**Figure S1** Example of manual segmentation. The figure A displayed MS lesions on T2-FLAIR. The IRL and NIRL showed T2 hyperintense (black and white arrows in figure A), and their corresponding performance on QSM (black arrow corresponded to IRLs and white arrow corresponded to NIRLs in figure B). The figure C showed the manual segmentation of MS lesions (black arrow showed the segmentation area of MS lesion). MS, multiple sclerosis; FLAIR, fluid-attenuated inversion recovery; IRL, iron rim lesion; NIRLs, non-iron rim lesions; QSM, quantitative susceptibility mapping.

Table S1 2-class selected features

| No.	LASSO	reliefF	MI
1	original_glcm_ClusterTendency	original_firstorder_Skewness	log-sigma-5-0-mm-3D_glszm_LowGrayLevelZoneEmphasis
2	original_gldm_SmallDependenceHighGrayLevelEmphasis	wavelet-LHH_glcm_JointEntropy	diagnostics_Image-original_Mean
3	wavelet-LHH firstorder10Percentile	wavelet-LHH_glcm_MaximumProbability	diagnostics_Image-original_Maximum
4	wavelet-LHL_gicm jointAverage	wavelet-LHH_glrlm_RunEntropy	log-sigma-3-0-mm-3D_glszm_LowGrayLevelZoneEmphasis
5	log-sigma-1-0-mm-3D_firstorder_RootMeanSquared	wavelet-LHH_gldm_DependenceEntropy	diagnostics_Image-original_Minimum
6	wavelet-HLH_glszm_GrayLevelNonUniformity	wavelet-HLH_glrlm_RunEntropy	wavelet-HHH_glszm_LowGrayLevelZoneEmphasis
7	wavelet-LLL_glszm_LargeAreaEmphasis	wavelet-HHL_glrlm_RunEntropy	log-sigma-5-0-mm-3D_glszm_SizeZoneNonUniformityNormalized
8		wavelet-HHH_glrlm_RunEntropy	log-sigma-5-0-mm-3D_glszm_GrayLevelNonUniformityNormalized
9			log-sigma-3-0-mm-3D_glszm_GrayLevelNonUniformityNormalized
10			wavelet-HHH_glszm_GrayLevelVariance

Table S2 3-class selected features

