Biomedical Computer Vision

Student: Claudia Italiani

Tuesday March 28th

Kidney Tumor Segmentation:

In the context of the KiTS19 Challenge, the **ground truth semantic segmentations** for arterial phase abdominal CT scans of **210** unique kidney cancer patients have been released for model training and validation with the goal to accelerate the development of reliable *kidney and kidney tumor semantic segmentation methodologies.*
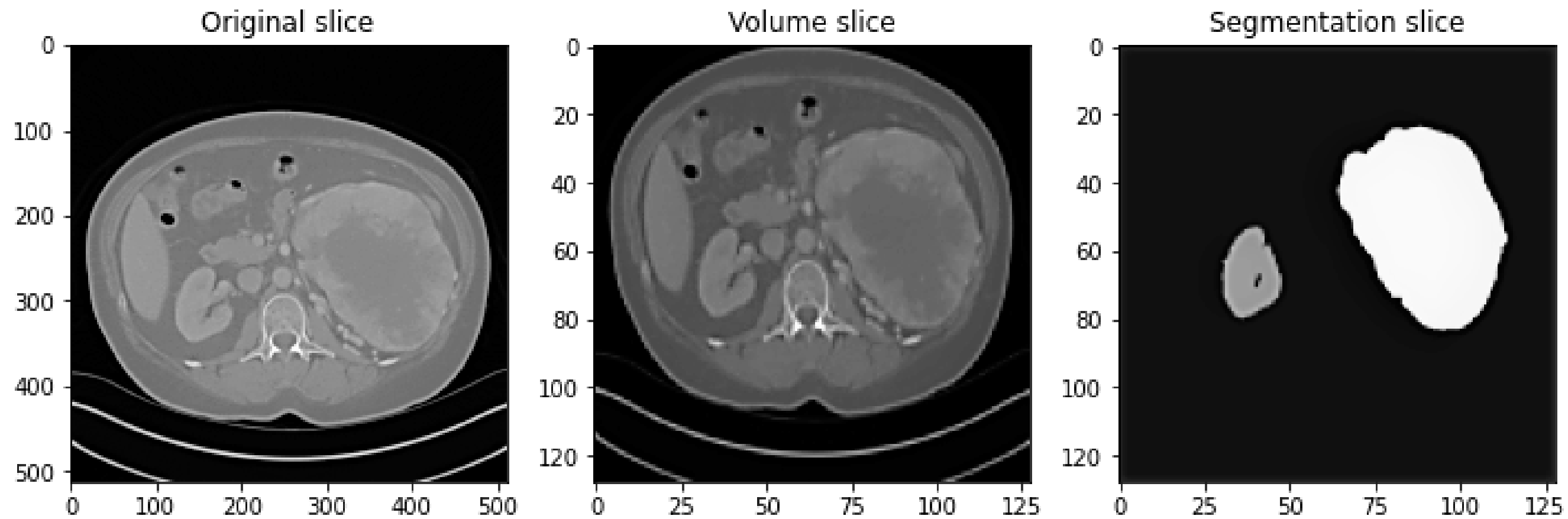
Case Selection:

