covid-data-challenge

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Task 1: Clinical data imputation

Method

We use KNN-3/KNN-6/KNN-9 and SoftImpute with fancyimpute, and a voting method to choose the best imputation method. The results are organized in folder below.

```
csv
├─feature_importance
├─filled_testSet
├─filled_trainSet
└─prediction_testSet
```

For a imputation method [method] in [filled_knn_3/filled_knn_6/filled_knn_9/filled_softimpute/] :

- ./csv/filled_testSet/[method]_testSet.txt
  - Filled **NaN** data using [method] based on **concatenation** of trainSet.txt & testSet.txt.
  - There are columns filled with **NaN** so we need **concatenation** of trainSet.txt & testSet.txt, otherwise nothing meaningful imputation can be obtained.
- ./csv/filled_trainSet/[method]_trainSet.txt
  - Filled **NaN** data using [method] based on trainSet.txt. (or the **concatenation** if needed (Question 1))
- ./csv/feature_importance/[method].csv
  - **Feature importance** of an ensemble methods consist of **random forest**, **gradient boost**, **adaboost** and **xgboost** predicting the **severity** with **filled training dataset** with **5-fold cross-validation**.
- ./csv/prediction_testSet/[method]_pred.txt
  - Prediction of a **voting** method using [method] filled testSet.txt with only clinical data.

Clinical data prediction

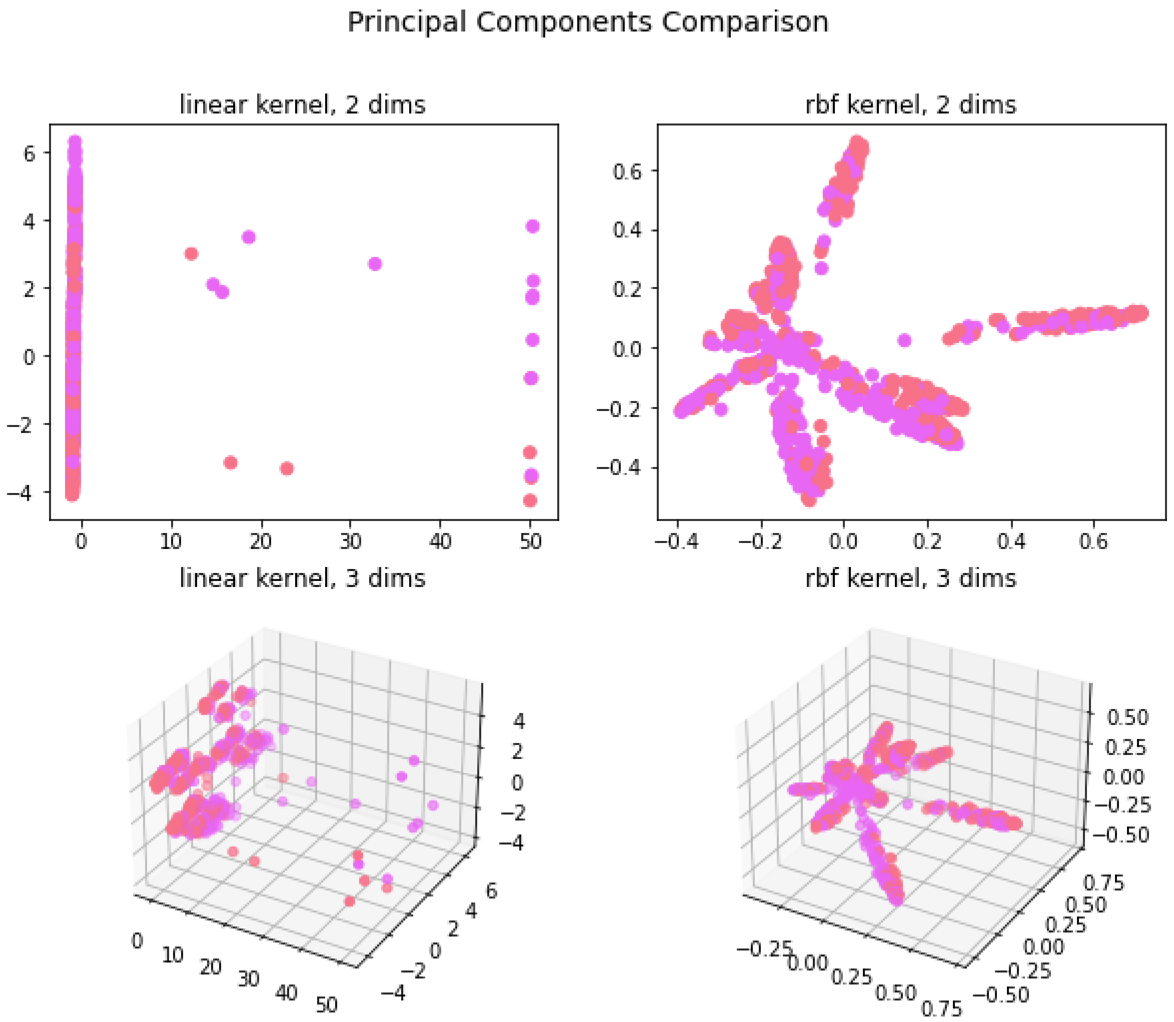
We verify the imputation by predicting the **severity** with **filled** training clinical data only with **5-fold cross-validation**.

