Supplementary

Appendix 1

(I) Rad-score (intra-tumoral ultrasound radiomics model) = 0.44174757281553406 + 0.032406 × intra_exponential_ngtdm_Busyness – 0.024007 × intra_lbp_3D_m2_glszm_LowGrayLevelZoneEmphasis – 0.023593 × intra_lbp_3D_m2_glszm_SizeZoneNonUniformityNormalized – 0.008471 × intra_squareroot_glcm_MaximumProbability – 0.019700 × intra_squareroot_ngtdm_Strength – 0.006566 × intra_wavelet_HHH_glcm_MaximumProbability – 0.003710 × intra_wavelet_HHH_glrlm_ShortRunHighGrayLevelEmphasis + 0.012468 × intra_wavelet_HHH_glszm_SmallAreaEmphasis + 0.000161 × intra_wavelet_HHH_glszm_SmallAreaHighGrayLevelEmphasis + 0.021125 × intra_wavelet_HLH_gldm_LowGrayLevelEmphasis – 0.003769 × intra_wavelet_HLH_gldm_SmallDependenceLowGrayLevelEmphasis + 0.007456 × intra_wavelet_HLH_glrlm_LowGrayLevelRunEmphasis – 0.028867 × intra_wavelet_HLH_glszm_ZonePercentage – 0.031240 × intra_wavelet_LHH_glrlm_ShortRunLowGrayLevelEmphasis + 0.034541 × intra_wavelet_LHH_glszm_ZoneEntropy

(II) Rad-score (peri-tumoral ultrasound radiomics model) = 0.44174757281104204 + 0.028242 × peri_exponential_gldm_DependenceNonUniformity – 0.019558 × peri_exponential_ngtdm_Coarseness – 0.056011 × peri_lbp_3D_k_ngtdm_Busyness – 0.007923 × peri_lbp_3D_m1_glrlm_RunLengthNonUniformityNormalized + 0.005438 × peri_lbp_3D_m2_firstorder_10Percentile + 0.004866 × peri_lbp_3D_m2_glszm_GrayLevelNonUniformity + 0.042394 × peri_lbp_3D_m2_glszm_SmallAreaHighGrayLevelEmphasis + 0.058387 × peri_lbp_3D_m2_ngtdm_Busyness + 0.006445 × peri_original_glcm_InverseVariance – 0.014347 × peri_original_shape_SurfaceVolumeRatio + 0.000740 × peri_square_glcm_JointEntropy – 0.042895 × peri_wavelet_HHH_gldm_SmallDependenceLowGrayLevelEmphasis + 0.038381 × peri_wavelet_HHH_glrlm_GrayLevelVariance + 0.019826 × peri_wavelet_HHH_glrlm_RunEntropy – 0.007692 × peri_wavelet_HHH_glszm_SizeZoneNonUniformityNormalized – 0.040106 × peri_wavelet_HLH_glszm_SizeZoneNonUniformityNormalized – 0.030913 × peri_wavelet_HLH_glszm_SmallAreaLowGrayLevelEmphasis – 0.047514 × peri_wavelet_HLH_glszm_ZonePercentage + 0.031881 × peri_wavelet_HLL_firstorder_Median – 0.006518 × peri_wavelet_HLL_glcm_Imc2 – 0.011146 × peri_wavelet_LHH_glszm_SizeZoneNonUniformityNormalized + 0.032048 × peri_wavelet_LLH_glszm_SmallAreaHighGrayLevelEmphasis + 0.020177 × peri_wavelet_LLL_glcm_Imc2 – 0.028796 × peri_wavelet_LLL_glcm_JointEnergy

(III) Rad-score (intra-tumoral combined peri-tumoral ultrasound radiomics model) = 0.44174757281243765 + 0.037846 × intra_exponential_ngtdm_Busyness – 0.034499 × intra_lbp_3D_m2_glszm_SizeZoneNonUniformityNormalized + 0.002664 × intra_square_firstorder_Minimum – 0.020038 × intra_squareroot_glcm_MaximumProbability – 0.045041 × intra_squareroot_ngtdm_Strength + 0.002376 × intra_wavelet_HHH_gldm_LargeDependenceHighGrayLevelEmphasis + 0.022352 × intra_wavelet_HHH_glszm_SmallAreaEmphasis – 0.010655 × intra_wavelet_HLH_gldm_DependenceVariance + 0.013130 × intra_wavelet_HLH_gldm_LowGrayLevelEmphasis – 0.016299 × intra_wavelet_HLH_gldm_SmallDependenceLowGrayLevelEmphasis + 0.018620 × intra_wavelet_HLH_glrlm_LowGrayLevelRunEmphasis – 0.008255 × intra_wavelet_HLH_glrlm_ShortRunLowGrayLevelEmphasis – 0.030078 × intra_wavelet_LHH_glrlm_ShortRunLowGrayLevelEmphasis + 0.025930 × intra_wavelet_LHH_glszm_ZoneEntropy – 0.000479 × peri_exponential_ngtdm_Coarseness – 0.039294 × peri_lbp_3D_k_ngtdm_Busyness – 0.009853 × peri_lbp_3D_m2_glrlm_RunLengthNonUniformityNormalized + 0.028628 × peri_lbp_3D_m2_glszm_SmallAreaHighGrayLevelEmphasis +0.032503 × peri_lbp_3D_m2_ngtdm_Busyness – 0.003507 × peri_original_shape_SurfaceVolumeRatio – 0.041759 × peri_wavelet_HHH_gldm_SmallDependenceLowGrayLevelEmphasis + 0.016954 × peri_wavelet_HHH_glrlm_GrayLevelVariance – 0.008628 × peri_wavelet_HLH_glszm_SizeZoneNonUniformityNormalized – 0.026301 × peri_wavelet_HLH_glszm_SmallAreaLowGrayLevelEmphasis – 0.055541 × peri_wavelet_HLH_glszm_ZonePercentage + 0.018472 × peri_wavelet_HLL_firstorder_Median + 0.019173 × peri_wavelet_LLH_glszm_SmallAreaHighGrayLevelEmphasis + 0.013909 × peri_wavelet_LLL_glcm_Imc2