To reduce the dimension of the dataset, among the 210 cases **48** were selected for model training and validation, with the following characteristics:
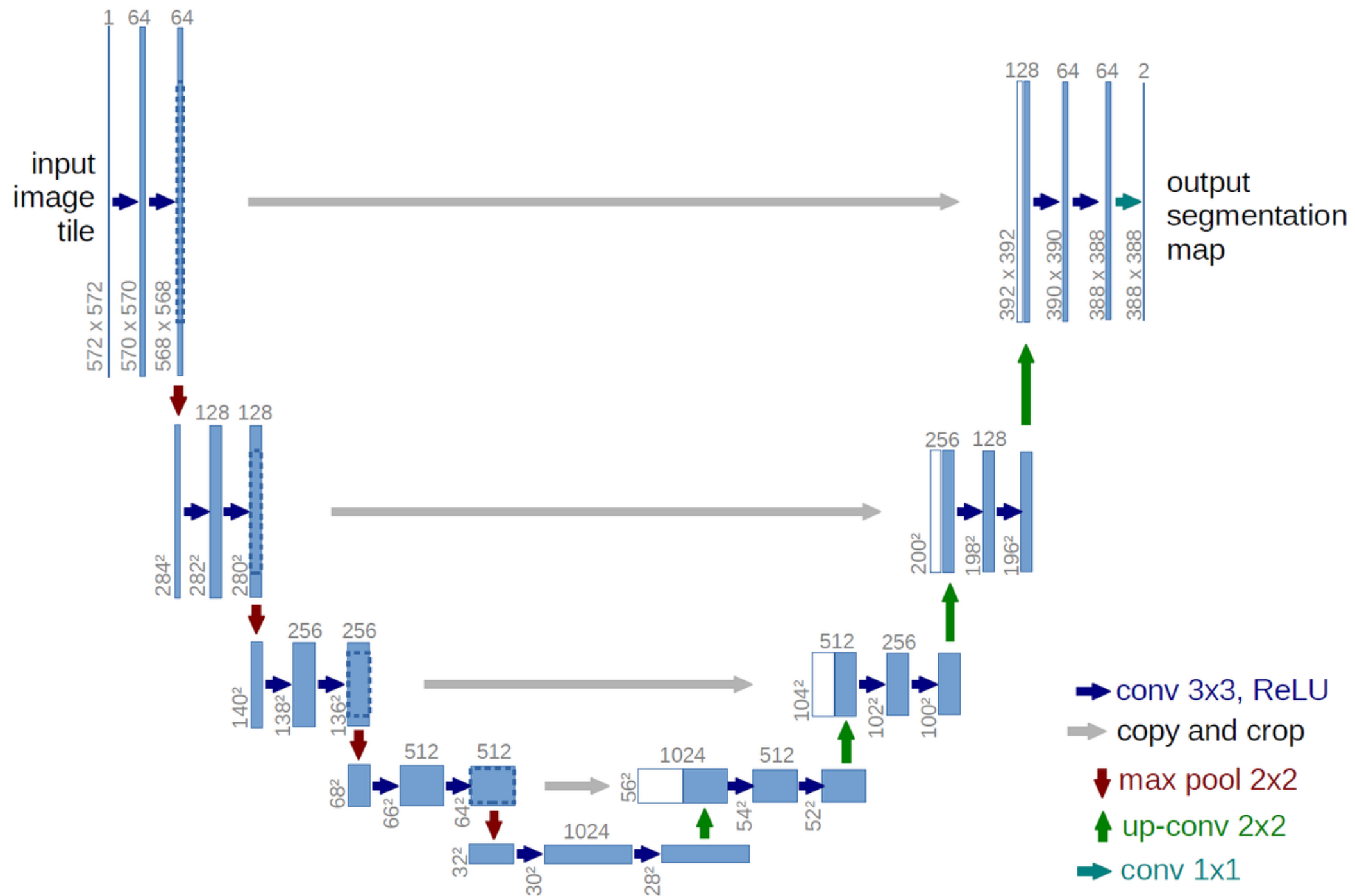
- number of **slices < 110**
- **Hounsfield Units** range **[-1024, 1679]**

Data Preprocessing:

CT scans, in an NIfTI format, were preprocessed using the MONAI framework

Network Architecture:

Ronneberger, Olaf, Philipp Fischer, and Thomas Brox. "U-net: Convolutional networks for biomedical image segmentation."International Conference on Medical image computing and computer-assisted intervention. Springer, Cham, 2015.
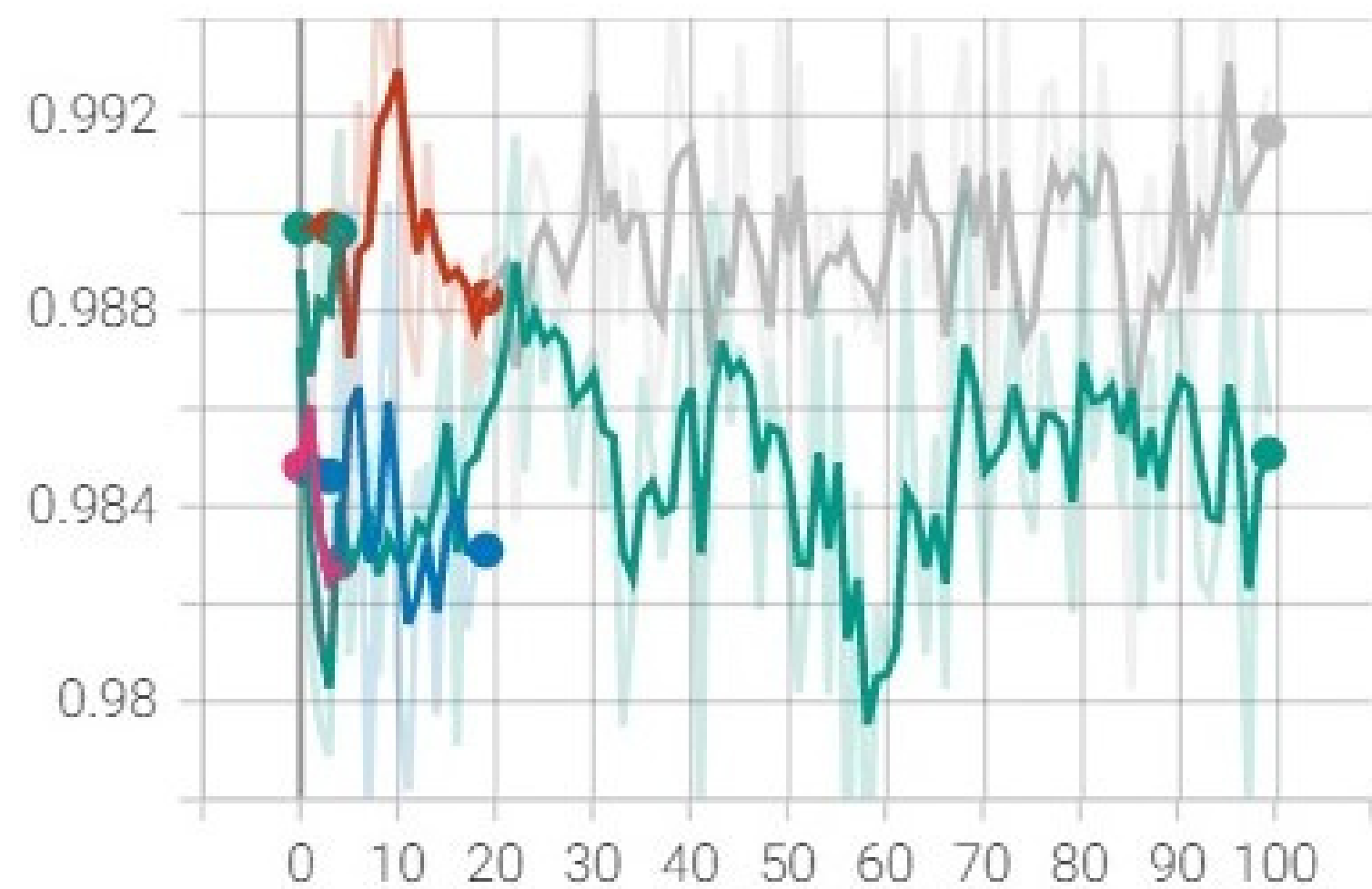
Network Training:

