Overall Result

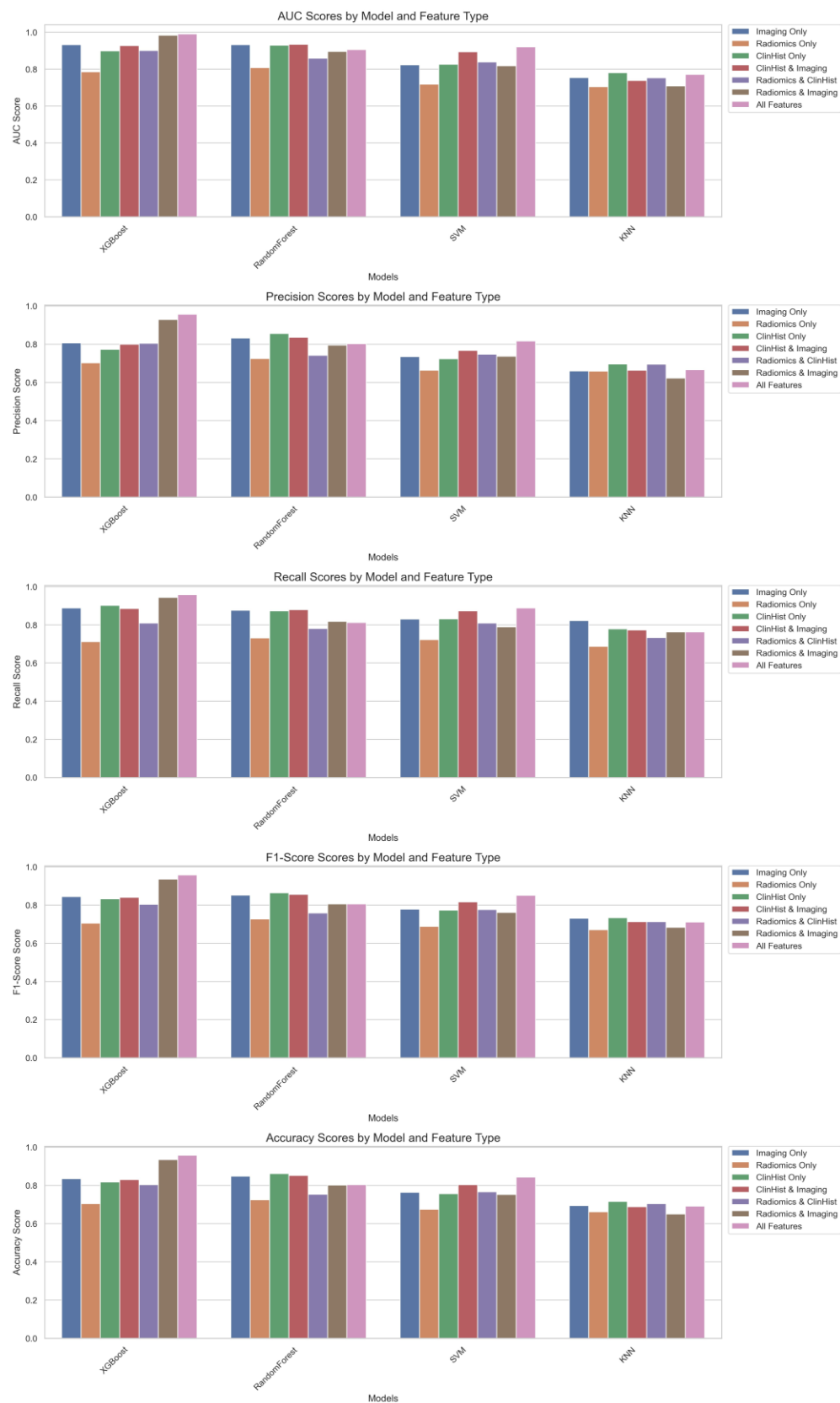| Feature Type	Model	Parameters	K-Fold	AUC	Precision	Recall	F1-score	Accuracy
Imaging Only	XGBoost	learning_rate=0.1	10	0.9326	0.8068	0.8884	0.8438	0.8354
	RandomForest	n_estimators=200	10	0.9324	0.8324	0.8768	0.8524	0.8482
	SVM	C=10	10	0.8235	0.7347	0.8307	0.7786	0.7636
	KNN	n_neighbors=3	10	0.7533	0.6604	0.8224	0.7307	0.695
Radiomics Only	RandomForest	n_estimators=300	10	0.8078	0.7254	0.7313	0.7268	0.7254
	XGBoost	learning_rate=0.1	10	0.7849	0.7027	0.7119	0.7057	0.7047
	SVM	C=10	10	0.7184	0.6641	0.7230	0.6889	0.6745
	KNN	n_neighbors=3	10	0.7042	0.6587	0.6870	0.6704	0.6621
ClinHist Only	RandomForest	n_estimators=300	10	0.9287	0.8558	0.874	0.864	0.8625
	XGBoost	n_estimators=300	5	0.8989	0.7738	0.9027	0.8329	0.8182
	SVM	C=10	10	0.8263	0.7238	0.831	0.7732	0.7564
	KNN	n_neighbors=3	10	0.7805	0.6964	0.7792	0.7335	0.7164
ClinHist & Imaging	RandomForest	n_estimators=300	10	0.9347	0.8364	0.8797	0.8564	0.8525