KNN-3 imputation

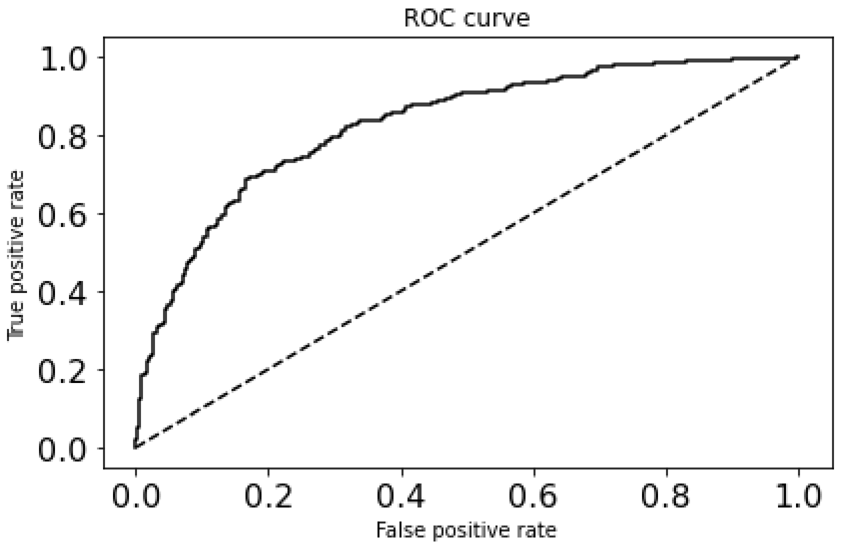
5-fold cross validation summary

	roc	acc	recall	sensitivity	specificity
voting	**0.8274**	0.7578	0.6941	0.6941	0.8196