- 2500 training images with batch size of 50
- 1100 validation images with batch size of 22
- Number of Epoch: 5 (50 steps each)
- ReLU activation function
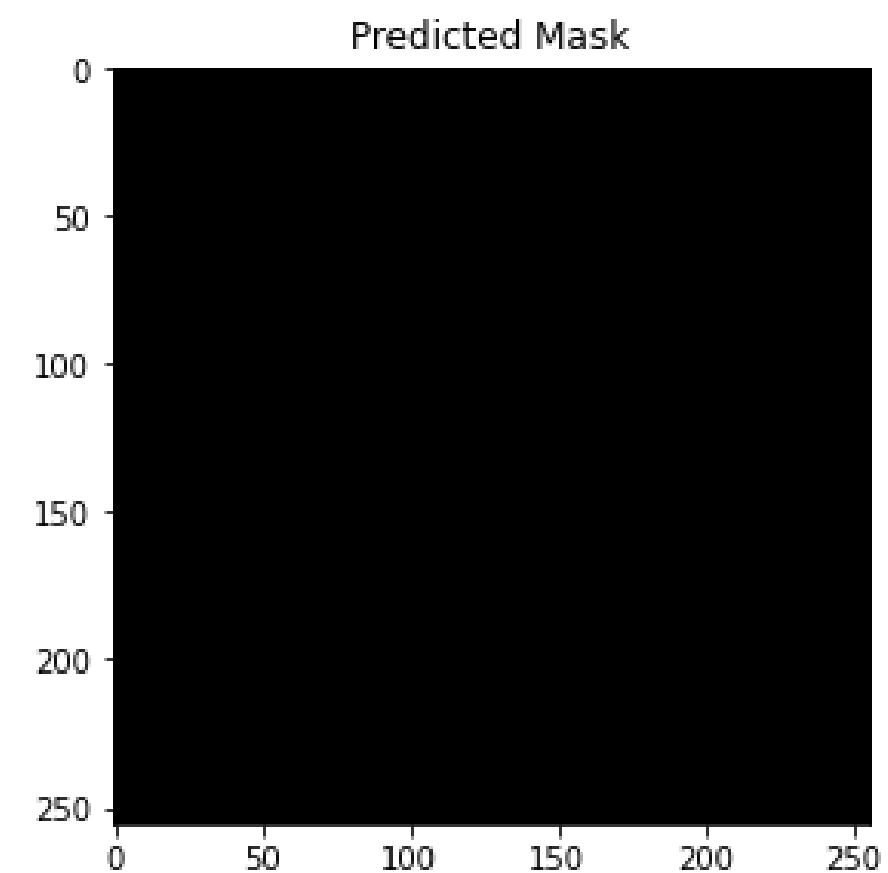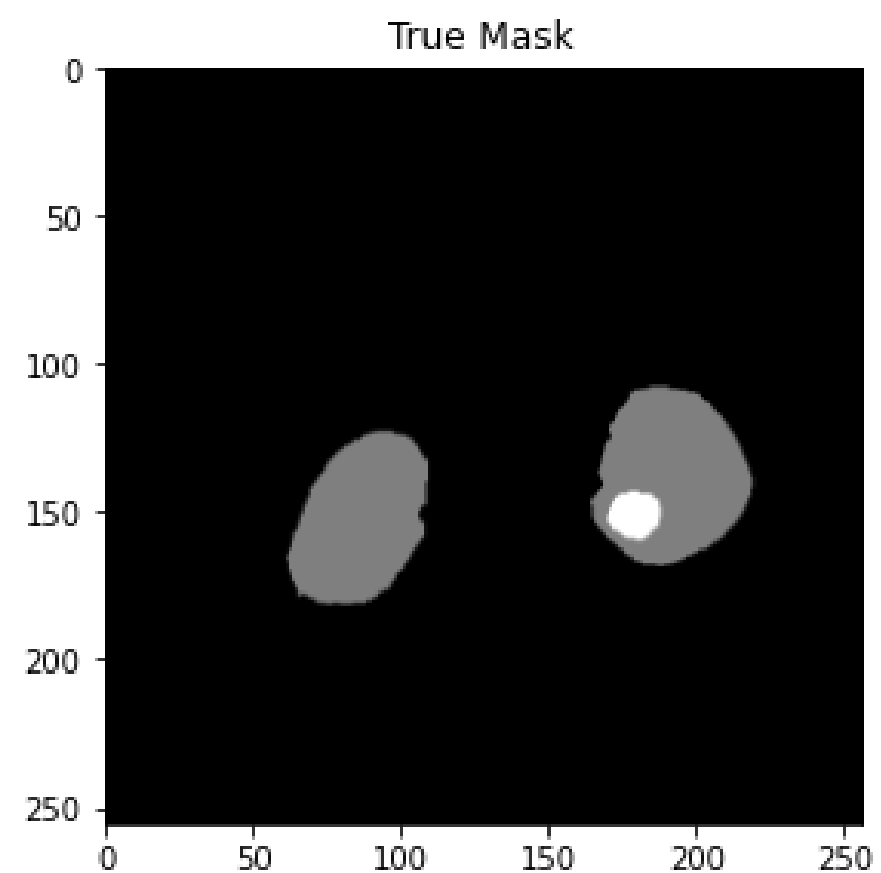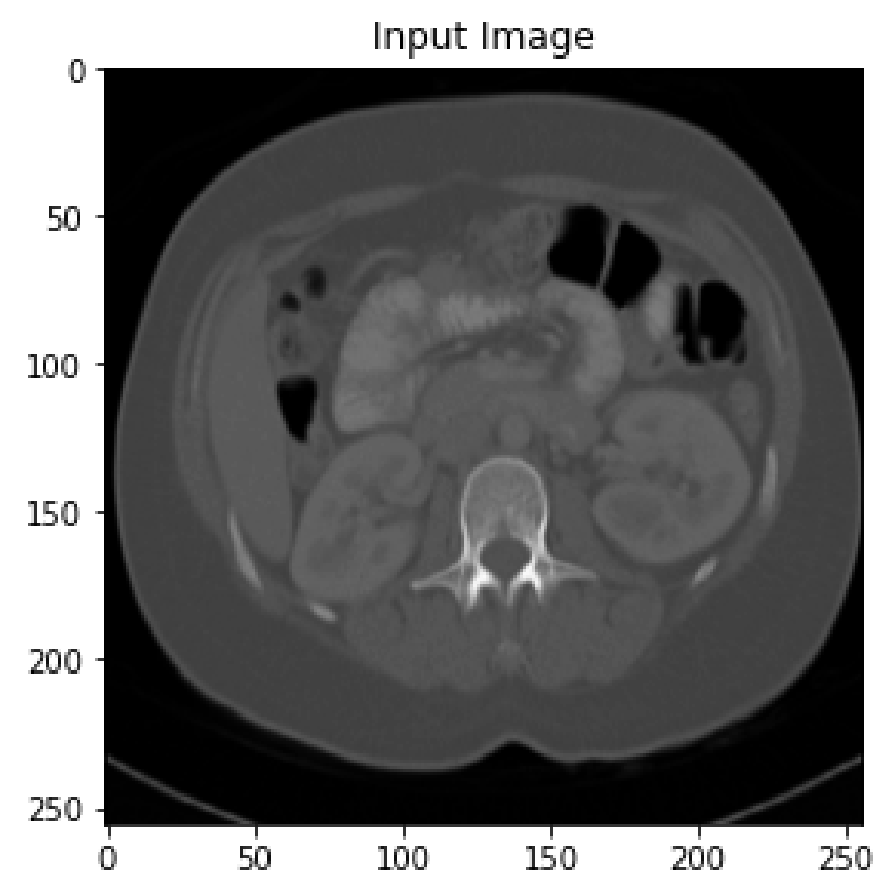- Adam optimizer
- MeanIoU metric

