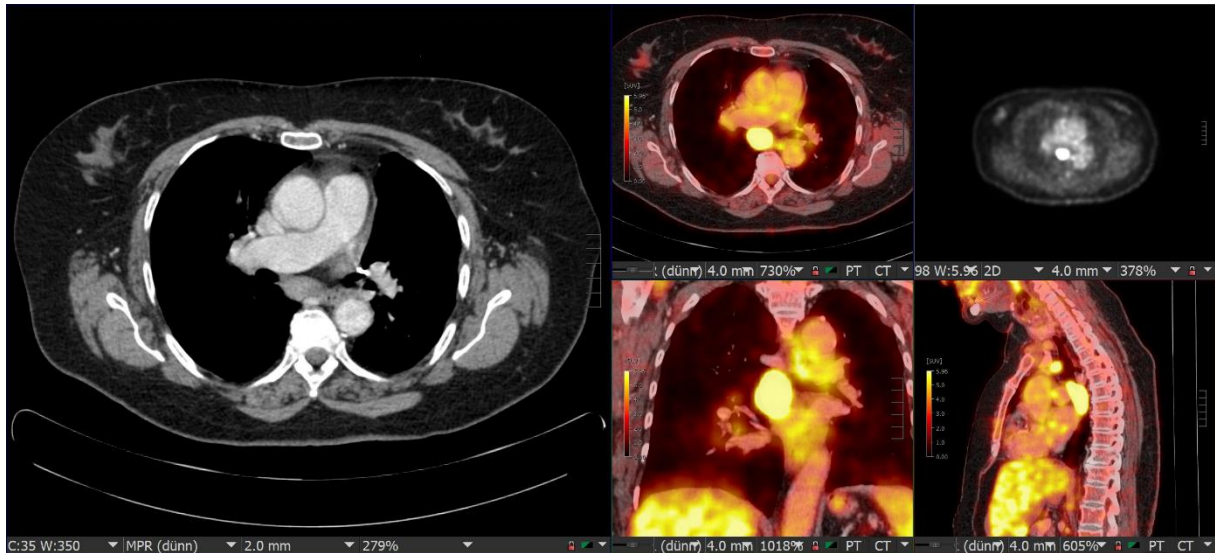


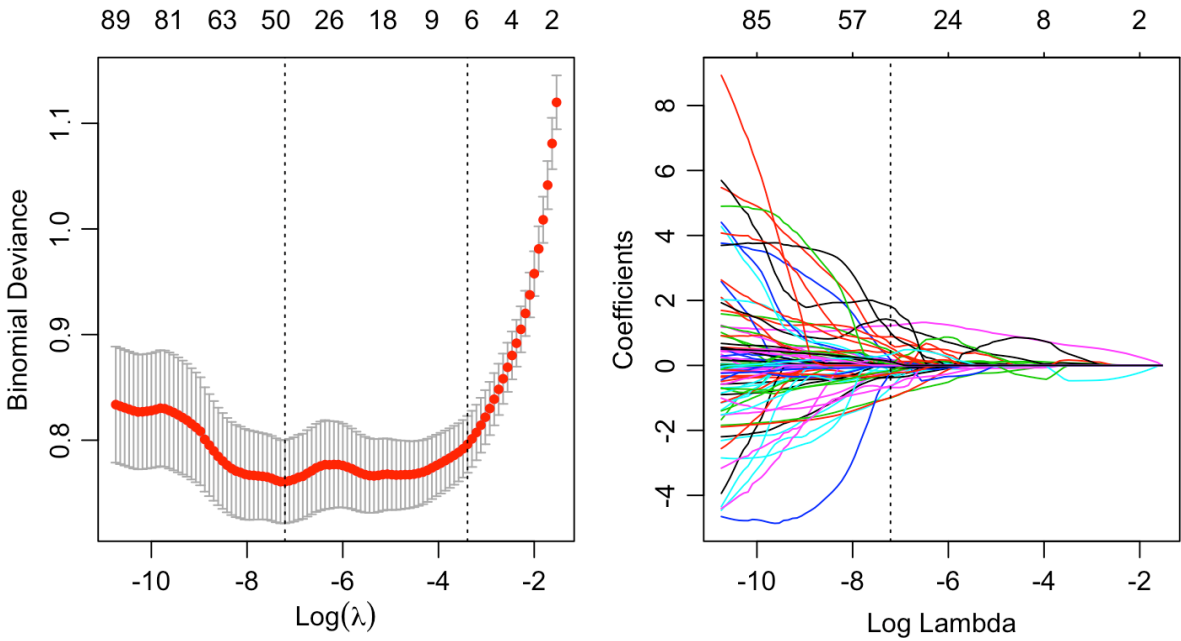
ELECTRONIC SUPPLEMENTARY MATERIAL

Inferring FDG-PET-positivity of lymph node metastases in proven lung cancer from contrast-enhanced CT using radiomics and machine learning

