

DEEP:PHI 과제

H9_목해민

Image Segmentation



Input



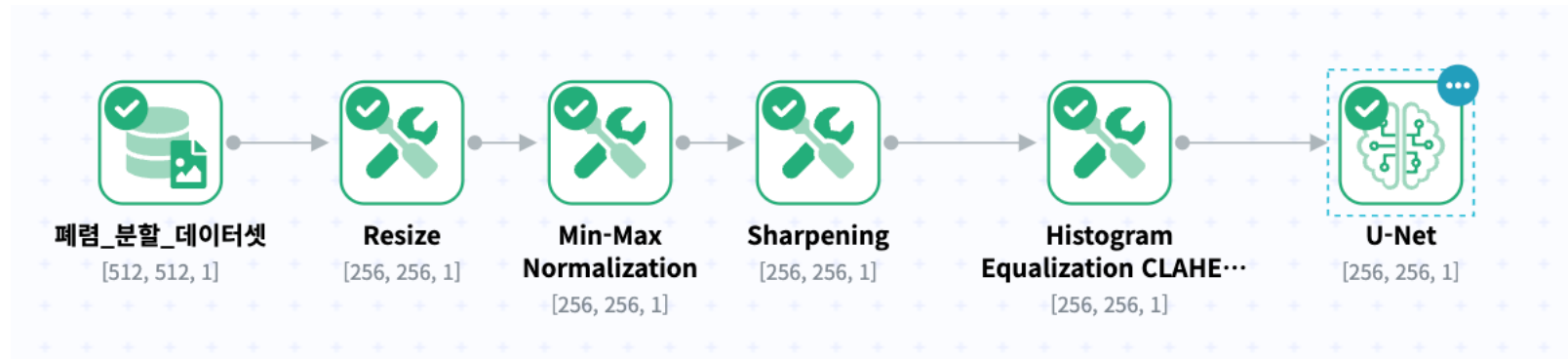
1: Person
2: Purse
3: Plants/Grass
4: Sidewalk
5: Building/Structures

3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5
3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5
3	3	3	3	3	3	1	1	3	3	3	3	3	5	5	5	5	5	5
3	3	3	3	3	3	1	1	1	1	3	3	3	5	5	5	5	5	5
3	3	3	3	3	3	1	1	3	3	3	5	5	5	5	5	5	5	5
5	5	3	3	3	3	1	1	3	3	5	5	5	5	5	5	5	5	5
4	4	3	4	1	1	1	1	1	1	4	4	4	5	5	5	5	5	5
4	4	3	4	1	1	1	1	1	1	4	4	4	4	4	5	5	5	5
4	4	4	1	1	1	1	1	1	1	1	4	4	4	4	4	4	4	4
3	3	3	1	1	1	1	1	1	1	1	4	4	4	4	4	4	4	4
3	3	3	1	2	2	1	1	1	1	1	4	4	4	4	4	4	4	4
3	3	3	1	2	2	1	1	1	1	1	4	4	4	4	4	4	4	4

Semantic Labels

- 이미지의 각 픽셀이 어느 클래스에 속하는지 예측
- 목적 : 사진에 있는 모든 픽셀을 해당하는 class로 분류

Lung Segmentation



Lung Segmentation

Files							
File Download							
Explore View							
Results : 241							
Data Usage							
Search							
<input type="checkbox"/>	No	Path / File Name	Shape	Color Mode	Dimension	Usage	Size
<input type="checkbox"/>	1	ID_0000_Z_0142.hdf5	[512, 512, 1]	Gray	2D	Train	1 MB
<input type="checkbox"/>	2	ID_0001_Z_0146.hdf5	[512, 512, 1]	Gray	2D	Train	1 MB
<input type="checkbox"/>	3	ID_0002_Z_0162.hdf5	[512, 512, 1]	Gray	2D	Train	1 MB
<input type="checkbox"/>	4	ID_0003_Z_0132.hdf5	[512, 512, 1]	Gray	2D	Train	1 MB
<input type="checkbox"/>	5	ID_0004_Z_0066.hdf5	[512, 512, 1]	Gray	2D	Train	1 MB
<input type="checkbox"/>	6	ID_0005_Z_0066.hdf5	[512, 512, 1]	Gray	2D	Train	1 MB
<input type="checkbox"/>	7	ID_0006_Z_0206.hdf5	[512, 512, 1]	Gray	2D	Train	1 MB