t-SNE

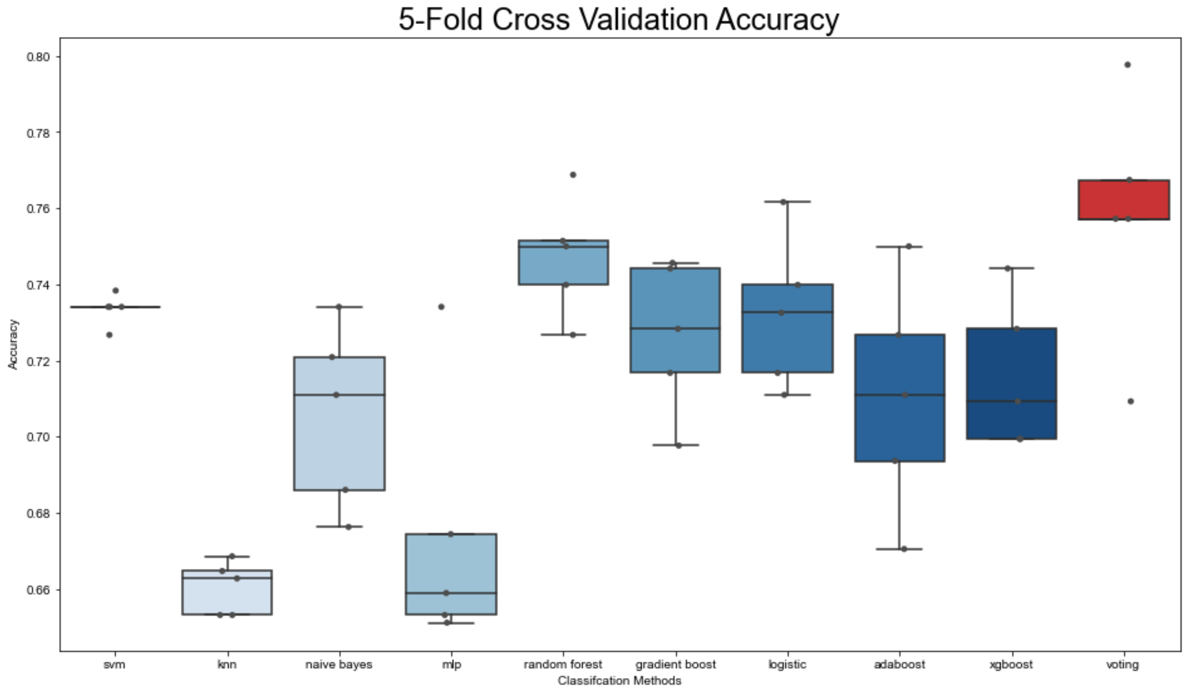


ROC curve

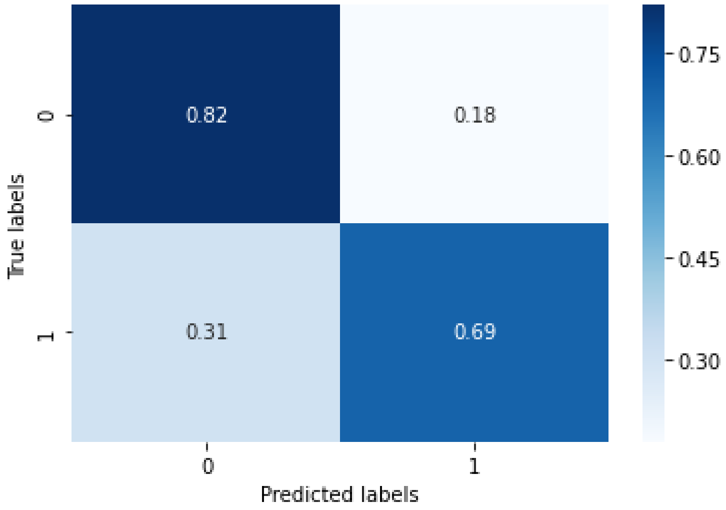


ROC AUC score of voting methods: **0.8178458232608112**

Accuracy@0.5



Confusion matrix@0.5