Supplementary Figure 1 Representative lymph node metastases

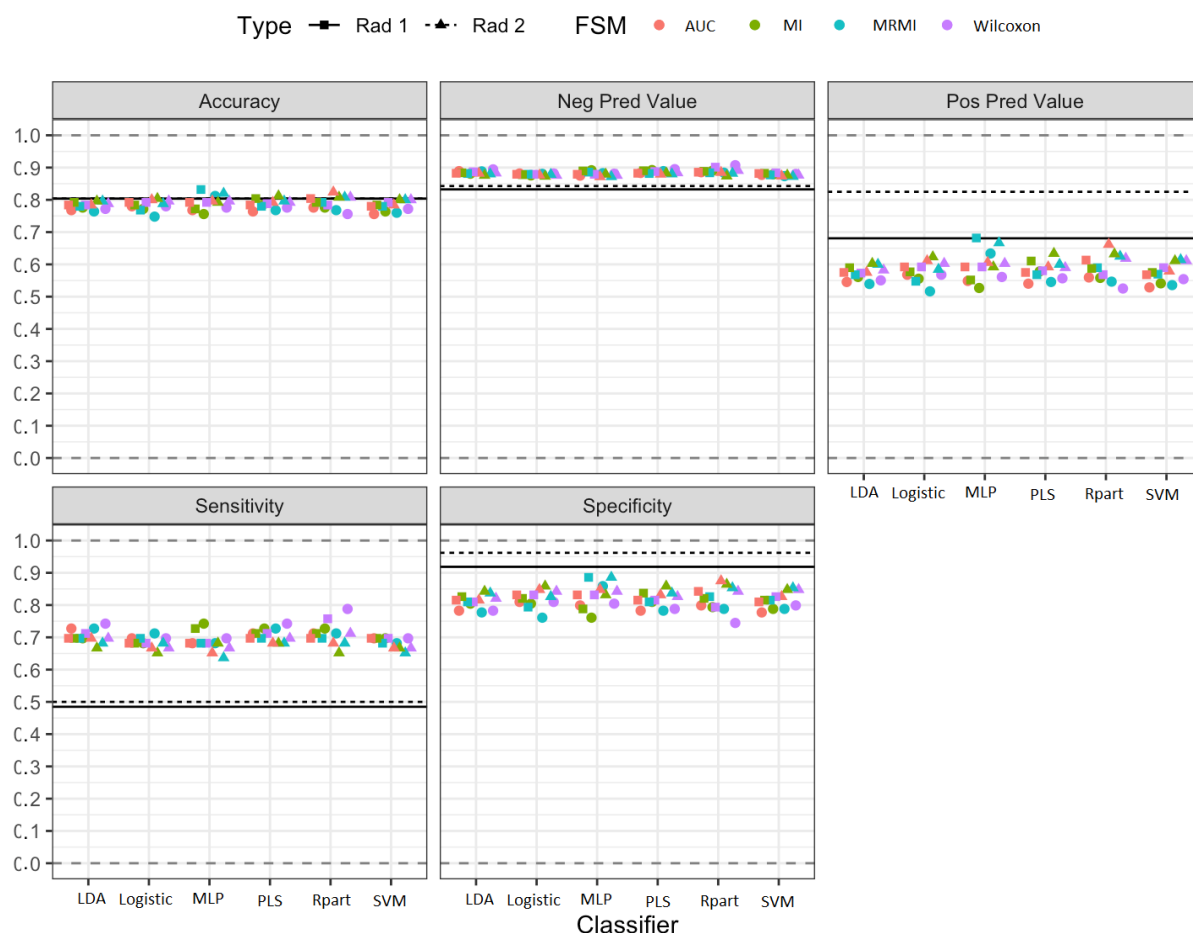


Supplementary Figure 2 Training and cross-validation with LASSO



LASSO Least absolute shrinkage and selection operator

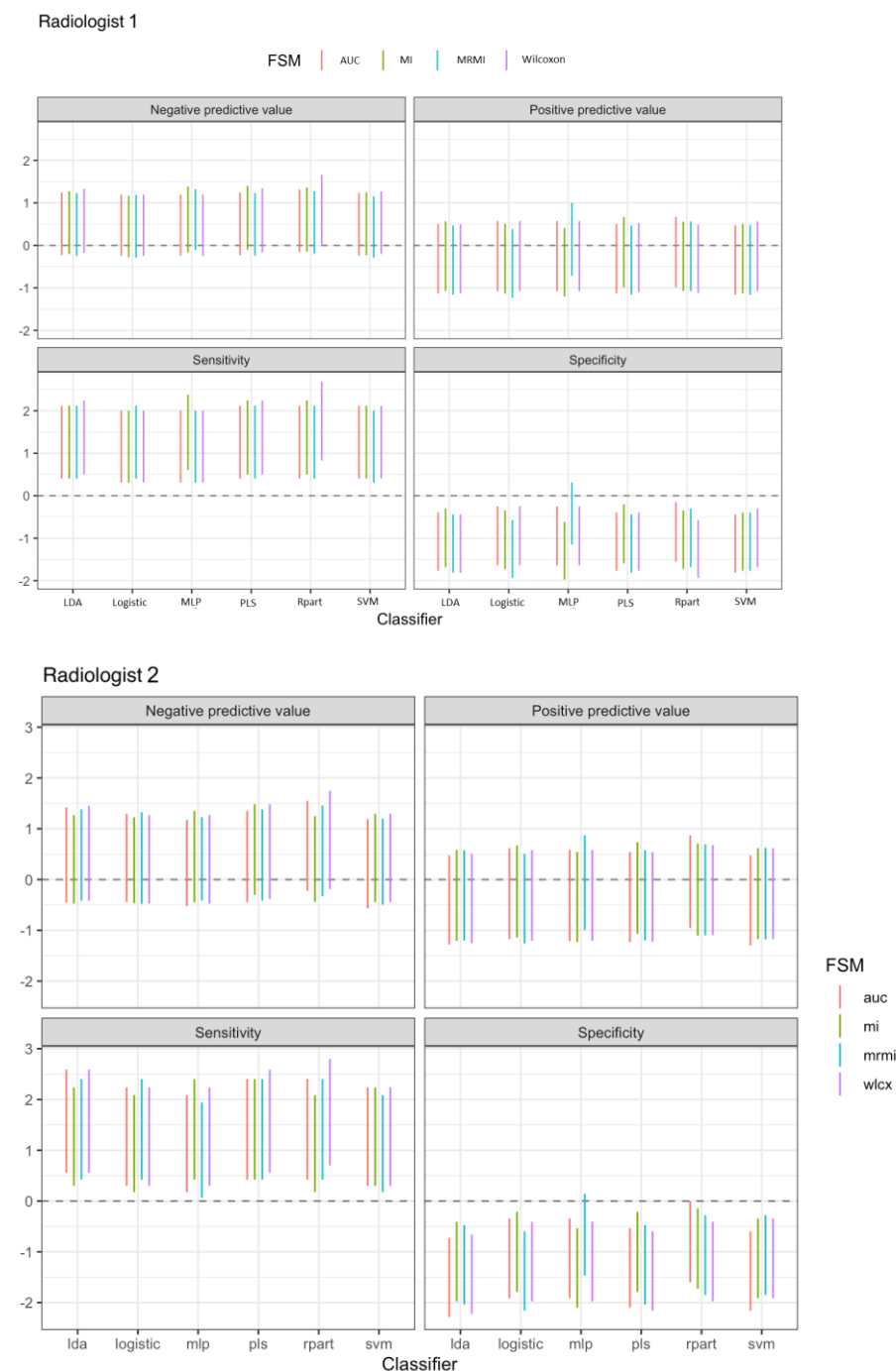
Supplementary Figure 3 Performance comparison of radiomics in the unsure group (likely benign and likely malignant) to expert radiologists and the effect of encountering the prediction model



The circles express the prediction of the respective modeling method and analysis, whereas the triangles and squares express the prediction model encountering radiomics in the unsure group (likely benign and likely malignant) classified by both radiologists.