No.	LASSO	reliefF	MI
1	log-sigma-1-0-mm-3D_firstorder_Median	original_gldm_LargeDependenceEmphasis	diagnostics_Image-original_Mean
2	log-sigma-1.0-mm.3D_glszm_GrayLevelVariance	wavelet-LHH_glcm_JointEnergy	diagnostics_Image-original_Maximum
3	log-sigma-I-0-mm-3D_firstorder_RootMeanSquared	wavelet-LHH_glcm_MaximumProbability	log-sigma-5-0-mm-3D_glszm_LowGrayLevelZoneEmphasis
4	wavelet-LLH_glszm_GrayLevelNonUniformity	wavelet-LHH_glrlm_GrayLevelNonUniformityNormalized	diagnostics_Image-original_Minimum
5	log-sigma-1-0-mm-3D_gldm_SmallDependenceHighGrayLevelEmphasis	wavelet-LHH_glrlm_LongRunEmphasis	wavelet-HHH_glszm_LowGrayLevelZoneEmphasis
6	wavelet-LLH frstorder_Mean		log-sigma-5-0-mm-3D_glszm_SizeZoneNonUniformityNormalized
7	log-sigma-1-0-mm-3D_glcm_ClusterTendency		log-sigma-5-0-mm-3D_glszm_GrayLevelNonUniformityNormalized
8			log-sigma-3-0-mm-3D_glszm_LowGrayLevelZoneEmphasis
9			wavelet-LHH_glcm_DifferenceAverage
10			wavelet-HHH_glszm_GrayLevelNonUniformityNormalized
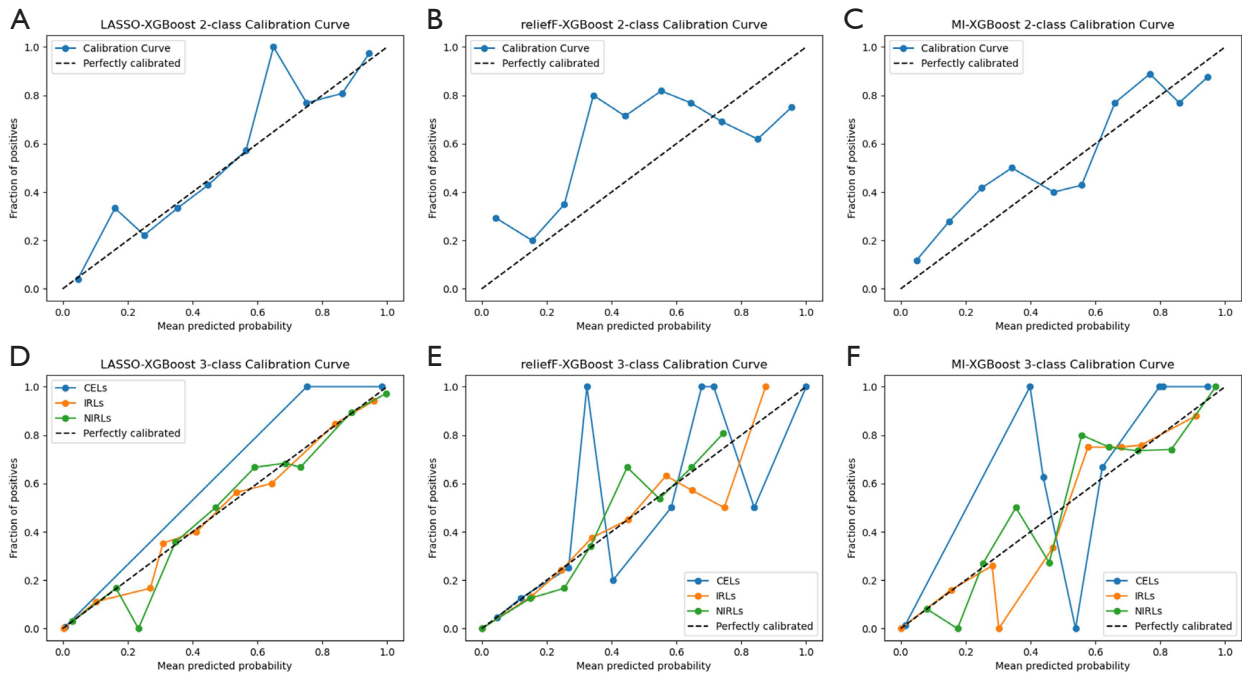
Figure S2 The calibration curve for different XGBoost model. Figure (A-C) showed the XGBoost model for the 2-class classification; Figure (D-F) displayed the XGBoost model for the 3-class classification. XGBoost, eXtreme gradient boosting; LASSO, least absolute shrinkage and selection operator; MI, mutual information.
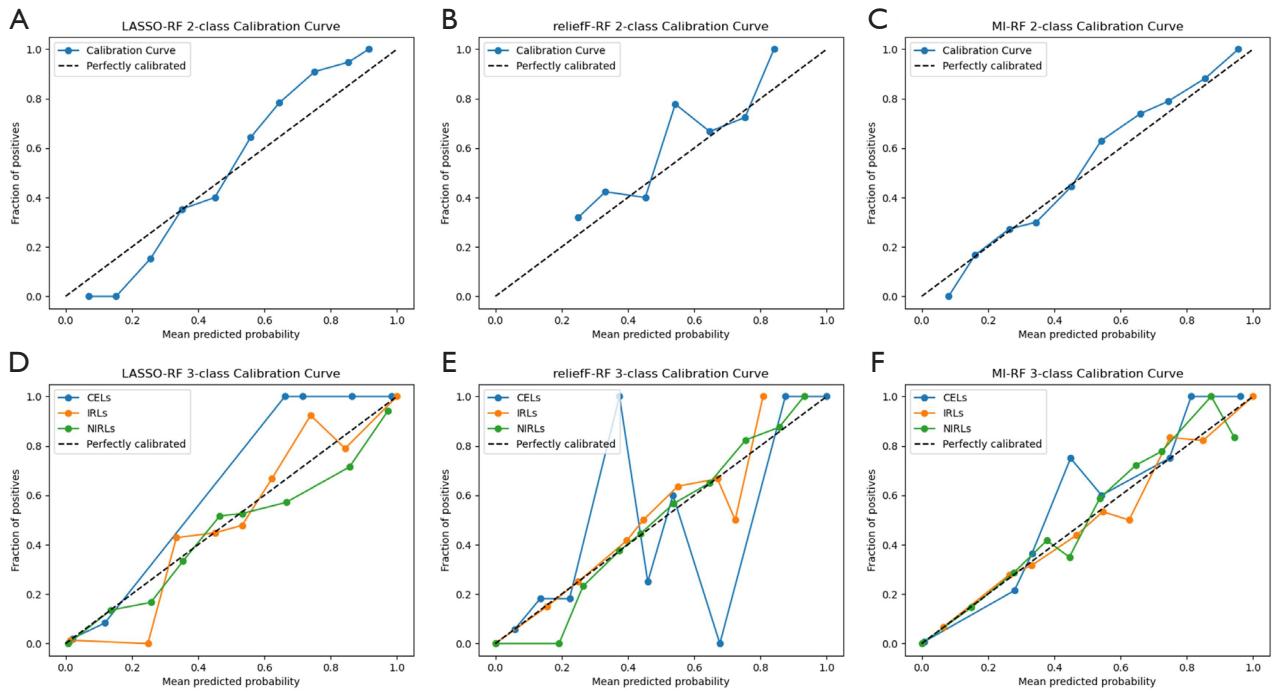
Figure S3 The calibration curve for RF model. Figure (A-C) showed the RF model for the 2-class classification; Figure (D-F) displayed the RF model for the 3-class classification. RF, random forest; LASSO, least absolute shrinkage and selection operator; MI, mutual information.