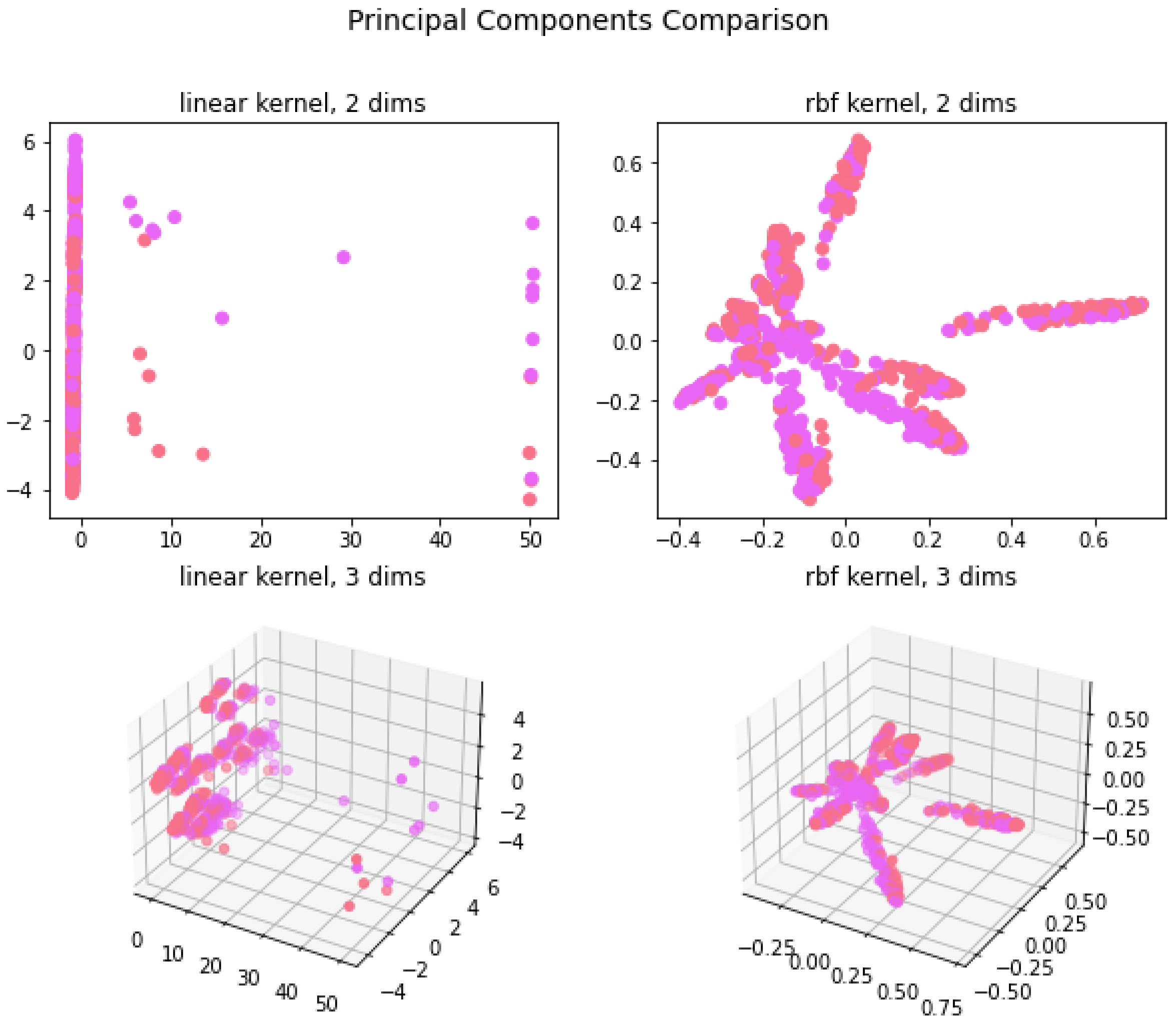


KNN-6 imputation

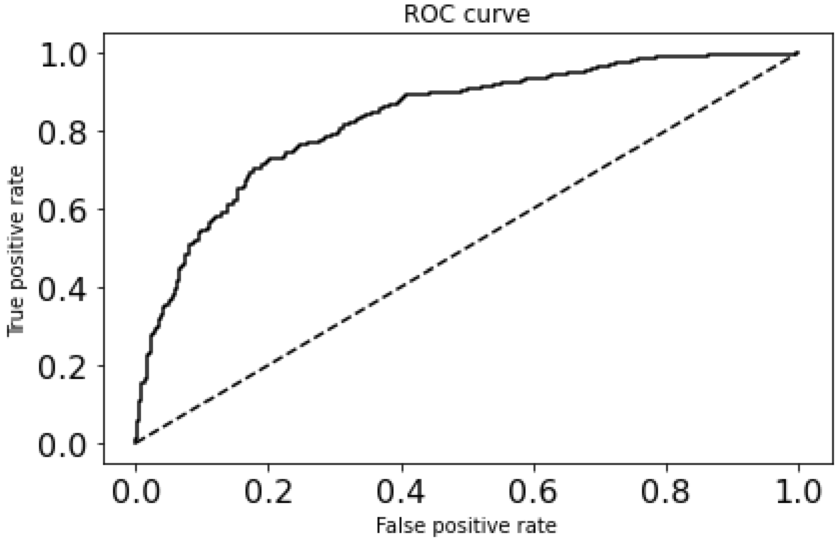
5-fold cross validation summary

	roc	acc	recall	sensitivity	specificity
voting	**0.8302**	0.7625	0.7129	0.7129	0.8105