AUC Area under the curve, *FSM* Feature selection method, *LDA* Linear discriminant analysis, *Logistic* Logistic regression, *MI* Mutual information, *MLP* multilayer perceptron (neural network), *MRMI* Maximum relevance minimum redundancy, *NPV* Negative predictive value, *PLS* Partial least squares, *PPV* Positive predictive value, *Rpart* Recursive partition, *SVM* Support vector machine

Supplementary Figure 4 Performance comparison of radiomics in the unsure group (likely benign and likely malignant) to expert radiologists plotting the 95% confidence interval



AUC Area under the curve, *FSM* Feature selection method, *LDA* Linear discriminant analysis, *Logistic* Logistic regression, *MI* Mutual information, *MLP* multilayer perceptron (neuronal network), *MRMI* Maximum relevance minimum redundancy, *NPV* Negative predictive value, *PLS* Partial least squares, *PPV* Positive predictive value, *Rpart* Recursive partition, *SVM* Support vector machine

Supplementary Table 1 Performance comparison of radiomics and the two expert radiologists

Classifier	FSM	Accuracy	Sensitivity	Specificity	PPV	NPV
Rad 1		0.8	0.48	0.92	0.68	0.83
Rad 2		0.8	0.50	0.96	0.83	0.84
LDA	Wilcoxon	0.77	0.74	0.78	0.55	0.89
LDA	AUC	0.77	0.73	0.78	0.55	0.89
LDA	MI	0.78	0.70	0.80	0.56	0.88
LDA	MRMI	0.76	0.73	0.78	0.54	0.89
Logistic regression	Wilcoxon	0.78	0.70	0.81	0.57	0.88
Logistic regression	AUC	0.78	0.70	0.81	0.57	0.88
Logistic regression	MI	0.77	0.68	0.80	0.56	0.88
Logistic regression	MRMI	0.75	0.71	0.76	0.52	0.88
PLS	Wilcoxon	0.78	0.74	0.79	0.56	0.90
PLS	AUC	0.76	0.71	0.78	0.54	0.88
PLS	MI	0.79	0.73	0.81	0.58	0.89
PLS	MRMI	0.77	0.73	0.78	0.55	0.89
SVM	Wilcoxon	0.77	0.70	0.80	0.55	0.88
SVM	AUC	0.76	0.70	0.78	0.53	0.88
SVM	MI	0.76	0.70	0.79	0.54	0.88
SVM	MRMI	0.76	0.68	0.79	0.54	0.87
MLP	Wilcoxon	0.78	0.70	0.80	0.56	0.88
MLP	AUC	0.77	0.68	0.80	0.55	0.88
MLP	MI	0.76	0.74	0.76	0.53	0.89
MLP	MRMI	0.81	0.68	0.86	0.63	0.88
Rpart	Wilcoxon	0.76	0.79	0.74	0.53	0.91
Rpart	AUC	0.78	0.71	0.80	0.56	0.89
Rpart	MI	0.78	0.73	0.79	0.56	0.89
Rpart	MRMI	0.77	0.71	0.79	0.55	0.88

AUC Area under curve at receiver operating characteristics analysis, *FSM* Feature selection method, *LDA* Linear discriminant analysis, *MI* Mutual information, *MLP* Multilayer perceptron (neuronal network), *MRMI* Maximum relevance minimum redundancy. *NPV* Negative predictive value, *PLS* Partial least squares, *PPV* Positive predictive value, *Rpart* Recursive partition, *SVM* support vector machine

Supplementary Table 2 The effect of encountering radiomics in the unsure group (likely benign and likely malignant) classified by the expert radiologists

