Supplementary Materials

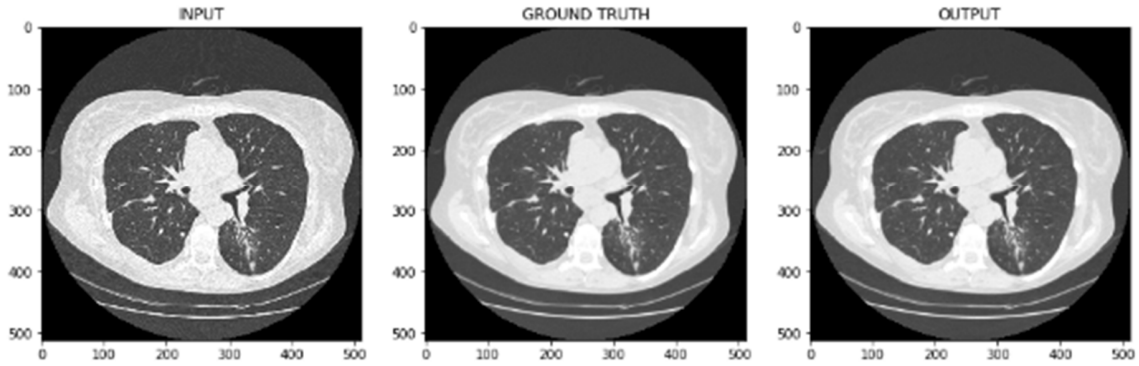

Figure S1. CNN kernel conversion example. An example of kernel conversion using the developed CNN network from sharp kernel (Input) to smooth kernel (Ground Truth). CT images of input (sharp), ground truth (smooth), and output (sharp -> conv_smooth) are shown, respectively.

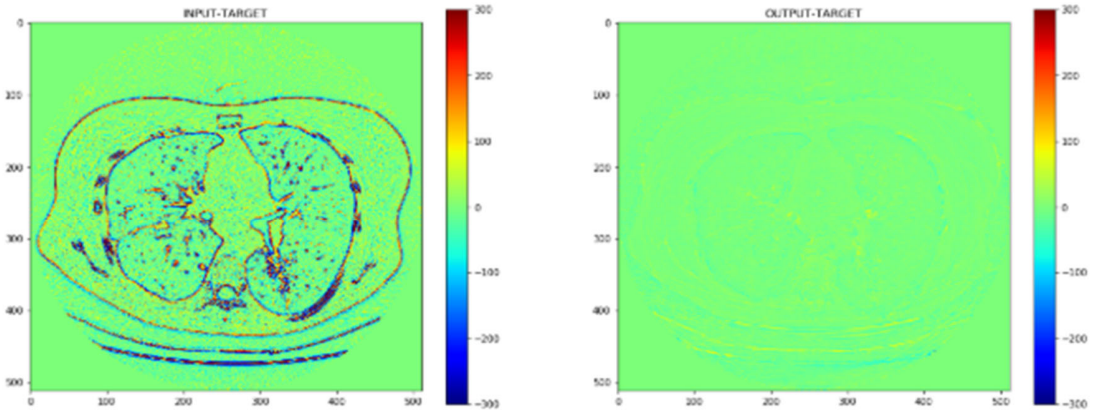

Figure S2. Difference maps. The difference maps are shown to show how much differences there are in the CT images between the input (sharp) and the target (smooth or ground truth) and between the output (conv_smo) and the target (smooth or ground truth). There was a 99% decrease in RMSE after CNN kernel conversion.

Table S1. CT image scanner parameters for the development cohort.

Scanning parameters	GE LightSpeed 16 (n = 28)	GE VCT (n = 4)
Tube voltage	120 kVp	120 kVp
Tube current	299-441 mA	298-351 mA
Collimator configuration	16 x 1.25 mm	64 x 0.63 mm
Pitch	1.375	0.984
In-plane resolution	0.51 x 0.51 – 0.90 x 0.90	0.50 x 0.50 – 0.87 x 0.87
Slice thickness	1.25 mm	1.25 mm
Reconstruction algorithm	Smooth: Standard Sharp: Lung	Smooth: Standard Sharp: Lung
Contrast	No	No

Table S2. CT image scanner parameters for the validation cohort.