	XGBoost	learning_rate=0.1	10	0.9268	0.8004	0.8855	0.8399	0.8310
	SVM	C=10	10	0.8931	0.7679	0.8738	0.8165	0.8037
	KNN	n_neighbors=3	10	0.7379	0.6644	0.7735	0.7136	0.6891
Radiomics & ClinHist	XGBoost	learning_rate=0.1	10	0.9004	0.8051	0.8098	0.8040	0.8041
	RandomForest	n_estimators=100	10	0.8590	0.7420	0.7809	0.7580	0.7542
	SVM	C=10	10	0.8380	0.7481	0.8099	0.7762	0.7661
	KNN	n_neighbors=3	5	0.7524	0.6952	0.734	0.7135	0.7047
Radiomics & Imaging	XGBoost	learning_rate=0.1	10	0.9836	0.929	0.9441	0.9360	0.9354
	RandomForest	n_estimators=100	10	0.8959	0.7953	0.8187	0.8059	0.8024
	SVM	C=10	10	0.8182	0.7370	0.7895	0.7617	0.7528
	KNN	n_neighbors=7	10	0.7090	0.6229	0.7634	0.6838	0.6504
All Features	**XGBoost**	**learning_rate=0.1**	**10**	**0.9908**	**0.9569**	**0.9589**	**0.9575**	**0.9575**
	SVM	C=10	10	0.9198	0.8166	0.8889	0.8507	0.8435
	RandomForest	n_estimators=300	10	0.9061	0.8031	0.8129	0.8060	0.8038
	KNN	n_neighbors=3	10	0.7707	0.6672	0.7629	0.7107	0.6914

