Radiomic-Based Prediction of Lesion-Specific Systemic Treatment Response in Metastatic Disease

Supplementary Material

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Selected Features

Table S1: *Summary of radiomic features included in best performing models for the prediction of pulmonary lesion-specific systemic treatment response to DM.*

Group	Radiomic Feature		
	Filter	**Class**	**Name**
All lesions	Wavelet-LHL	First Order	Variance (exterior rim)
	LOG (σ = 3mm)	GLDM	Grey Level Variance (lesion core)
	-	Shape	Voxel Volume
|Z| <= 3	Wavelet-LHL	First Order	Variance (exterior rim)
	LOG (σ = 3mm)	GLDM	Grey Level Variance (lesion core)
	LOG (σ = 3mm)	First Order	10th Percentile (exterior rim)
	-	Shape	Voxel Volume

Table S2: *Summary of radiomic features included in best performing models for the prediction of pulmonary lesion-specific systemic treatment response to DE.*

Group	Radiomic Feature		
	Filter	**Class**	**Name**
All lesions	LOG (σ = 4mm)	GLDM	Grey Level Variance (interior rim)
	Logarithm	GLCM	Sum of Squares (lesion core)
	-	Shape	Voxel Volume
|Z| <= 3	Wavelet-HHL	First Order	Variance (lesion core)
	Wavelet-LLH	First Order	Mean (lesion core)
	Logarithm	First Order	Mean (lesion core)
	Wavelet-LHL	GLCM	Cluster Tendency (lesion core)
	-	Shape	Voxel Volume
|Z| > 3	Logarithm	GLCM	Sum of Squares (lesion core)
	Logarithm	First Order	Minimum (interior rim)
	Wavelet-HHL	First Order	Variance (lesion core)
	Wavelet-LHL	GLCM	Cluster Tendency (lesion core)
	-	Shape	Voxel Volume

Hyperparameter Tuning

Hyperparameter tuning was performed with GridSearchCV in Python. This process systematically explores optimal hyperparameters for machine learning models. It involves cross-validation, where the dataset is divided into folds, and each hyperparameter combination is assessed using a separate fold. GridSearchCV automates this process by exhaustively searching through a predefined grid of hyperparameter values to select the best-performing combination based on a specified evaluation metric. The predefined grid of hyperparameters used for this study are in **Table S3**.

Table S3: *Predefined grid of hyperparameters used for GridSearchCV used in this study.*

Hyperparameter	**Options**
‘penalty’	['l1', 'l2', 'elasticnet', None]
'solver'	['lbfgs', 'liblinear', 'newton-cg', 'newton-cholesky', 'sag', 'saga']
'tol'	[1e-4, 1e-5, 1e-6, 1e-7, 1e-8, 1e-9]
'max_iter'	[50,100,150,200]