t-SNE

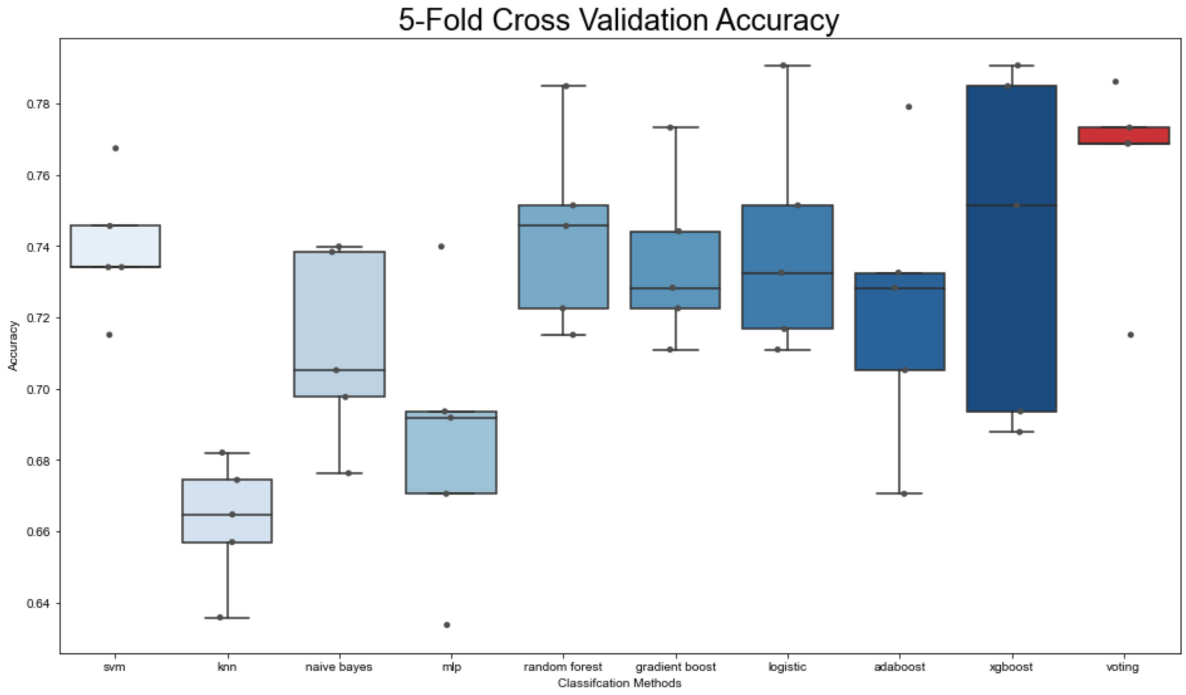


ROC curve

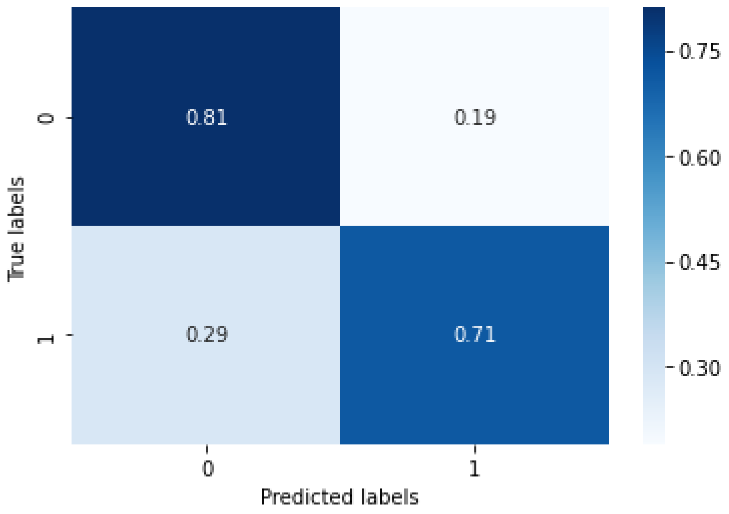


ROC AUC score of voting methods: **0.8302**

Accuracy@0.5



Confusion matrix@0.5