Best Result:

- Feature Type: All Features
- Model: XGBoost (Learning_Rate: 0.1)
- K-Fold: 10
- Accuracy: 0.9575
- Precision: 0.9569
- Recall: 0.9589
- F1-score: 0.9575
- AUC: 0.9908

Implementation Setup:

- Oversampling: Random Oversampler
- Hyperparamter Tuning: Grid Search
- SVM C-index (AUC-ROC): [0.1, 1, 10]
- KNN n_neighbors: [3, 5, 7]
- RandomForest n_estimators: [100, 200, 300]
- XGBoost [n_estimators, learning_rate]: [[100, 200, 300], [0.01, 0.1, 1]]
- K_folds: [3, 5, 10]
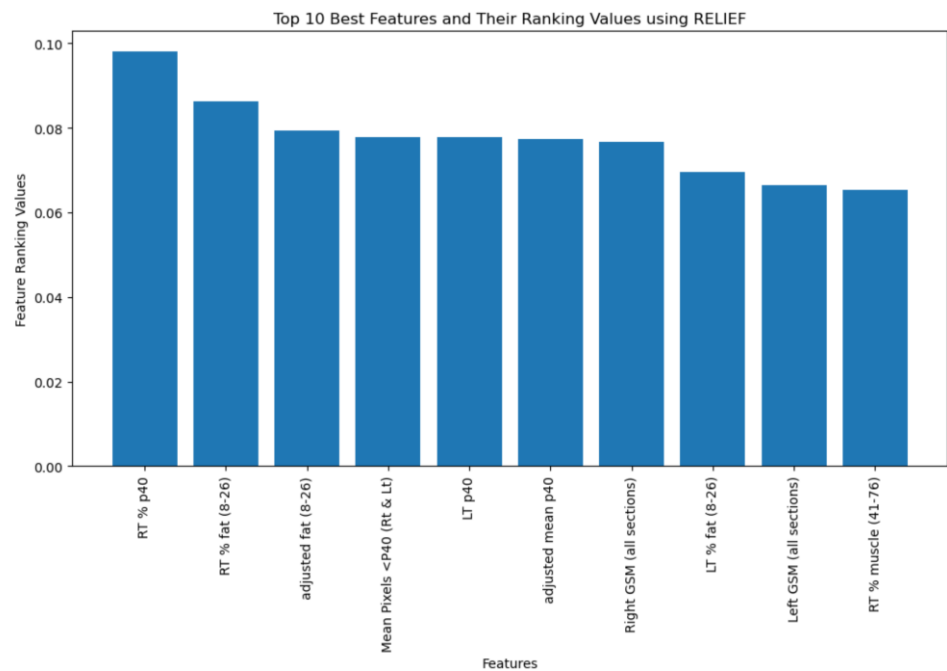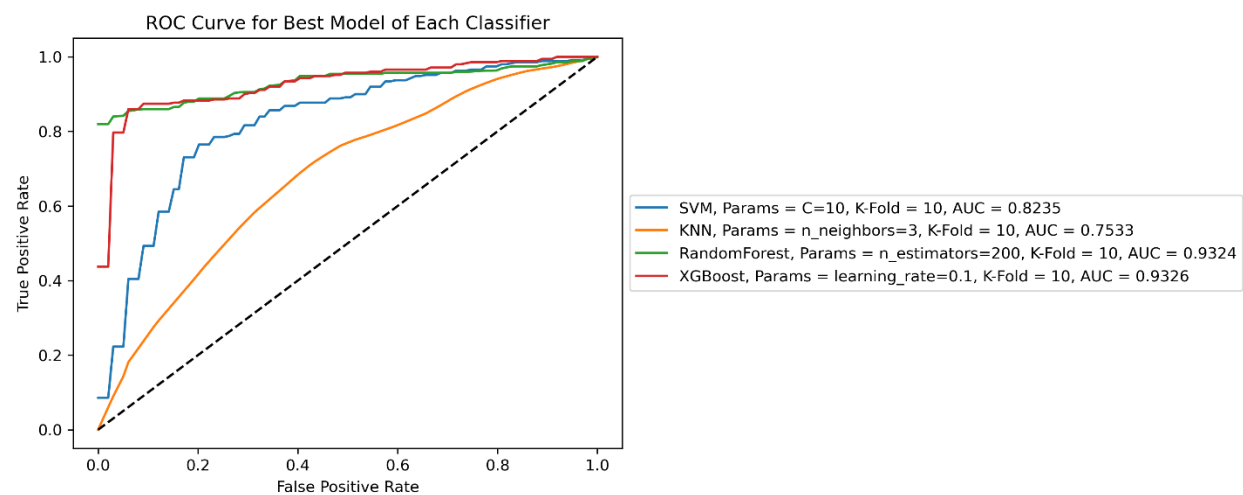- Feature Selection: Relieff - 10 Best Features

