**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.

<table>
<thead>
<tr>
<th></th>
<th>Class 1</th>
<th>Class 2</th>
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<tbody>
<tr>
<td><strong>Unet-2D vs Reader 1</strong></td>
<td>0.942 (0.104)</td>
<td>0.943 (0.102)</td>
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<tr>
<td><strong>Reader 2 vs Reader 1</strong></td>
<td>0.978 (0.114)</td>
<td>0.983 (0.107)</td>
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</table>

Examples of predicted masks
LUNG1-009. Real mask
LUNG1-009. Predicted mask by U-Net 2D
LUNG1-059. Predicted mask by U-Net 2D