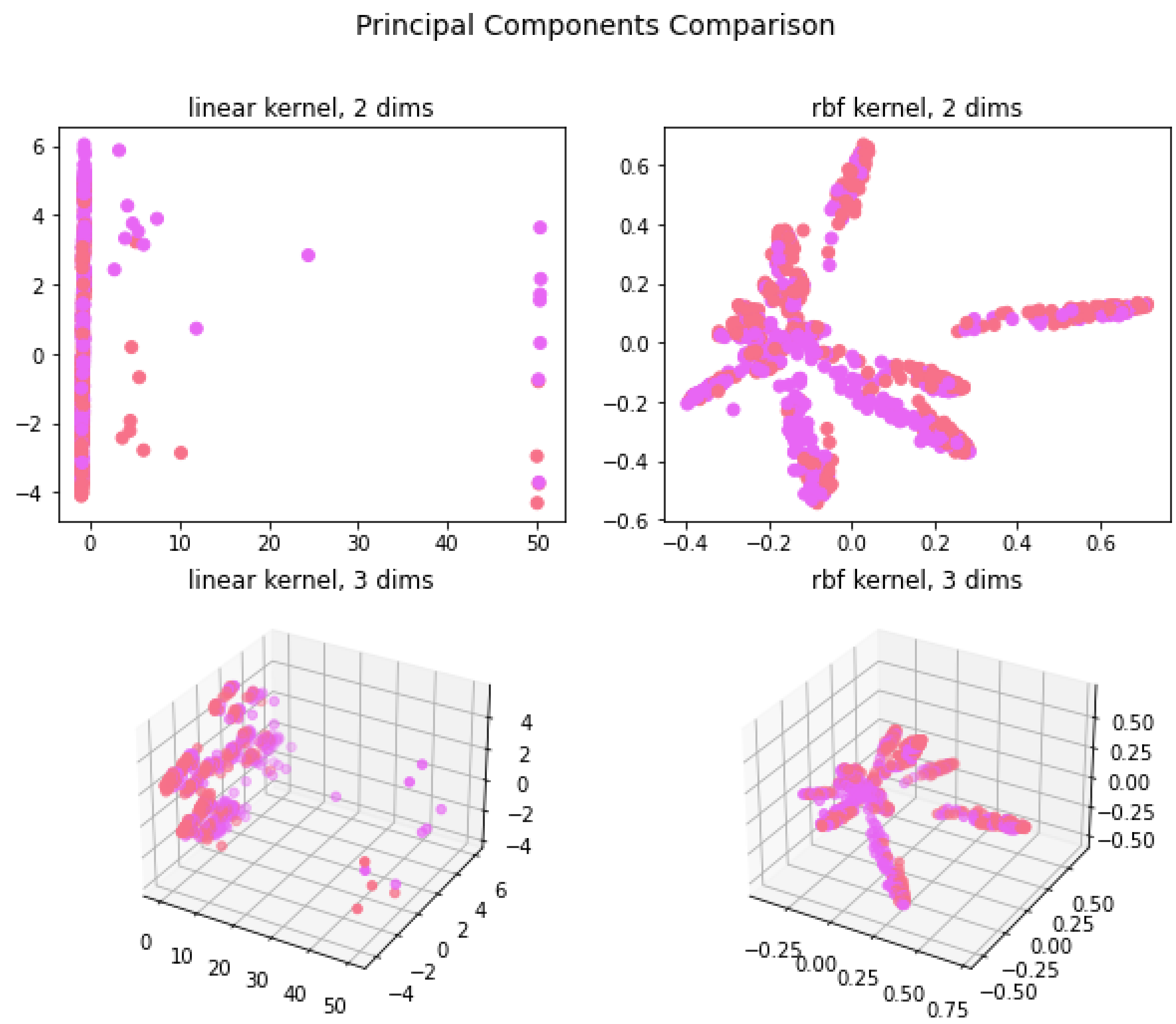


KNN-9 imputation

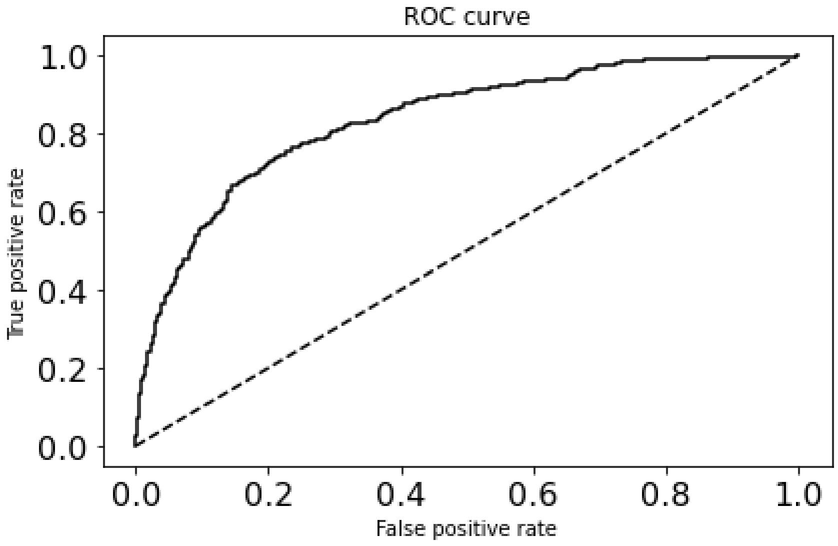
5-fold cross validation summary

	roc	acc	recall	sensitivity	specificity
voting	**0.8350**	0.7578	0.7012	0.7012	0.8128