Visualization

Details of Feature Types

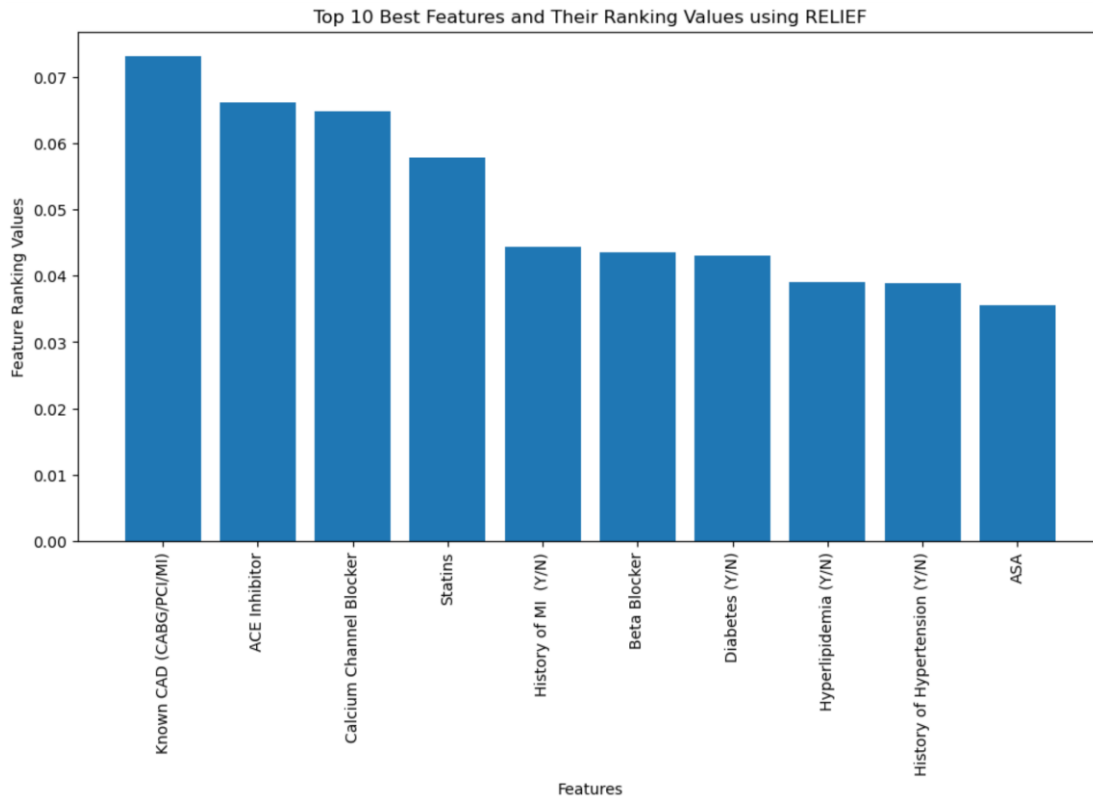