

MRI Radiomics in Head and Neck Cancer from Reproducibility to Combined Approaches

Supplementary Material

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Influence of the image preprocessing method

The default setting of Pyradiomics for image preprocessing includes a fixed-bin histogram discretization with 25 bins. Optionally, Z-score image standardization can be enabled, as well as voxel size resampling to a specific isotropic resolution (with B-spline interpolator as default option). To assess the impact of the image preprocessing method on the radiomic signature performance, 4 preprocessing settings, listed in Supplementary Table 1, were tested to reproduce R2 and R5, given that a preprocessing method was not declared in the studies. Supplementary Table 2 and Figure 1 provide the performance of R2 and R5 on overall survival prediction and patient high- low-risk stratification, at the 4 different preprocessing methods. It can be noted that the signatures performances are highly affected by the preprocessing method, in terms of C-index, HR, log-rank p-value and Kaplan-Meier curves.

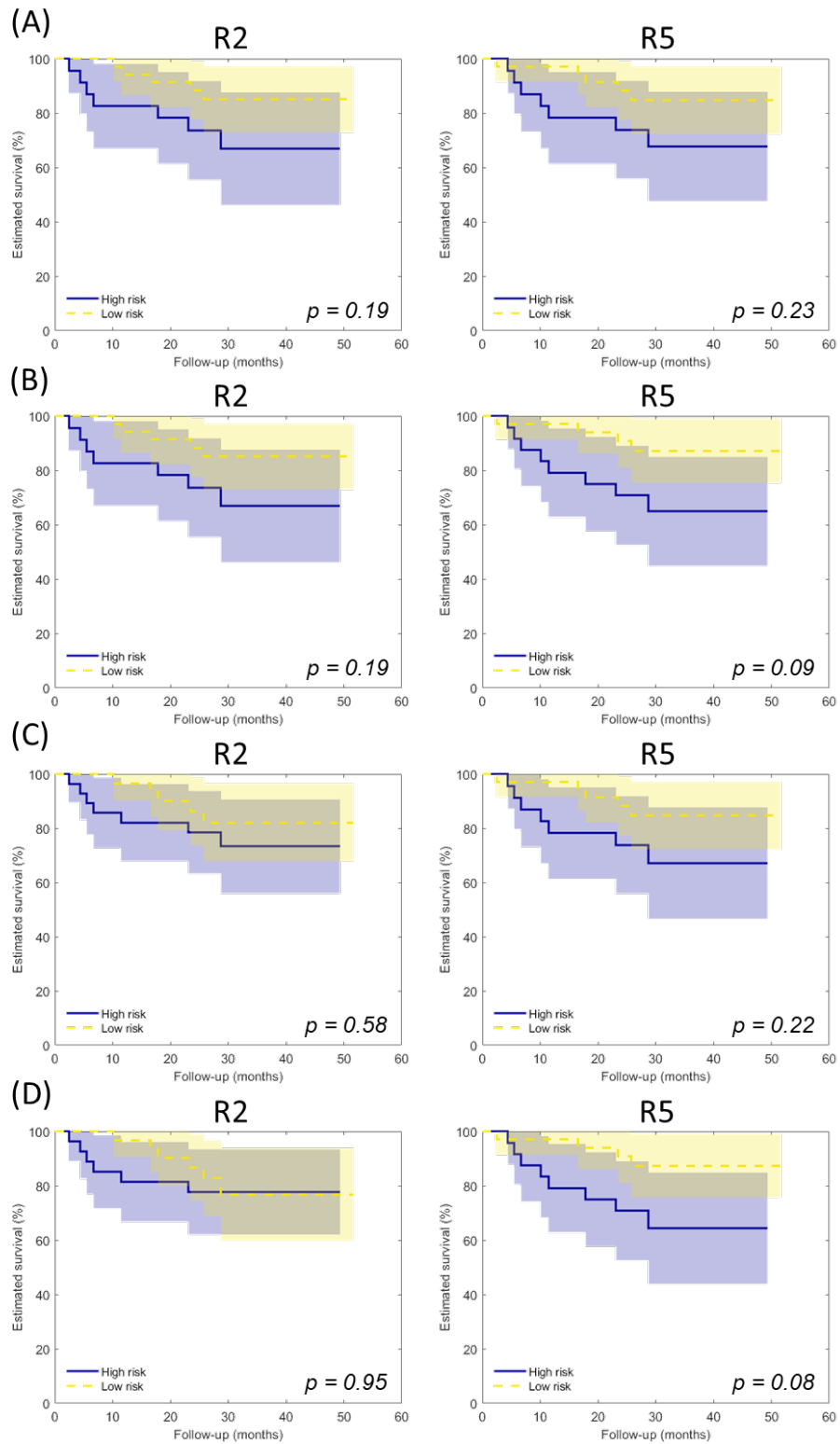
Supplementary Table 1 Image preprocessing methods

Method	histogram discretization	Z-score	Resampling
A	25 bins	Disabled	Disabled
B	25 bins	Enabled	Disabled
C	25 bins	Disabled	Enabled, 3 mm isotropic resolution
D	25 bins	Enabled	Enabled, 3 mm isotropic resolution

Supplementary Table 2 Radiomic signatures prognostic performances at different image preprocessing methods

Signature	Preprocessing method	C-index	Log-rank HR	Log-rank <i>p</i>
R2	A	0.63 [IQR 0.59 0.69]	2.62 [95% CI 0.81 8.53]	0.19
R2	B	0.64 [IQR 0.58 0.71]	2.62 [95% CI 0.81 8.53]	0.19
R2	C	0.61 [IQR 0.57 0.68]	1.62 [95% CI 0.52 5.06]	0.58
R2	D	0.64 [IQR 0.58 0.70]	1.22 [95% CI 0.39 3.82]	0.95
R5	A	0.61 [IQR 0.55 0.67]	2.46 [95% CI 0.76 7.95]	0.23
R5	B	0.64 [IQR 0.55 0.72]	3.29 [95% CI 1.03 10.55]	0.09
R5	C	0.61 [IQR 0.54 0.67]	2.49 [95% CI 0.77 8.03]	0.22
R5	D	0.60 [IQR 0.56 0.68]	3.36 [95% CI 1.05 10.77]	0.08

C-index: Harrel's concordance index; HR: hazard ratio



Supplementary Figure 1 Kaplan-Meier curves for the radiomic signatures R2 and R5 at different image preprocessing methods (A to D), as listed in the Supplementary Table 1.