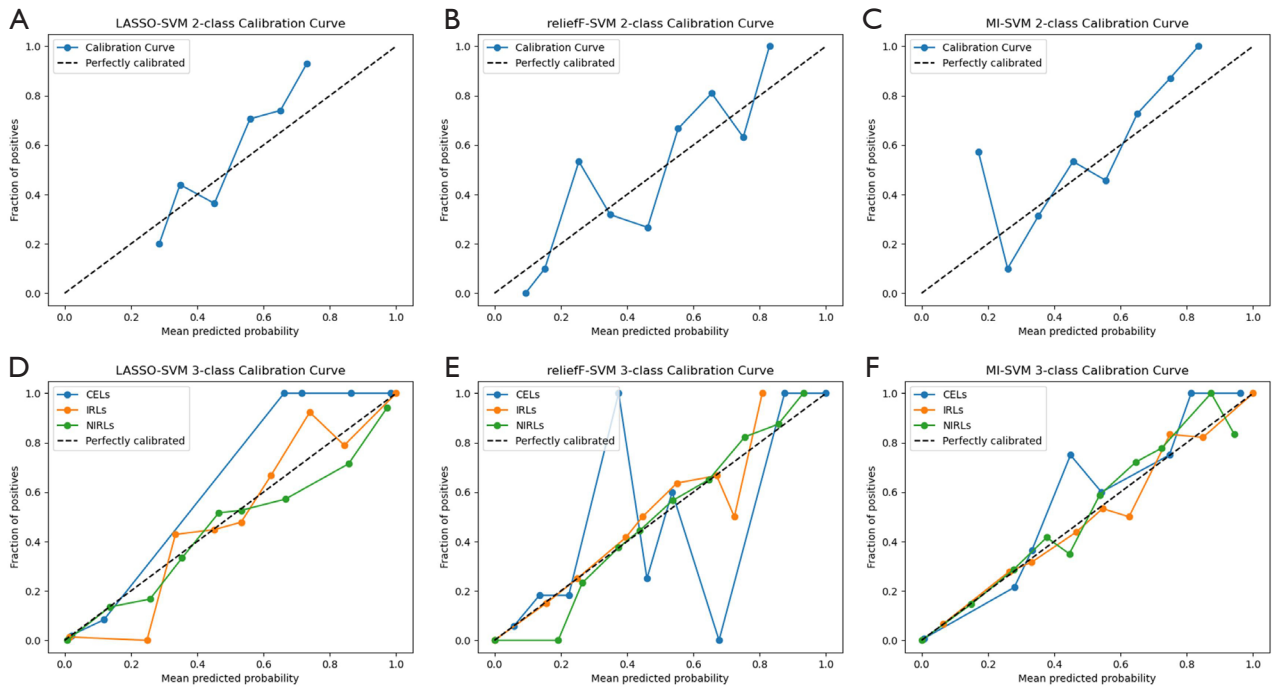
Figure S4 The calibration curve for SVM model. Figure (A-C) showed the SVM model for the 2-class classification; Figure (D-F) displayed the SVM model for the 3-class classification. SVM, support vector machine; LASSO, least absolute shrinkage and selection operator; MI, mutual information.