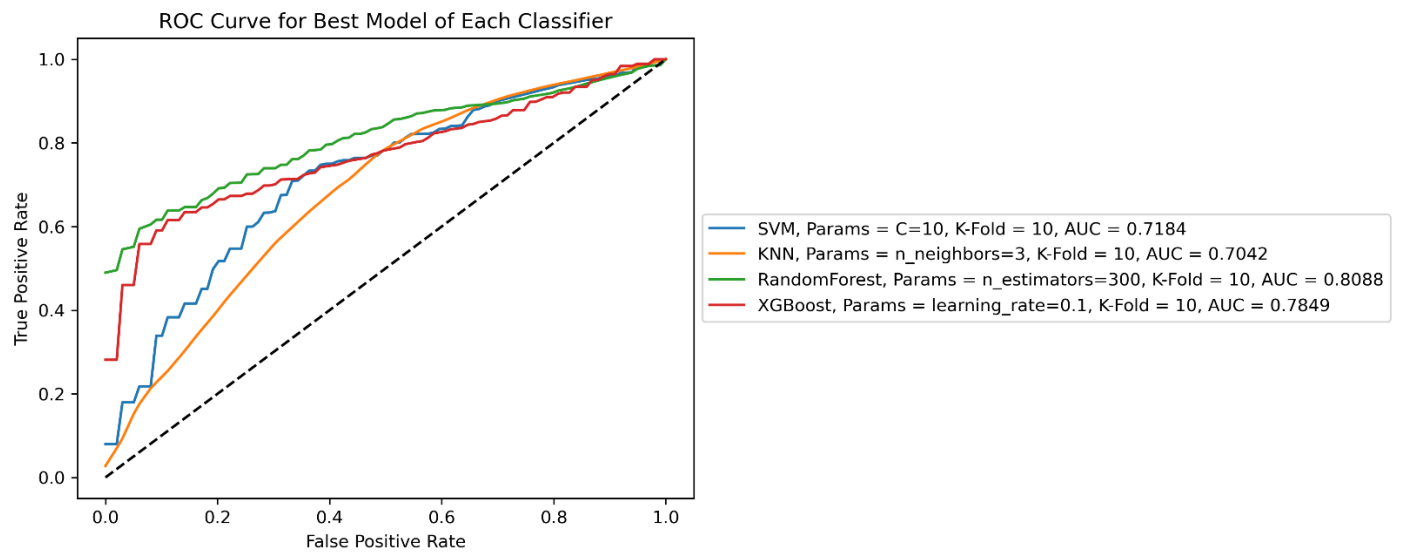## 1. Imaging Only