Type	Classifier	FSM	Accuracy	Sensitivity	Specificity	PPV	NPV
Rad 1	LDA	Wilcoxon	0.78	0.71	0.81	0.57	0.89
Rad 1	LDA	AUC	0.78	0.70	0.82	0.57	0.88
Rad 1	LDA	MI	0.79	0.70	0.83	0.59	0.88
Rad 1	LDA	MRMI	0.78	0.70	0.81	0.57	0.88
Rad 1	Logistic regression	Wilcoxon	0.79	0.68	0.83	0.59	0.88
Rad 1	Logistic regression	AUC	0.79	0.68	0.83	0.59	0.88
Rad 1	Logistic regression	MI	0.78	0.68	0.82	0.58	0.88
Rad 1	Logistic regression	MRMI	0.77	0.70	0.79	0.55	0.88
Rad 1	PLS	Wilcoxon	0.79	0.71	0.82	0.58	0.89
Rad 1	PLS	AUC	0.78	0.70	0.82	0.57	0.88
Rad 1	PLS	MI	0.80	0.71	0.84	0.61	0.89
Rad 1	PLS	MRMI	0.78	0.70	0.81	0.57	0.88
Rad 1	SVM	Wilcoxon	0.79	0.70	0.83	0.59	0.88
Rad 1	SVM	AUC	0.78	0.70	0.81	0.57	0.88
Rad 1	SVM	MI	0.78	0.70	0.82	0.57	0.88
Rad 1	SVM	MRMI	0.78	0.68	0.82	0.57	0.88
Rad 1	MLP	Wilcoxon	0.79	0.68	0.83	0.59	0.88
Rad 1	MLP	AUC	0.79	0.68	0.83	0.59	0.88
Rad 1	MLP	MI	0.77	0.73	0.79	0.55	0.89
Rad 1	MLP	MRMI	0.83	0.68	0.89	0.68	0.89
Rad 1	Rpart	Wilcoxon	0.78	0.76	0.79	0.57	0.90
Rad 1	Rpart	AUC	0.80	0.70	0.84	0.61	0.89
Rad 1	Rpart	MI	0.79	0.71	0.82	0.59	0.89
Rad 1	Rpart	MRMI	0.79	0.70	0.83	0.59	0.88
Rad 2	LDA	Wilcoxon	0.79	0.70	0.82	0.58	0.88
Rad 2	LDA	AUC	0.78	0.70	0.82	0.57	0.88
Rad 2	LDA	MI	0.80	0.67	0.84	0.60	0.88
Rad 2	LDA	MRMI	0.80	0.68	0.84	0.60	0.88
Rad 2	Logistic regression	Wilcoxon	0.80	0.67	0.84	0.60	0.88
Rad 2	Logistic regression	AUC	0.80	0.67	0.85	0.61	0.88
Rad 2	Logistic regression	MI	0.80	0.65	0.86	0.62	0.87
Rad 2	Logistic regression	MRMI	0.79	0.68	0.83	0.58	0.88
Rad 2	PLS	Wilcoxon	0.79	0.70	0.83	0.59	0.88
Rad 2	PLS	AUC	0.79	0.68	0.83	0.59	0.88
Rad 2	PLS	MI	0.81	0.68	0.86	0.63	0.88
Rad 2	PLS	MRMI	0.80	0.68	0.84	0.60	0.88
Rad 2	SVM	Wilcoxon	0.80	0.67	0.85	0.61	0.88
Rad 2	SVM	AUC	0.78	0.67	0.83	0.58	0.87
Rad 2	SVM	MI	0.80	0.67	0.85	0.61	0.88
Rad 2	SVM	MRMI	0.80	0.65	0.85	0.61	0.87
Rad 2	MLP	Wilcoxon	0.80	0.67	0.84	0.60	0.88
Rad 2	MLP	AUC	0.80	0.65	0.85	0.61	0.87

Rad 2	MLP	MI	0.79	0.68	0.83	0.59	0.88
Rad 2	MLP	MRMI	0.82	0.64	0.89	0.67	0.87
Rad 2	Rpart	Wilcoxon	0.81	0.71	0.84	0.62	0.89
Rad 2	Rpart	AUC	0.82	0.68	0.88	0.66	0.88
Rad 2	Rpart	MI	0.81	0.65	0.86	0.63	0.87
Rad 2	Rpart	MRMI	0.81	0.68	0.85	0.62	0.88

AUC Area under curve at receiver operating characteristics analysis, *FSM* Feature selection method, *LDA* Linear discriminant analysis, *MI* Mutual information, *MLP* Multilayer perceptron (neuronal network), *MRMI* Maximum relevance minimum redundancy. *NPV* Negative predictive value, *PLS* Partial least squares, *PPV* Positive predictive value, *Rpart* Recursive partition, *SVM* support vector machine