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Appendix 2

(I) Intra-tumoral deep learning SVM model: label = 0.441747572815534 + 0.050511 × intra-DL99 – 0.012917 × intra-DL466 + 0.010750 × intra-DL535 + 0.002416 × intra-DL546 + 0.026286 × intra-DL946 +0.003813 × intra-DL1471

(II) Peri-tumoral deep learning SVM model: label = 0.441747572815534 – 0.054271 × peri-DL80 – 0.013273 × peri-DL131 – 0.002240 × peri-DL369 – 0.014571 × peri-DL720 + 0.022282 × peri-DL729 + 0.004146 × peri-DL783 + 0.013923 × peri-DL1108 + 0.012110 × peri-DL1178 + 0.020860 × peri-DL1179 + 0.005080 × peri-DL1266 – 0.019905 × peri-DL1740

(III) Intra- + peri-tumoral deep learning SVM model: label = 0.441747572815534 + 0.042141 × intra-DL99 – 0.018919 × intra-DL466 + 0.002869 × intra-DL1136 – 0.051437 × peri-DL80 – 0.011430 × peri-DL131 + 0.001990 × peri-DL301 – 0.004400 × peri-DL369 – 0.013929 × peri-DL720 + 0.017384 × peri-DL729 + 0.000587 × peri-DL783 + 0.005235 × peri-DL1108 + 0.010738 × peri-DL1178 + 0.017906 × peri-DL1179 – 0.014824 × peri-DL1740

Appendix 3

(I) Intra-tumoral radiomics-deep learning fusion SVM models: label = 0.441747572815534 – 0.008837 × intra_lbp_3D_m2_glszm_LowGrayLevelZoneEmphasis – 0.002541 × intra_wavelet_HLH_gldm_SmallDependenceLowGrayLevelEmphasis – 0.035894 × intra_wavelet_HLH_glszm_ZonePercentage – 0.002879 × intra_wavelet_LHH_glrlm_ShortRunLowGrayLevelEmphasis + 0.025293 × intra_wavelet_LHH_glszm_ZoneEntropy + 0.044488 × intra-DL99 – 0.004295 × intra-DL466 + 0.001946 × intra-DL535 + 0.002783 × intra-DL1136

(II) Peri-tumoral radiomics-deep learning fusion SVM models: label = 0.44174757281553406 + 0.002960 × peri_lbp_3D_m2_glszm_SmallAreaHighGrayLevelEmphasis + 0.040143 × peri_squareroot_glcm_InverseVariance – 0.004125 × peri_wavelet_HHH_gldm_SmallDependenceLowGrayLevelEmphasis – 0.019342 × peri_wavelet_HHH_glszm_SmallAreaLowGrayLevelEmphasis – 0.009443 × peri_wavelet_HLH_glszm_SizeZoneNonUniformityNormalized – 0.017091 × peri_wavelet_HLH_glszm_ZonePercentage – 0.007802 × peri_wavelet_LHH_glszm_GrayLevelVariance – 0.051591 × peri_DL80 – 0.010067 × peri_DL131 – 0.000913 × peri_DL204 + 0.008153 × peri_DL301 – 0.031397 × peri_DL369 + 0.000550 × peri_DL516 + 0.025843 × peri_DL538 – 0.024842 × peri_DL720 + 0.016614 × peri_DL729 + 0.004348 × peri_DL783 – 0.014626 × peri_DL882 – 0.009470 × peri_DL883 + 0.001624 × peri_DL1093 + 0.021111 × peri_DL1108 + 0.025581 × peri_DL1178 + 0.044318 × peri_DL1179 + 0.002782 × peri_DL1237 + 0.013564 × peri_DL1266 + 0.001930 × peri_DL1332 + 0.017597 × peri_DL1518 – 0.018736 × peri_DL1740 – 0.000761 × peri_DL1912 + 0.006502 × peri_DL1972 + 0.015919 × peri_DL1973

(III) Intra- + peri-tumoral radiomics-deep learning SVM model: label = 0.441747572815534 – 0.042527 × peri_DL80 – 0.008009 × peri_DL720 + 0.009827 × peri_DL729 + 0.003507 × peri_DL1178 + 0.008116 × peri_DL1179 – 0.004200 × peri_DL1740 + 0.029925 × intra-DL99 – 0.011394 × intra_wavelet_HLH_glszm_ZonePercentage + 0.004634 × intra_wavelet_LHH_glszm_ZoneEntropy

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