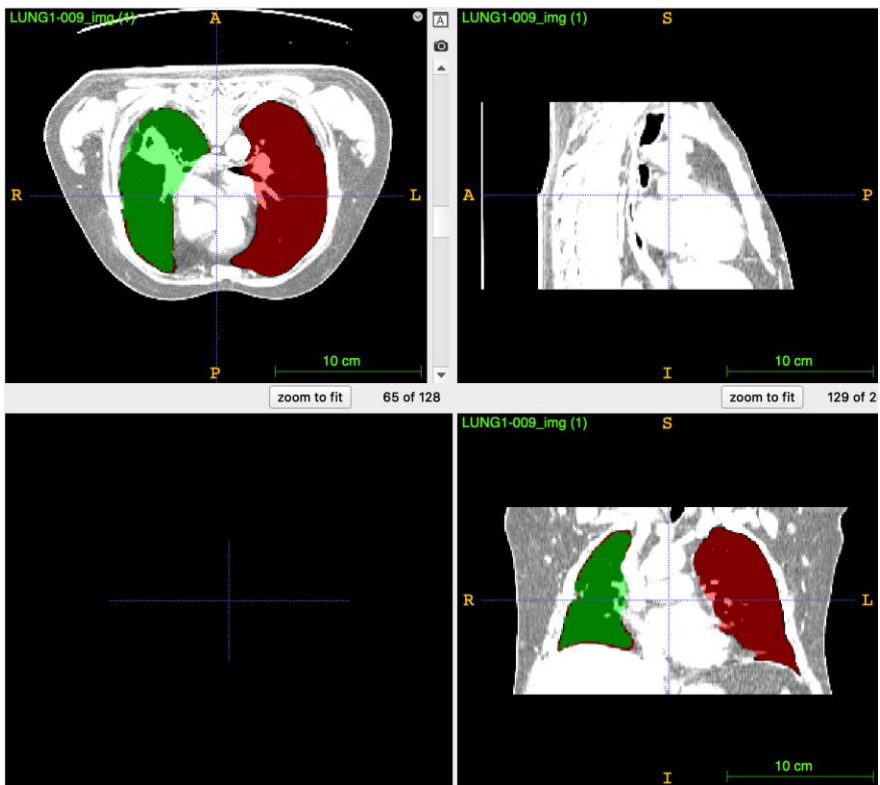
Dice Coefficient on Test set

	Class 1	Class 2
Unet-2D vs Reader 1	0.90219624 (0.90219624)	0.93981157 (0.13862787)
Reader 2 vs Reader 1	0.97833153 (0.11416037)	0.98346537 (0.10716874)