Top 10 Best Features

Top 10 Best Features and Their Ranking Values using RELIEF

ROC Curve

ROC Curve for Best Model of Each Classifier

2. Radiomics Only

Top 10 Best Features

Top 10 Best Features and Their Ranking Values using RELIEF

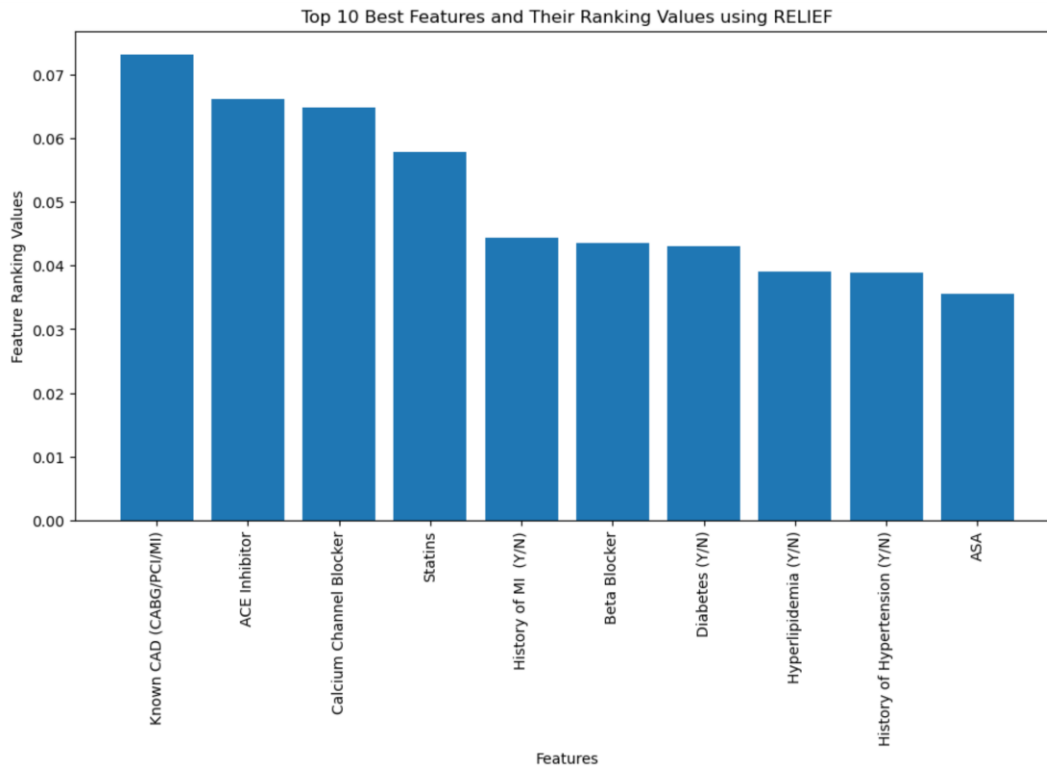### ROC Curve
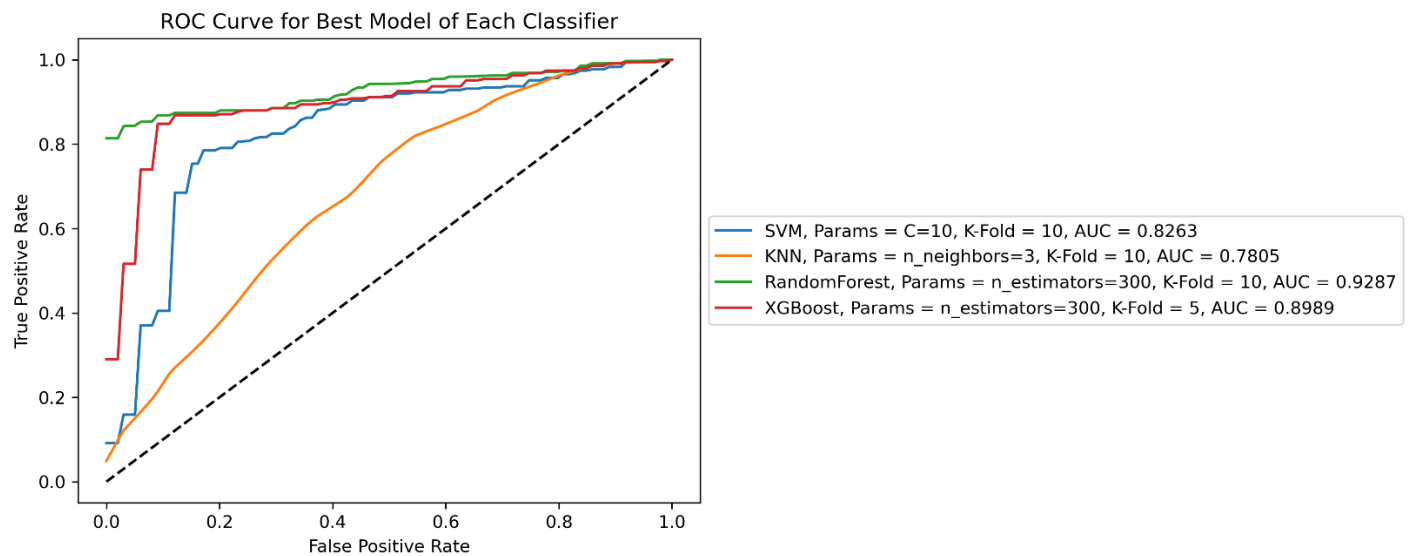

