0815 - Classifier Performances with Selected Radiomics Features

Comparison using different scalers

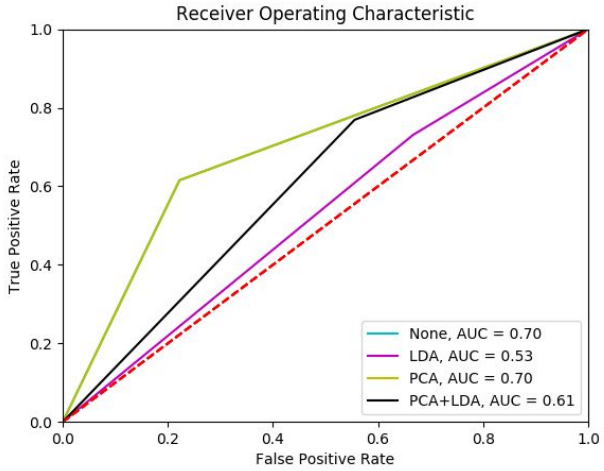
Aug 21, 2019

Update scores to reflect patient level evaluations.

#1 Logistic Regression Classifier Performance

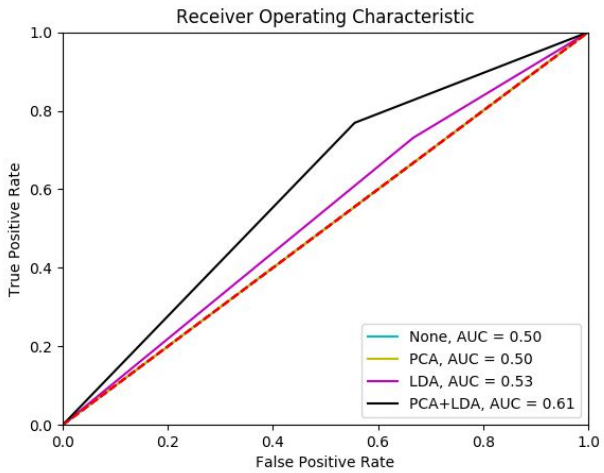
Script file: msc_project_db_and_codes/codes/patient_level_radiomics_lr_pca_lda_pred.py
Results of using Standard Scaler:

Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.41	0.89	0.33	0.73	0.53	
PCA	0.3	0.76	0.78	0.62	0.70	
LDA	0.41	0.89	0.78	0.62	0.70	
PCA+LDA	0.4	0.8	0.44	0.77	0.61	



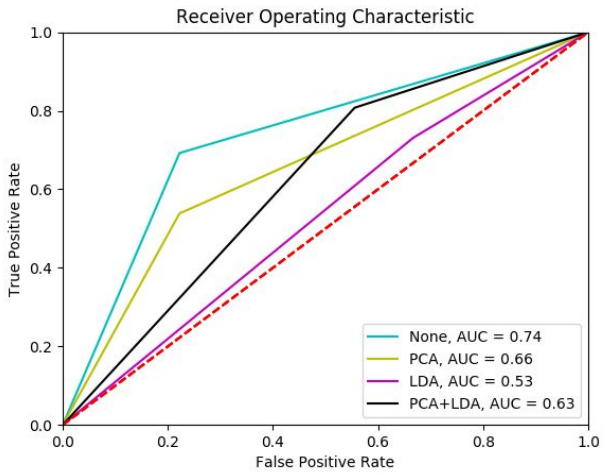
Script file: msc_project_db_and_codes/codes/patient_level_radiomics_lr_pca_lda_pred_v2.py
Results of using MinMax Scaler:

Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0	0.74	0	1	0.5	
PCA	0	0.74	0	1	0.5	
LDA	0.3	0.76	0.33	0.73	0.53	
PCA+LDA	0.4	0.8	0.44	0.77	0.61	



Script file: msc_project_db_and_codes/codes/patient_level_radiomics_lr_pca_lda_pred_rs.py
Results of using Robust Scaler:

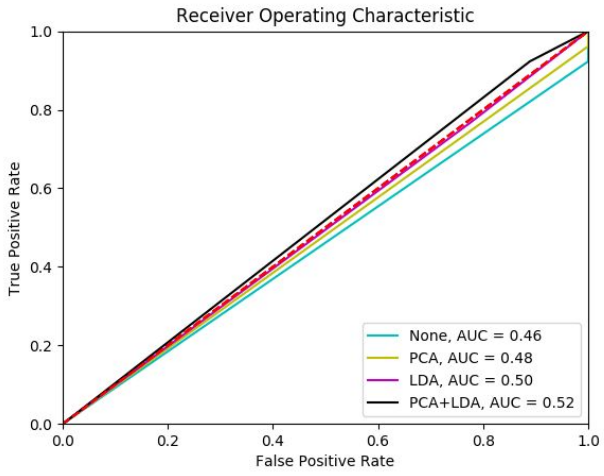
Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.47	0.9	0.78	0.69	0.74	
PCA	0.37	0.88	0.78	0.54	0.66	
LDA	0.3	0.76	0.33	0.73	0.53	
PCA+LDA	0.44	0.81	0.44	0.81	0.63	



#2 Super Vector Machine (SVM) Classifier Performance

Script file: msc_project_db_and_codes/codes/radiomics_svm_pca_lda_pred.py
Results of using Standard Scaler:

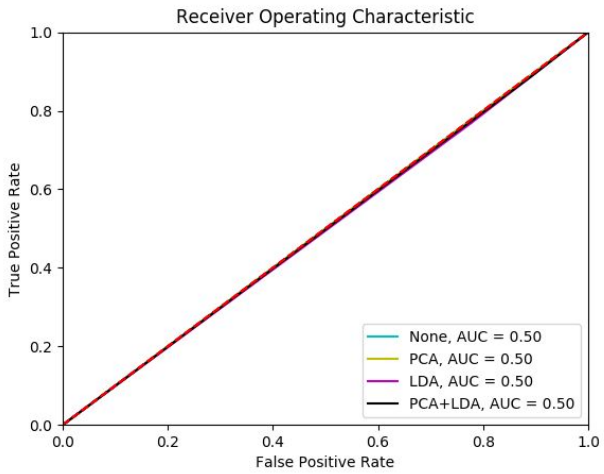
Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0	0.72	0	0.92	0.46	
PCA	0	0.74	0	0.96	0.48	
LDA	0.25	0.74	0.22	0.77	0.50	
PCA+LDA	0.33	0.75	0.11	0.92	0.52	



Script file: msc_project_db_and_codes/codes/radiomics_svm_pca_lda_pred_v2.py
Results of using MinMax Scaler:

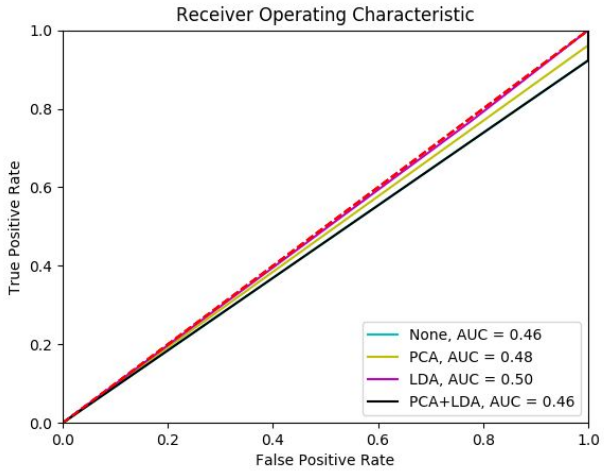
Optimization	Scores	Plot

	Precision		Recall		AUC
	0	1	0	1	
NONE	0	0.74	0	1	0.5
PCA	0	0.74	0	1	0.5
LDA	0.25	0.74	0.22	0.77	0.50
PCA+LDA	0.25	0.74	0.11	0.77	0.50



Script file: msc_project_db_and_codes/codes/patient_level_radiomics_svm_pca_lda_pred_rs_0821.py
Results of using Robust Scaler:

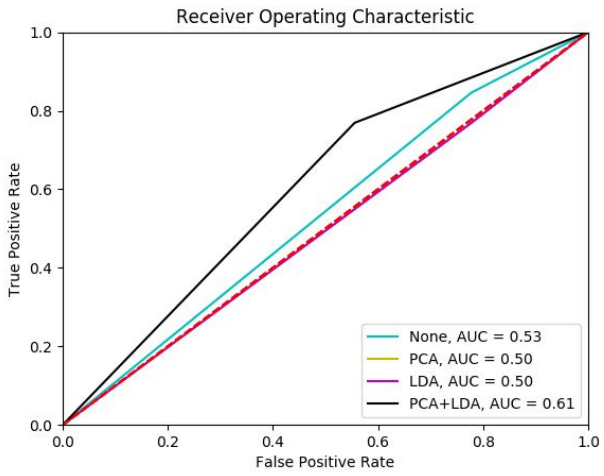
Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0	0.72	0	0.92	0.46	
PCA	0	0.74	0	0.96	0.48	
LDA	0.25	0.74	0.22	0.77	0.50	
PCA+LDA	0	0.73	0	0.92	0.46	



#3 MLP Classifier Performance

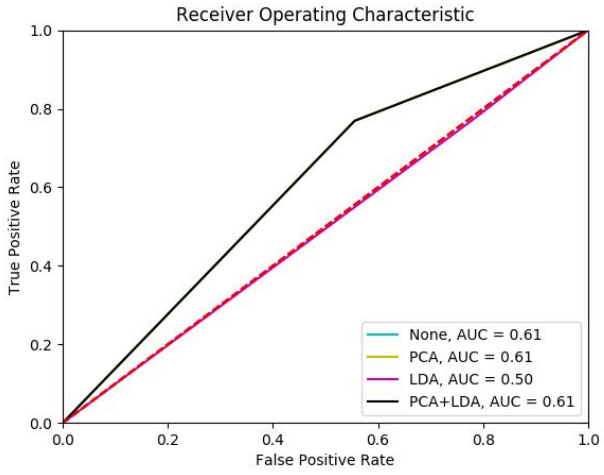
Script file: msc_project_db_and_codes/codes/patient_level_radiomics_mlp_pca_lda_pred_ss_0821.py
Results of using Standard Scaler

Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.33	0.76	0.22	0.85	0.53	
PCA	0.25	0.74	0.22	0.77	0.50	
LDA	0.25	0.74	0.22	0.77	0.50	
PCA+LDA	0.4	0.8	0.44	0.77	0.61	



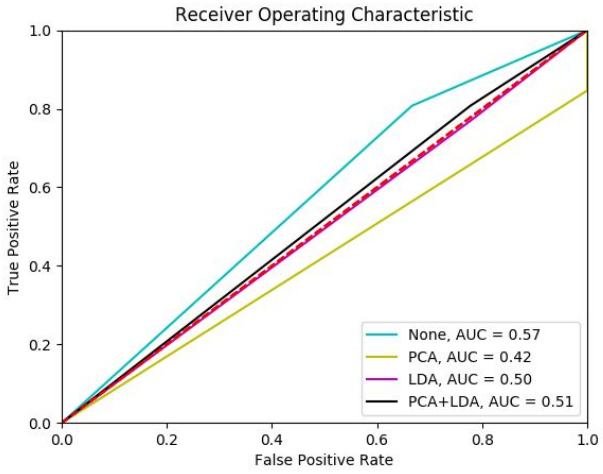
Script file: msc_project_db_and_codes/codes/patient_level_radiomics_mlp_pca_lda_pred_mm_0821.py
Results of using MinMax Scaler

Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.4	0.8	0.44	0.77	0.61	
PCA	0.4	0.8	0.44	0.77	0.50	
LDA	0.25	0.74	0.22	0.77	0.50	
PCA+LDA	0.4	0.8	0.44	0.77	0.61	



Script file: msc_project_db_and_codes/codes/patient_level_radiomics_mlp_pca_lda_pred_rs_0821.py
Results of using Robust Scaler

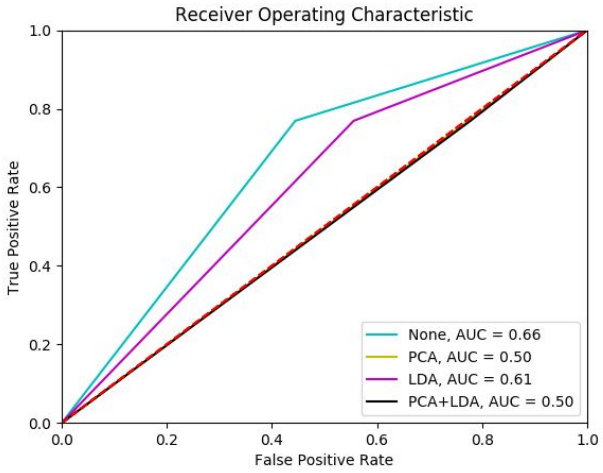
Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.38	0.78	0.33	0.81	0.57	
PCA	0	0.71	0	0.85	0.42	
LDA	0.25	0.74	0.22	0.77	0.50	
PCA+LDA	0.29	0.75	0.22	0.81	0.51	