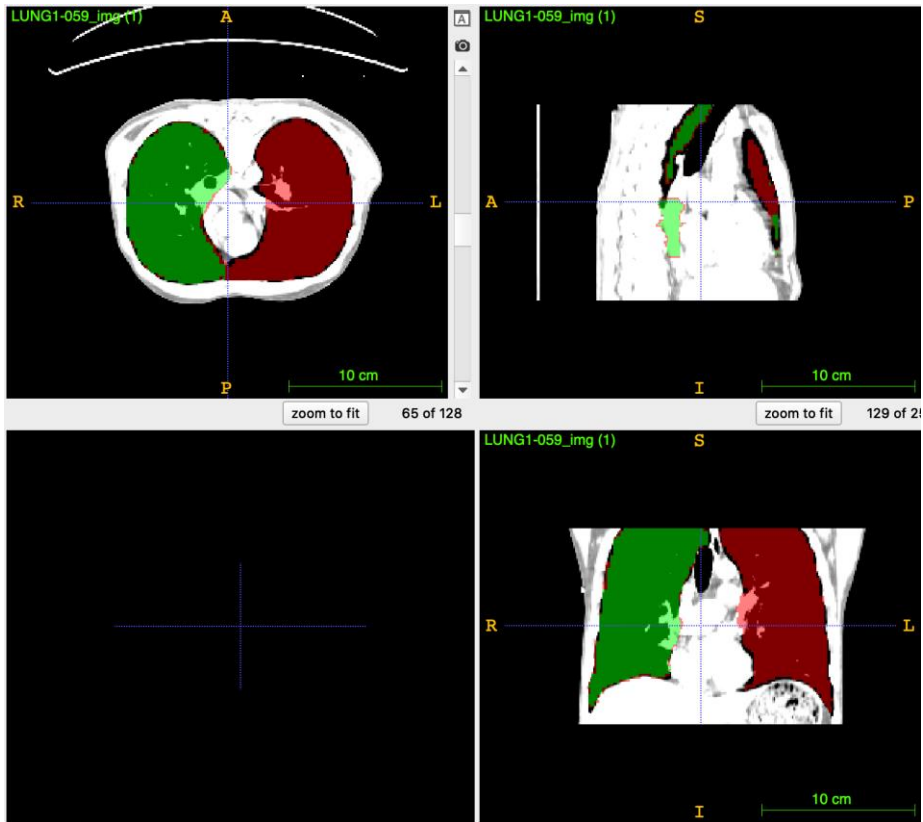
Examples of predicted masks



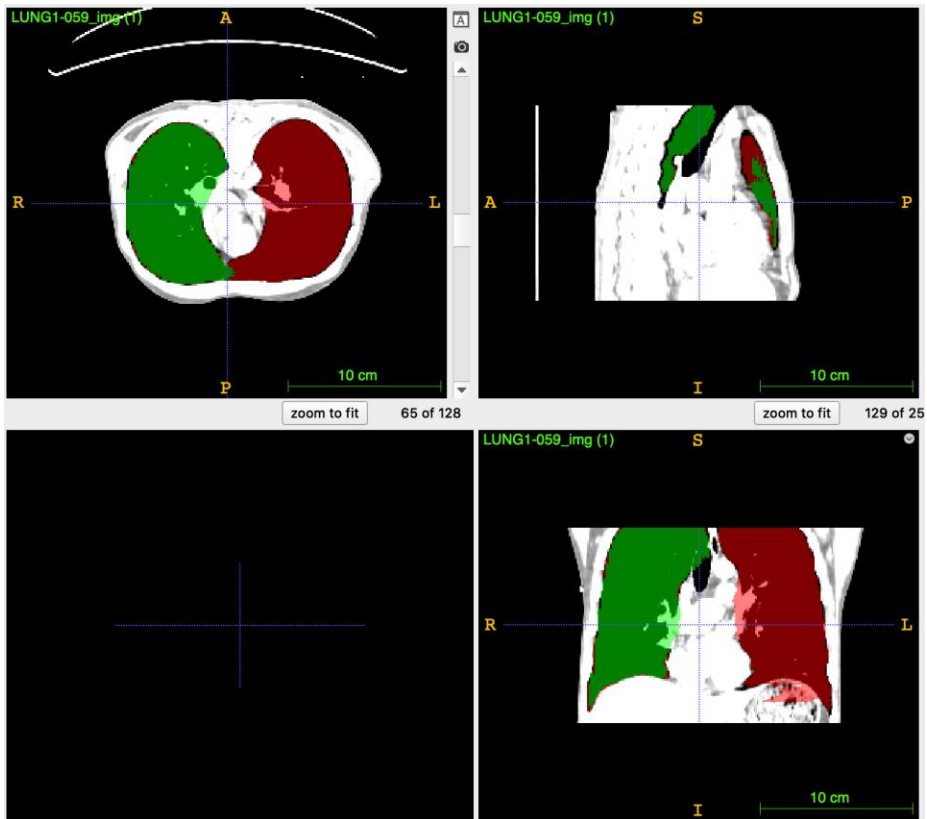
LUNG1-009. Real mask



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



LUNG1-059 real mask



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