ROC Curve for Best Model of Each Classifier
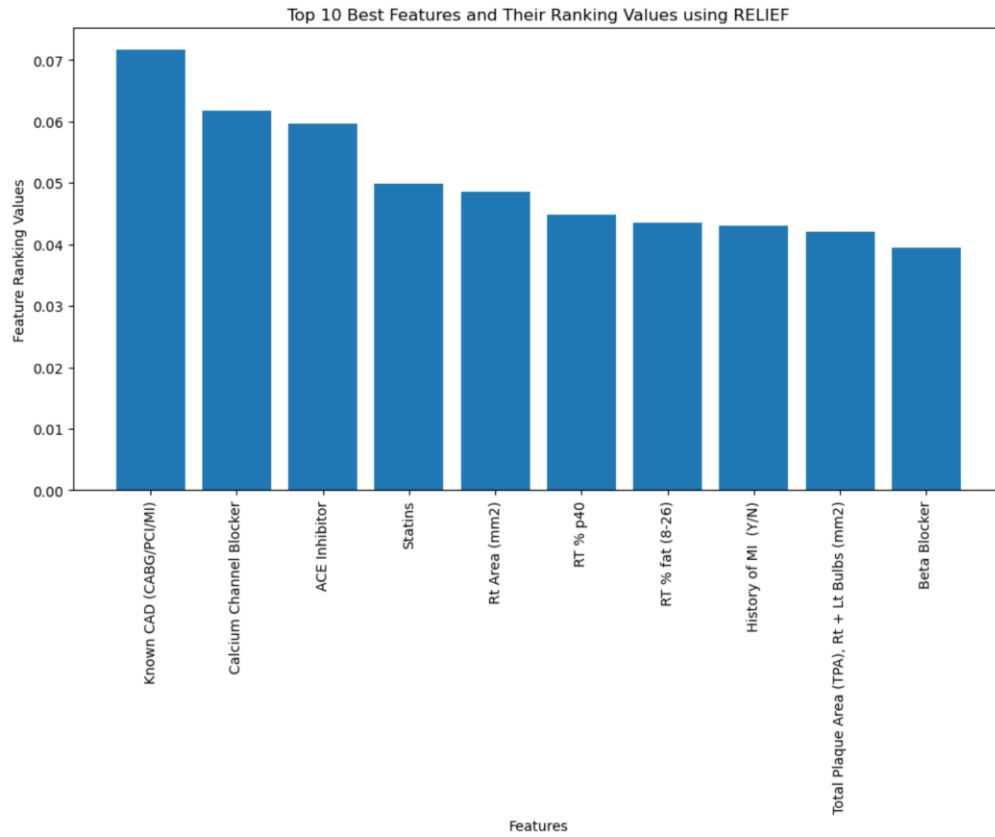
3. Clinical History Only

Top 10 Best Features

ROC Curve

4. Clinical History and Imaging

Top 10 Best Features

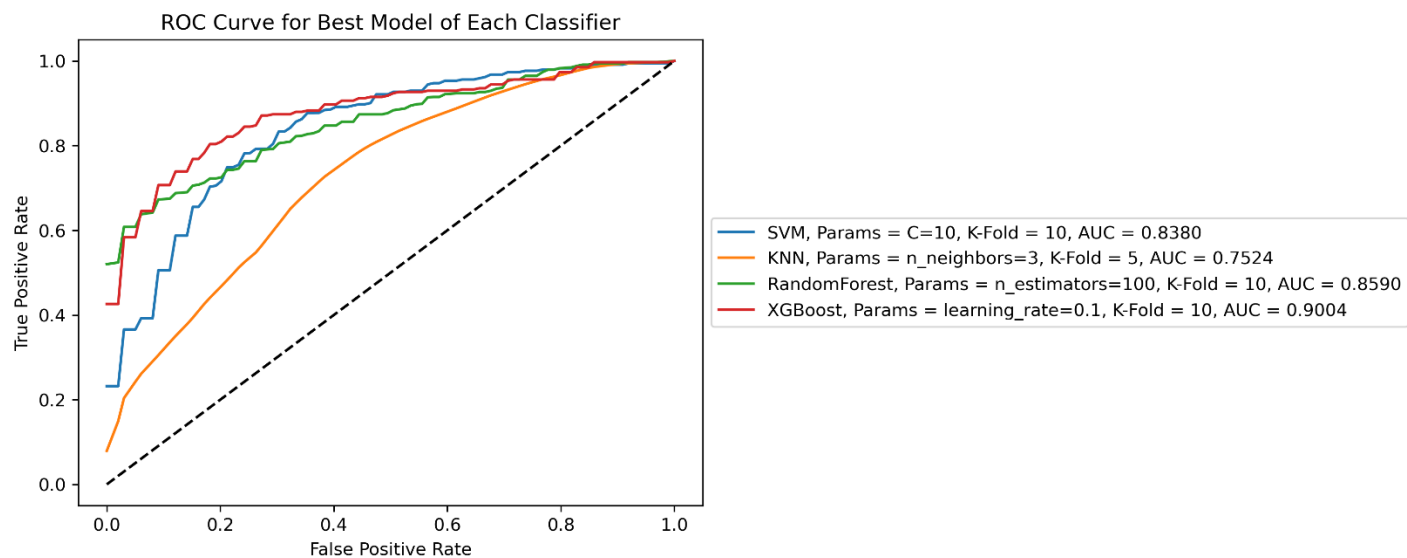Top 10 Best Features and Their Ranking Values using RELIEF