Scanning parameters	Siemens Perspective (n = 86)	Siemens Sensation 64 (n = 50)	Siemens SOMATOM Definition AS (n = 12)	Siemens SOMATOM Definition Flash (n = 75)
Tube voltage (kVp)	110 and 130	120	120	120
Tube current (mA)	52 – 329	151 – 415	184 – 661	102 – 691
Exposure (mAs)	600	500	330 and 500	500
Slice interval (mm)	0.7, 0.9 and 1	0.8, 0.9 and 1	0.9 and 1	0.7, 0.8 and 1
Slice thickness (mm)	1	1	1	1
Pixel spacing (mm)	0.48 – 0.81	0.58 – 0.81	0.57 – 0.71	0.53 – 0.83
Reconstruction algorithm	Smooth: B31s Sharp: B70s	Smooth: B30f and B31f Sharp: B70f	Smooth: B31f Sharp: B70f and B80f	Smooth: B30f and B31f Sharp: B60f and B70f

Table S3. A summary table for features groups analyzed in the development cohort.

Group #	Feature Name(s)
1	Shape_Index_8
2	GTDM_Strength, GTDM_Coarseness, EdgeFreq_Coarseness
3	Sigmoid_Offset_Mean
4	Shape_Index_2, Shape_Index_3, Shape_Index_4, Shape_Index_5, Run_PLU, Run_GLU, Uni_2D, Bi_2D, Vol, Uniformity_p4
5	LoG_Entropy_p4
6	Sigmoid_Amplitude_Mean, Intensity_Mean_2D, Intensity_Mean_3D, GLCM_Sum_Average, GLCM_Sum_Variance
7	Eccentricity
8	Spatial
9	Shape_Index_9
10	Solidity, Compact_Factor, Round_Factor
11	LoG_MGI_p1, LoG_MGI_p4
12	DWT_LH, DWT_H, Gabor_dir90
13	Intensity_Std_2D, Intensity_Std_3D, Laws_1, GLCM_Contrast, GLCM_Sum_Squares, Cluster, Laws_2, Laws_3, Laws_5, Laws_6, Laws_8, Laws_11, Laws_12
14	Intensity_Kurtosis_3D, Intensity_Kurtosis_2D
15	EdgeFreq_Contrast, GTDM_Contrast
16	Gabor_dir0, DWT_V, DWT_LV, DWT_LD, Gabor_dir45, DWT_D, Gabor_dir135, Gabor_sum
17	Shape_Index_6, Shape_Index_7
18	Intensity_Skewness_2D, Intensity_Skewness_3D, GLCM_Entropy, GLCM_Diff_Entropy, Run_SPE, Run_PP, EdgeFreq_Mean, LoG_Entropy_p1
19	Run_LPE
20	GLCM_IMC1, Fractal
21	GLCM_IMC2, GLCM_Corr, GLCM_MCC
22	Laws_10, Laws_4, Laws_7, Laws_9, Laws_13, Laws_14, GTDM_Complexity
23	Sigmoid_Slope

Table S4. CCC heatmap for the development cohort with CCC values.

Groups	a) Original smooth vs sharp	b) smooth vs conv_smooth (ori_sharp -> conv_smooth)	c) sharp vs conv_sharp (ori_smooth -> conv_smooth)
1	0.928	0.928	0.928
2	0.876	0.950	0.873
3	0.922	0.977	0.975
4	0.884	0.928	0.957
5	0.833	0.873	0.859
6	0.843	0.935	0.930
7	0.811	0.811	0.811
8	0.515	0.893	0.788
9	0.856	0.856	0.856
10	0.835	0.835	0.835
11	0.624	0.889	0.616
12	0.552	0.770	0.780
13	0.562	0.811	0.780
14	0.361	0.846	0.568
15	0.503	0.802	0.832
16	0.425	0.741	0.749
17	0.717	0.717	0.717
18	0.245	0.876	0.744
19	0.162	0.788	0.744
20	0.128	0.541	0.656
21	0.135	0.556	0.553
22	0.191	0.492	0.481
23	-0.040	0.068	0.049