여러 종류의 폐 dataset을 upload

Image

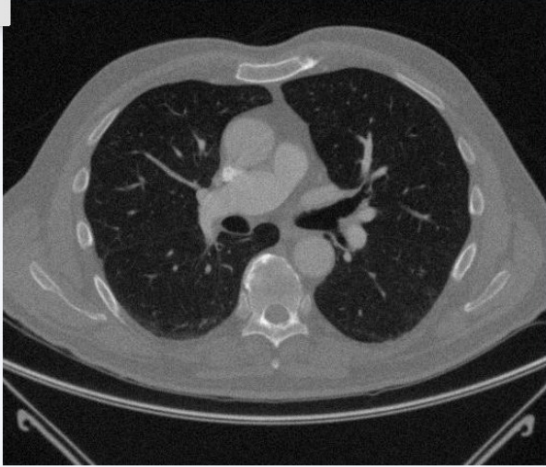
Y, X 308 , 17
Pixel -165.65



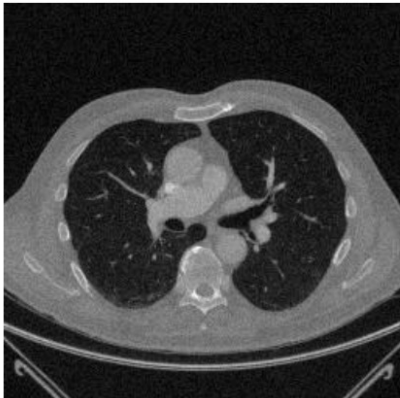
Lung Segmentation

Process Results

Resize



✕ Resize



Resize

서로 다른 이미지의 크기를 동일하게 맞춰준다.

Lung Segmentation



✕ Min-Max Normalization

Selected



Min-Max Normalization

이미지마다 제각각 다른 픽셀 범위를 가지고 있을 경우,
이를 이미지의 최대, 최소 픽셀값을 이용해 $[0, 1]$ 사이로 통일

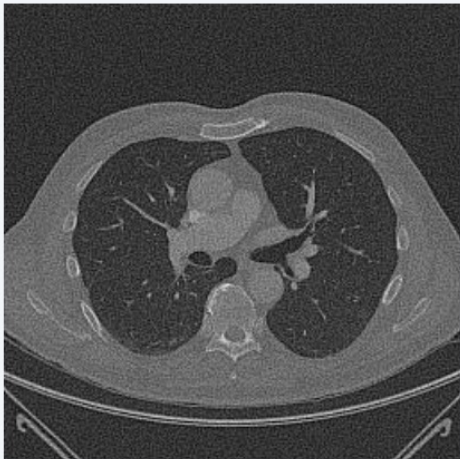
Lung Segmentation



✕ Sharpening

Selected

Sharpening



Sharpening

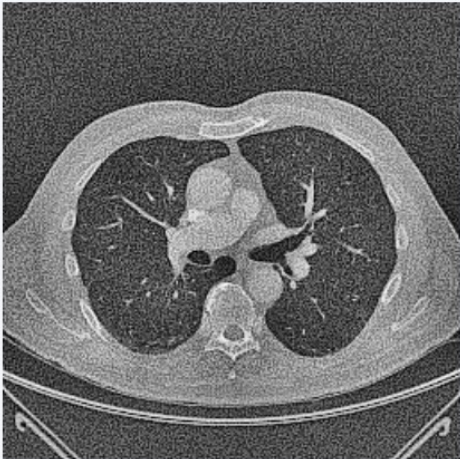
이미지 내의 픽셀 강도의 변화를 강조

Lung Segmentation



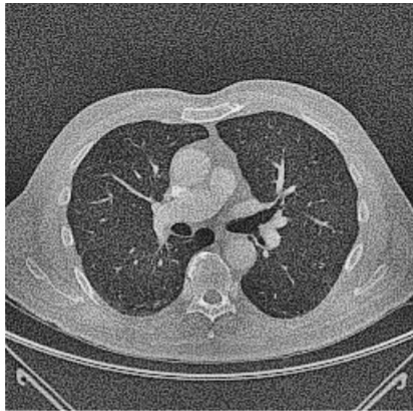
✕ Histogram Equalization CLAHE - Gra...