t-SNE

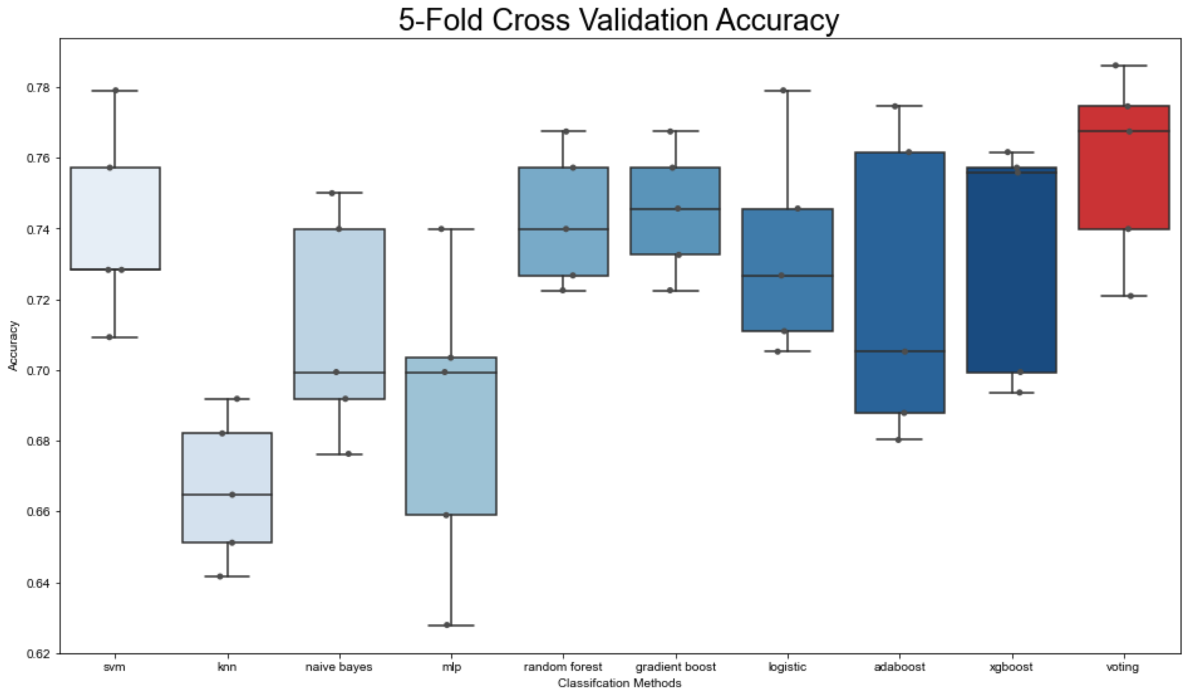


ROC curve

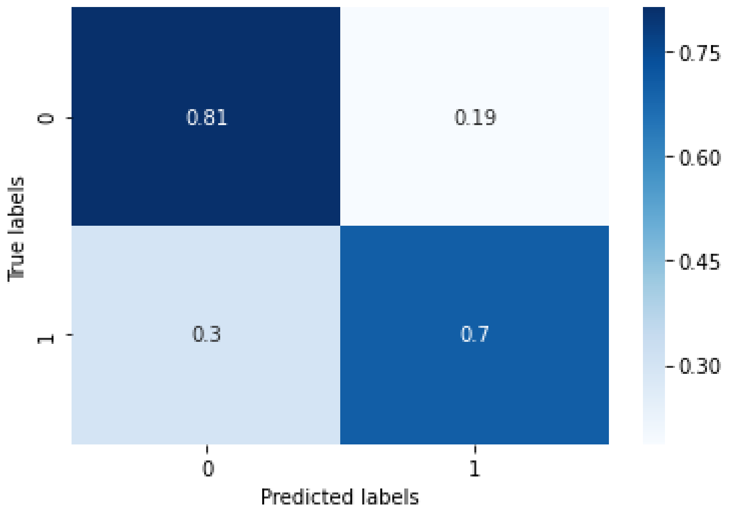


ROC AUC score of voting methods: **0.8350**

Accuracy@0.5



