**1、Training of lung field registration model based on AC RegNet**

（1）Train data set

Location of training dataset: \data\DRLung

The folder DRLung\image is the static chest X-ray image route.

The folder DRLung\label is the static lung field mask image route.

（2）Training

2.1. VectorCNN.

Train the AutoEncoder corresponding to anatomical constraints using lung field label images from static chest X-ray images (acregnet/networks.py) (code file location: scripts/aenet\_train.py）， Save the trained encoder:/results/DRLung/AENet/train/model.pt;

2.2. AC-RegNet\_V1.

The complete pairwise pairing of static chest X-ray images. Among them, one image is used as the moving image, and the other is the fixed image (the moving image is registered to the fixed image).

Finally, the paired images (moving image and fixed image) and the corresponding autoencoders for anatomical constraints (/results/DRLung/AENet/train/model.p) were used for initial training of the registration convolutional neural network (code file location: scripts/acregnet\_test\_v1.py）

Code file location: scripts/acregnet\_train\_v1.py

2.3. AC-RegNet\_V2.

Perform affine transformation on each image (moving images) in static chest X-ray images to generate corresponding fixed images; Finally, match moving image and fixed image and the corresponding AutoEncoder for anatomical constraints (（/results/DRLung/AENet/train/model.pt), and retrain the initially trained registration convolutional neural network (/results/DRLung/ACRegNet/train/model-v1. pt).

Code file location: scripts/acregnet\_train\_v3.py

2.4. AC-RegNet\_V3.

Extract lung parenchyma from static chest X-ray images and obtain corresponding lung parenchyma images; Perform affine transformation on each lung parenchyma image (moving image) in the lung parenchyma image to generate the corresponding fixed lung parenchyma image; Finally, match the lung parenchyma moving image and fixed image with the AutoEncoder corresponding to anatomical constraints (/results/DRLung/AENet/train/model. pt), and continue training the retrained registration convolutional neural network (/results/DRLung/ACRegNet/train/model. v3. pt) to obtain the final lung field registration mode.

**2、Dynmic lung field registration based on the AC RegNet\_V3**

Final lung field registration model ( AC RegNet\_V3)：Scripts/acregnet\_train\_v4.py

Test code file：scripts/acregnet\_test\_v4.py

**3、Evaluation metrics**

scripts/aenet\_compute\_metrics.py

scripts/MSD