ROC Curve

ROC Curve for Best Model of Each Classifier

- SVM, Params = C=10, K-Fold = 10, AUC = 0.8931
- KNN, Params = n_neighbors=3, K-Fold = 10, AUC = 0.7379
- RandomForest, Params = n_estimators=300, K-Fold = 10, AUC = 0.9347
- XGBoost, Params = learning_rate=0.1, K-Fold = 10, AUC = 0.9268
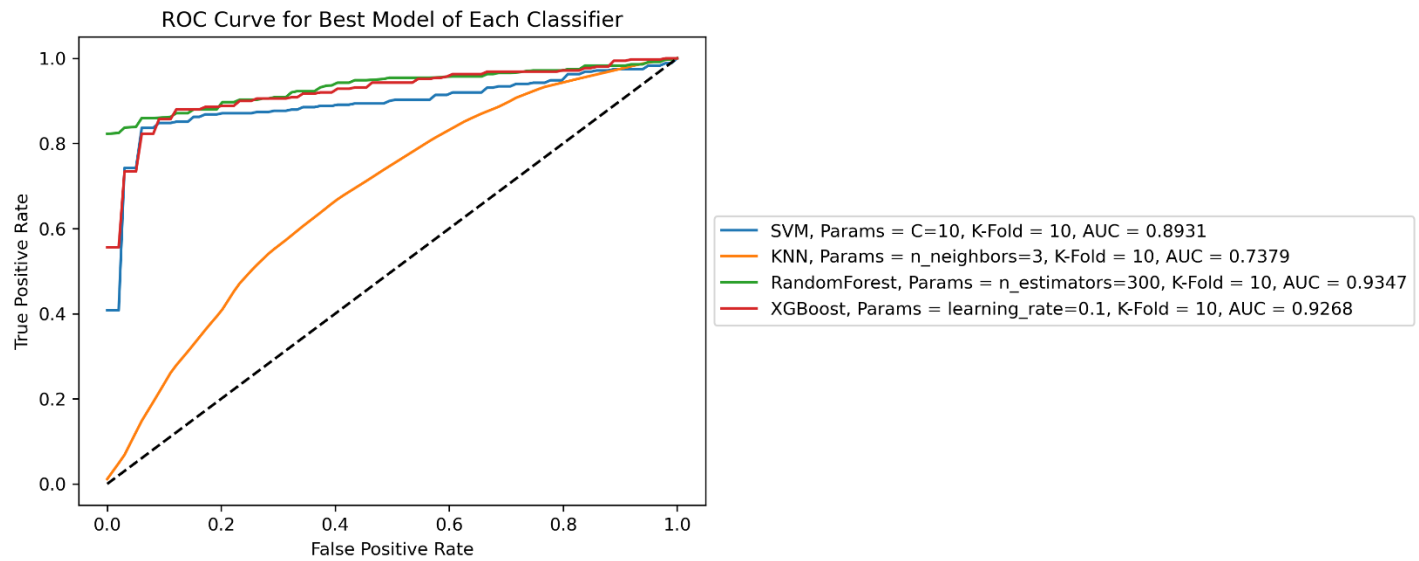
5. Radiomics and Clinical History

Top 10 Best Features

Top 10 Best Features and Their Ranking Values using RELIEF

ROC Curve

ROC Curve for Best Model of Each Classifier

6. All Features

Top 10 Best Features

Top 10 Best Features and Their Ranking Values using RELIEF

ROC Curve

ROC Curve for Best Model of Each Classifier