Results:

Accuracy: MeanIoU

Name	Smoothed	Value	Step	Time	Relative
20230320-095145/train	0.9829	0.9833	4	Mon Mar 20, 11:39:59	7m 23s
20230320-095145/validation	0.9896	0.9917	4	Mon Mar 20, 11:39:59	7m 23s
20230321-110949/train	0.9831	0.9832	19	Tue Mar 21, 13:20:52	33m 48s
20230321-110949/validation	0.9883	0.9891	19	Tue Mar 21, 13:20:52	33m 48s
20230321-174852/train	0.9851	0.9858	99	Tue Mar 21, 22:29:15	3h 13m 6s
20230321-174852/validation	0.9917	0.9926	99	Tue Mar 21, 22:29:15	3h 13m 6s
20230322-094136/train	0.9846	0.9843	3	Wed Mar 22, 16:41:17	4h 13m 58s
20230322-094136/validation	0.9897	0.9897	3	Wed Mar 22, 16:41:17	4h 13m 58s
20230322-173635/train	0.9848	0.9848	0	Wed Mar 22, 20:03:16	0s
20230322-173635/validation	0.9897	0.9897	0	Wed Mar 22, 20:03:16	0s

Results:

Biomedical Computer Vision

Student: Claudia Italiani

Tuesday March 28th