#4 Random Forest Classifier Performance

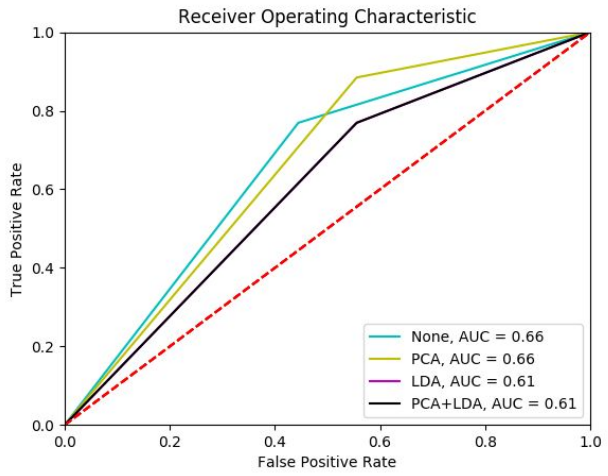
Script file: msc_project_db_and_codes/codes/patient_level_radiomics_rf_pca_lda_pred_ss_0821.py
Results of using Standard Scaler:

Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.45	0.83	0.56	0.77	0.66	
PCA	0.25	0.74	0.11	0.88	0.50	
LDA	0.4	0.8	0.44	0.77	0.61	
PCA+LDA	0.25	0.74	0.22	0.77	0.50	

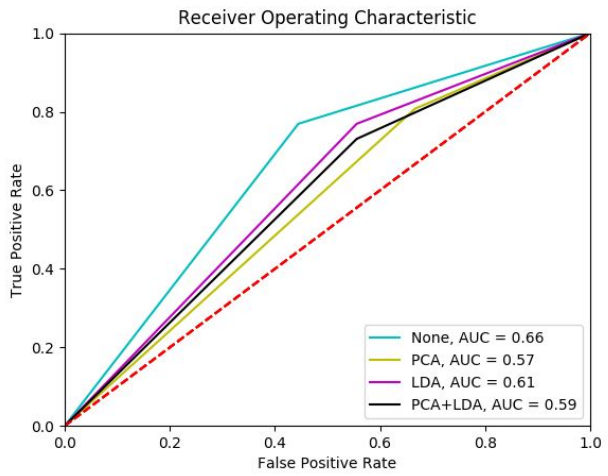


Script file: msc_project_db_and_codes/codes/patient_level_radiomics_rf_pca_lda_pred_mm_0821.py
Results of using MinMax Scaler:

Optimization	Scores	Plot

	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.45	0.83	0.56	0.77	0.66	
PCA	0.57	0.82	0.44	0.88	0.66	
LDA	0.4	0.8	0.44	0.77	0.61	
PCA+LDA	0.4	0.8	0.44	0.77	0.61	

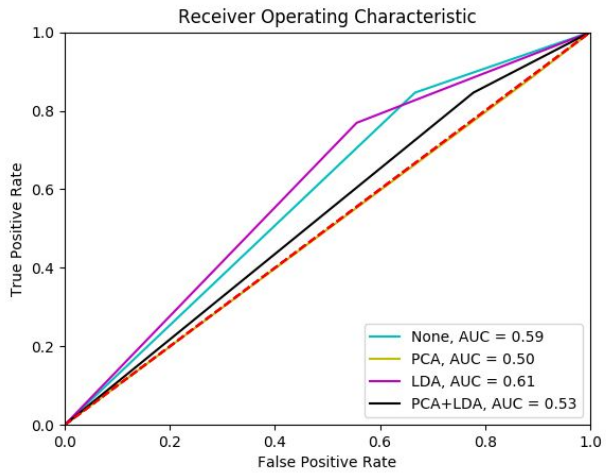
Script file: msc_project_db_and_codes/codes/patient_level_radiomics_rf_pca_lda_pred_rs_0821.py
Results of using Robust Scaler:

Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.38	0.78	0.33	0.81	0.57	
PCA	0.38	0.78	0.33	0.81	0.57	
LDA	0.4	0.8	0.44	0.77	0.61	
PCA+LDA	0.36	0.79	0.44	0.73	0.59	

#5 Gradient Boosting Classifier Performance

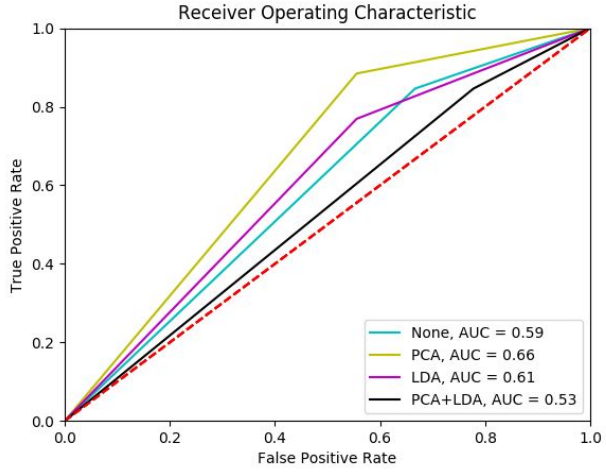
Script file: msc_project_db_and_codes/codes/patient_level_radiomics_gb_pca_lda_pred_ss_0821.py
Results of of using Standard Scaler:

Optimization	Scores	Plot

	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.43	0.79	0.33	0.85	0.59	
PCA	0.25	0.74	0.11	0.88	0.50	
LDA	0.4	0.8	0.44	0.77	0.61	
PCA+LDA	0.33	0.76	0.22	0.85	0.53	

Script file: msc_project_db_and_codes/codes/patient_level_radiomics_gb_pca_lda_pred_mm_0821.py

Results of using MinMax Scaler

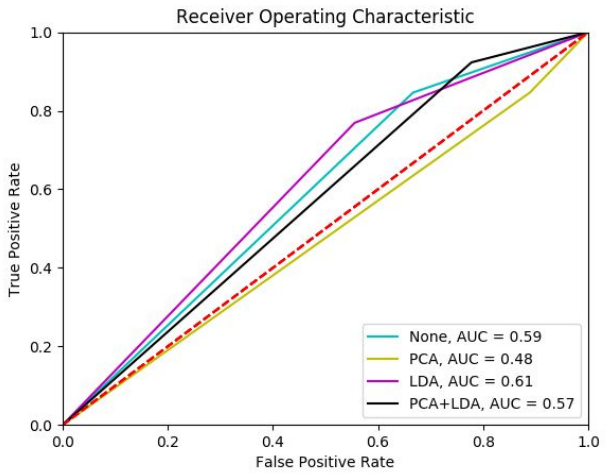
Optimization	Scores					Plot
	Precision		Recall		AUC	
	0	1	0	1		
NONE	0.43	0.79	0.33	0.85	0.59	
PCA	0.57	0.82	0.44	0.88	0.66	
LDA	0.4	0.8	0.44	0.77	0.61	
PCA+LDA	0.33	0.76	0.22	0.85	0.53	

Script file: msc_project_db_and_codes/codes/patient_level_radiomics_gb_pca_lda_pred_rs_0821.py

Results of using Robust Scaler

Optimization	Scores	Plot

	Precision		Recall		AUC
	0	1	0	1	
NONE	0.43	0.79	0.33	0.85	0.59
PCA	0.2	0.73	0.11	0.85	0.49
LDA	0.4	0.8	0.44	0.77	0.61
PCA+LDA	0.5	0.77	0.22	0.92	0.57



(from last 0804)

Result Analysis - Brief

Among the 5 classifiers, the Gradient Boosting Classifier with LDA providers the best AUC score of 0.71. Details are as below.

There are 35 patients in total, 4 of which has two nodule diagnosed (as highlighted in yellow). 11 patients were misclassified, accuracy rate is 68.6%

Predictions: [0 1 1 1 0 0 1 1 1 0 0 1 1 1 1 1 0 0 1 1 1 0 1 1 1 1 0 0 1 0 1 1 0 1 1 1 1 1]

y_test: 1 1 1 1 0 1 1 0 1 0 0 1 1 0 0 1 0 1 1 0 1 1 1 0 1 1 1 1 1 0 0 1 1 0 1 1 1 1 1