SIIM-ACR Pneumothorax Segmentation

Identify Pneumothorax disease in chest x-rays

overview of 54th place solution (silver medal)

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Competition overview

2 stage competition:

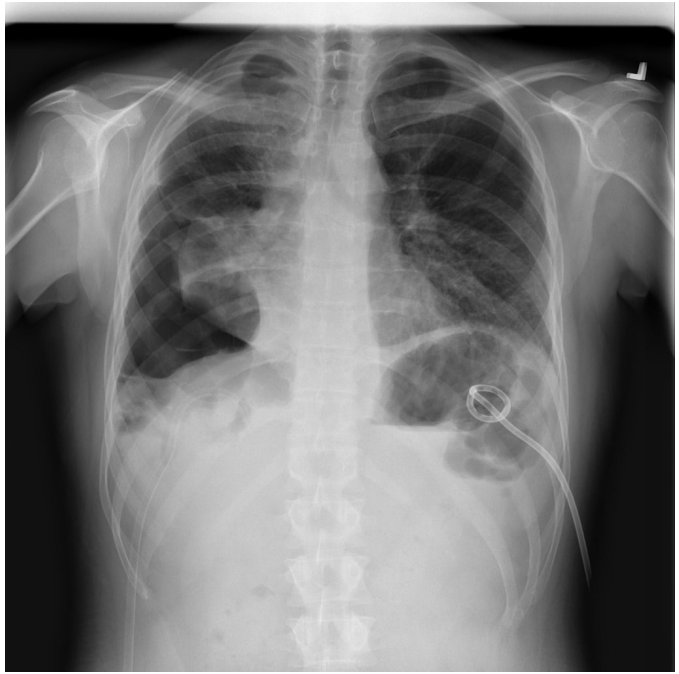
- 1st stage:
  - train set: 10675 images (with class disbalance 0.75/0.25)
  - test set: 2325 images

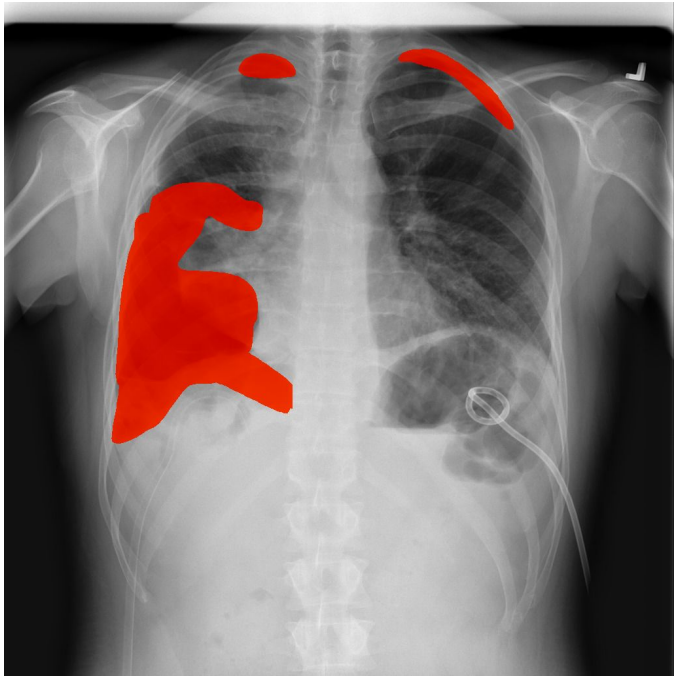
- 2nd stage:
  - train + test set from stage 1
  - test set: 3205 images

Evaluation metric: Dice coefficient

Data

images with 1024x1024 size



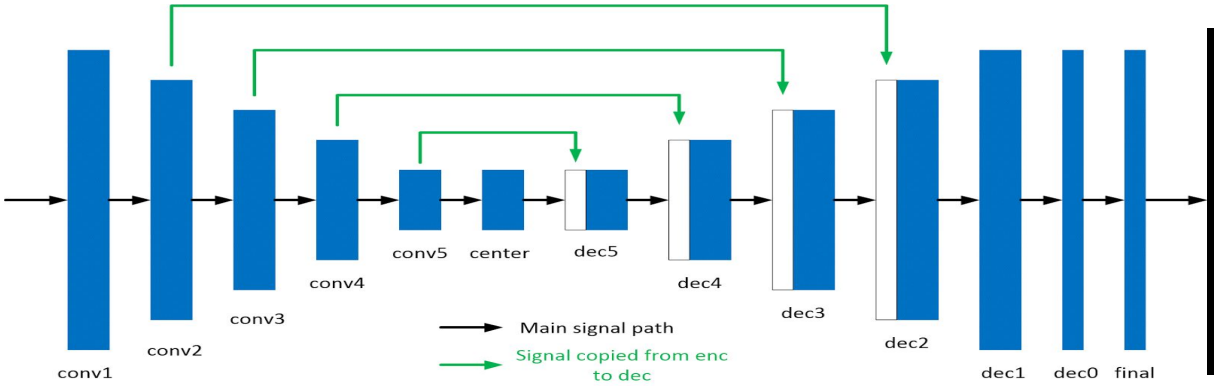


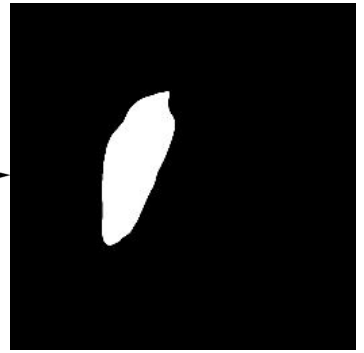
Solution

Model:

Unet with Resnet34 encoder (pretrained on ImageNet)

1. Train on 512x512 size images
2. Finetune on full size





Settings

5 stratified fold by mask area splits in 4 category

augmentation (for augmentations was used Albumentations):

- Horizontal flip
- Random scale
- Rotate
- One of
  - Optical Distortion
  - Elastic Transform
  - Grid Distortion

optimizer: Adam, lr = 1e-5

loss: BCE

Search best threshold from validation

Search threshold for min mask area from validation

Albumentations: https://github.com/albu/albumentations

Take best checkpoint from 80-100 epoch

Tips and tricks

which were not made
or didn`t work :(

- Symmetric Lovasz loss (lovasz loss - https://arxiv.org/pdf/1705.08790.pdf)

  boost on cv, but not on lb

- Pseudo-labeling

  teams from top used this and it boost score

- Use external data
- Large and deeper encoders

  resnet50, seresnext50, senet154 etc.

- Upgrade unet and blend different models

  SCSE, CBAM, ASPP, etc.

- Combo loss