Selected



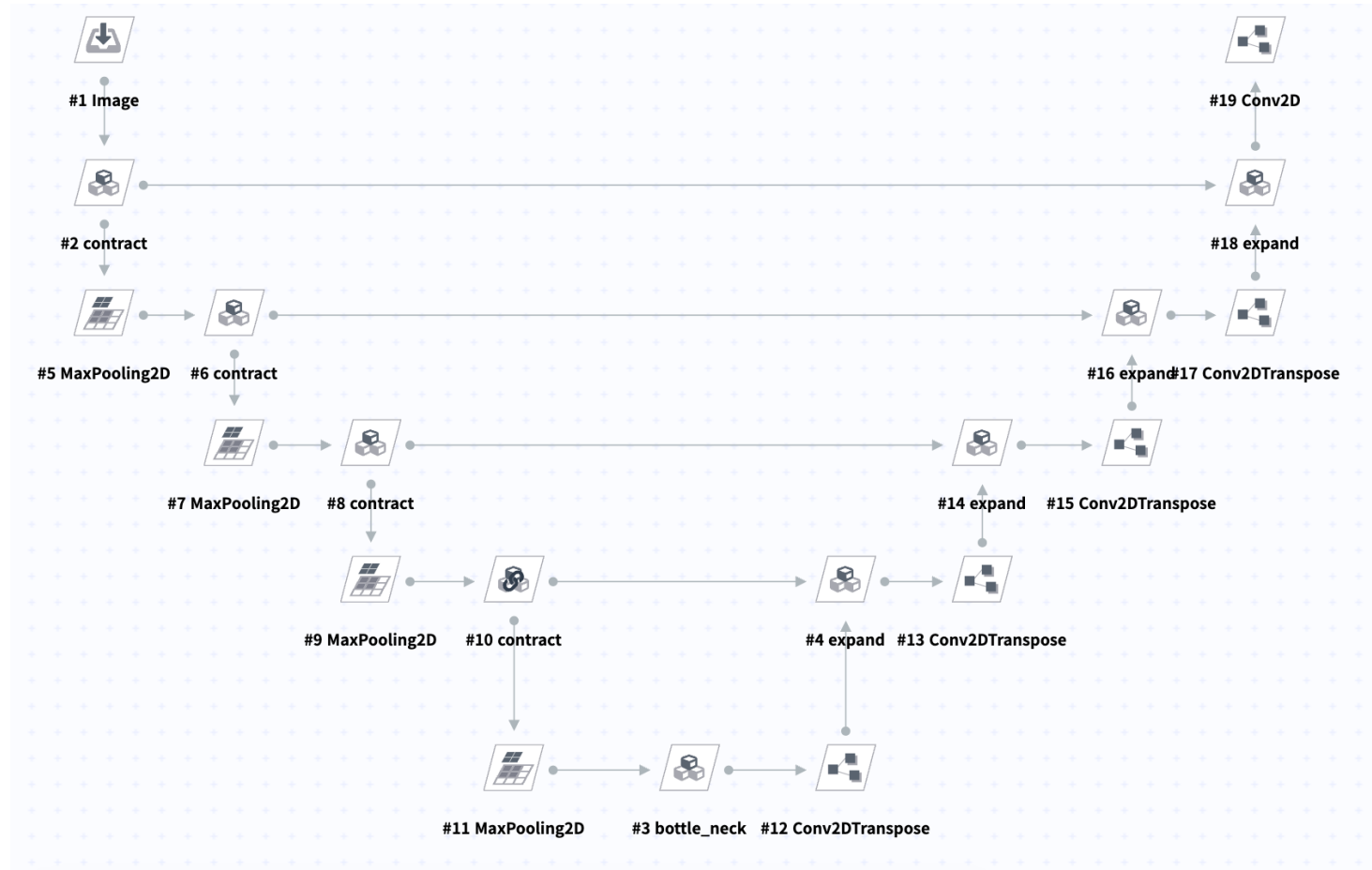
Histogram Equalization CLAHE – Gray
이미지의 contrast 를 늘리는 방법.

Lung Segmentation



U-Net

Selected



U-Net

이미지의 전반적인 컨텍스트 정보를 얻기 위한 네트워크와
정확한 지역화(Localization)를 위한 네트워크가 대칭 형태로 구성

Lung Segmentation

Summary

Epoch20 / 20

Processing Time(Sec/Epoch)	11.3531			
Processing Time(Sec/Batch)	0.8109			
Loss	Train	0.0544	Validation	0.0405
Accuracy	Train	0.9886	Validation	0.9925

	Class	Accuracy	Sensitivity	Specificity	PPV	NPV	Dice	mIoU
Train	background	0.9886	0.9895	0.9856	0.9959	0.9634	0.9927	0.9855
	Lung	0.9886	0.9856	0.9895	0.9634	0.9959	0.9743	0.9504
Validation	background	0.9925	0.9936	0.9890	0.9966	0.9796	0.9951	0.9902
	Lung	0.9925	0.9890	0.9936	0.9796	0.9966	0.9843	0.9690

Lung Segmentation

