

Print Checklist

CLEAR Checklist v1.0

[Click here for short version \(CLEAR-S Checklist\)](#)

Note: Use the checklist in conjunction with the main text for clarification of all items. Yes, details provided; No, details not provided; n/e, not essential; n/a, not applicable; Page, page number

Section	No.	Item	Yes	No	n/a	Page
Title						
	1	Relevant title, specifying the radiomic methodology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abstract						
	2	Structured summary with relevant information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Keywords						
	3	Relevant keywords for radiomics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Introduction						
	4	Scientific or clinical background	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5	Rationale for using a radiomic approach	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6	Study objective(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Method						
<i>Study Design</i>						
	7	Adherence to guidelines or checklists (e.g., CLEAR checklist)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	8	Ethical details (e.g., approval, consent, data protection)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9	Sample size calculation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	10	Study nature (e.g., retrospective, prospective)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11	Eligibility criteria	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	12	Flowchart for technical pipeline	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Data</i>						
	13	Data source (e.g., private, public)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	14	Data overlap	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	15	Data split methodology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	16	Imaging protocol (i.e., image acquisition and processing)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	17	Definition of non-radiomic predictor variables	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	18	Definition of the reference standard (i.e., outcome variable)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Segmentation</i>						
	19	Segmentation strategy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	20	Details of operators performing segmentation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Pre-processing</i>						
	21	Image pre-processing details	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	22	Resampling method and its parameters	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	23	Discretization method and its parameters	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	24	Image types (e.g., original, filtered, transformed)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Feature extraction</i>						
	25	Feature extraction method	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	26	Feature classes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	27	Number of features	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	28	Default configuration statement for remaining parameters	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Data preparation</i>						
	29	Handling of missing data	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	30	Details of class imbalance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	31	Details of segmentation reliability analysis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	32	Feature scaling details (e.g., normalization, standardization)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	33	Dimension reduction details	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Modeling</i>						
	34	Algorithm details	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	35	Training and tuning details	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	36	Handling of confounders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	37	Model selection strategy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Evaluation</i>						
	38	Testing technique (e.g., internal, external)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	39	Performance metrics and rationale for choosing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	40	Uncertainty evaluation and measures (e.g., confidence intervals)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	41	Statistical performance comparison (e.g., DeLong's test)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	42	Comparison with non-radiomic and combined methods	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	43	Interpretability and explainability methods	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Results						
	44	Baseline demographic and clinical characteristics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	45	Flowchart for eligibility criteria	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	46	Feature statistics (e.g., reproducibility, feature selection)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	47	Model performance evaluation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	48	Comparison with non-radiomic and combined approaches	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discussion						
	49	Overview of important findings	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	50	Previous works with differences from the current study	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	51	Practical implications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	52	Strengths and limitations (e.g., bias and generalizability issues)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Open Science						
<i>Data availability</i>						
	53	Sharing images along with segmentation data [n/e]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	54	Sharing radiomic feature data	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Code availability</i>						
	55	Sharing pre-processing scripts or settings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	56	Sharing source code for modeling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Model availability</i>						
	57	Sharing final model files	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	58	Sharing a ready-to-use system [n/e]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Kocak B, Baessler B, Bakas S, Cuccolo R, Fedorov A, Maier-Helm L, Mercado N, Müller H, Orhac F, Pinto Dos Santos D, Stanzione A, Ugge L, Zwaneburg A. CheckList for Evaluation of Radiomics research (CLEAR): a step-by-step reporting guideline for authors and reviewers endorsed by ESR and EuSoMI. *Insights Imaging*. 2023 May 4;14(1):75. doi: 10.1186/s13244-023-01415-8

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Supplementary Figure 1 The CheckList for the evaluation of radiomics research.

label = 0.26190476190476175 · \leftarrow
+0.058188 lbp_3D_k_glszm_GrayLevelNonUniformityNormalized · \leftarrow
-0.040007 lbp_3D_k_ngtdm_Complexity · \leftarrow
-0.081151 lbp_3D_m2_glcm_DifferenceVariance · \leftarrow
-0.041802 lbp_3D_m2_glrIm_ShortRunLowGrayLevelEmphasis · \leftarrow
-0.075739 lbp_3D_m2_glszm_SmallAreaLowGrayLevelEmphasis · \leftarrow
-0.036194 log_sigma_1_0_mm_3D_firstorder_90Percentile · \leftarrow
-0.009648 log_sigma_3_0_mm_3D_glszm_LargeAreaLowGrayLevelEmphasis · \leftarrow
+0.175167 square_firstorder_Minimum · \leftarrow
+0.043619 square_glrIm_ShortRunEmphasis · \leftarrow
+0.029183 squareroot_glszm_LargeAreaHighGrayLevelEmphasis · \leftarrow
+0.005697 squareroot_ngtdm_Busyness · \leftarrow
+0.048869 wavelet_HHL_firstorder_MeanAbsoluteDeviation · \leftarrow
-0.097593 wavelet_HHL_gldm_LargeDependenceLowGrayLevelEmphasis · \leftarrow
-0.173061 wavelet_HHL_glszm_SmallAreaHighGrayLevelEmphasis · \leftarrow
+0.034654 wavelet_HLH_glszm_SmallAreaEmphasis · \leftarrow
-0.119326 wavelet_LHH_firstorder_Mean · \leftarrow
-0.011206 wavelet_LHH_glszm_LargeAreaHighGrayLevelEmphasis · \leftarrow
-0.021500 wavelet_LLH_firstorder_Kurtosis · \leftarrow
-0.111329 wavelet_LLL_glcm_JointEnergy \leftarrow

Supplementary Figure 2 The detailed rad-signature formulas.