Confusion matrix@0.5

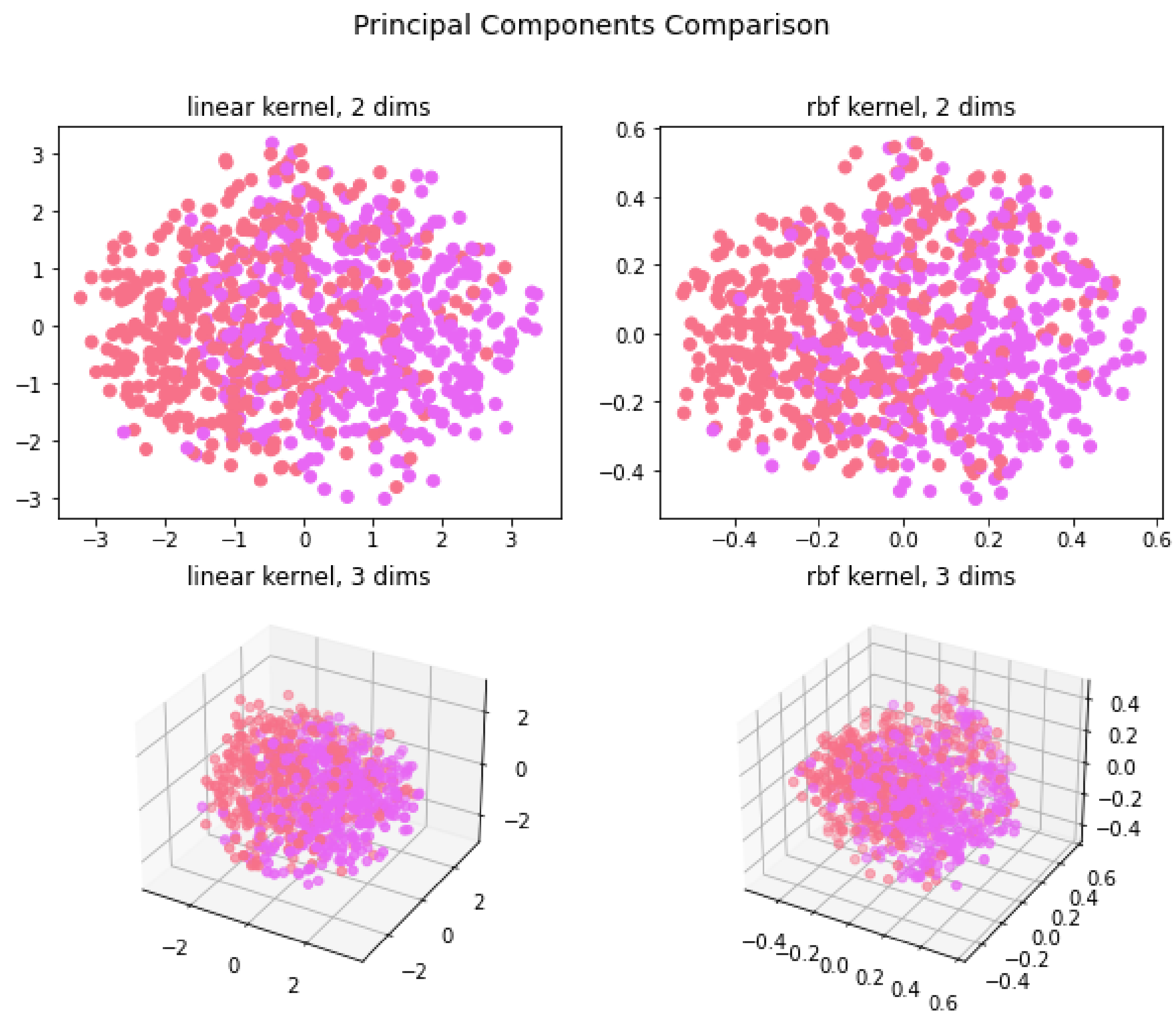


Soft imputation

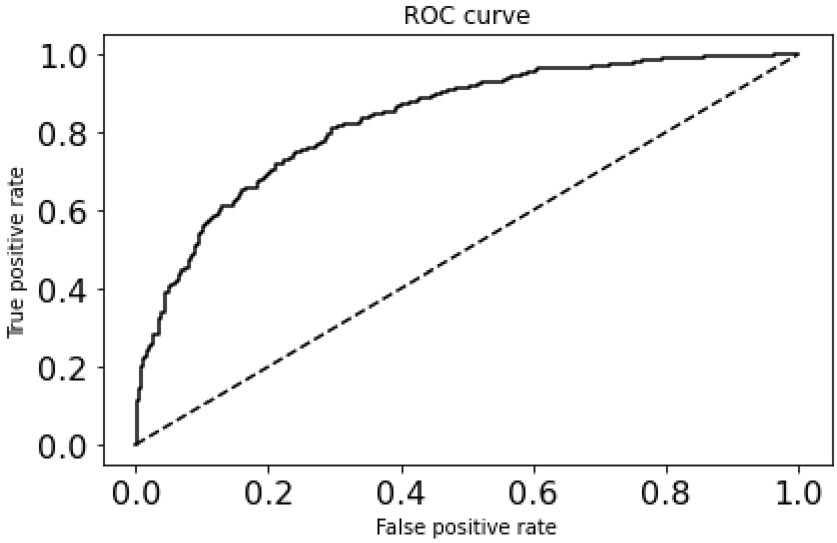
5-fold cross validation summary

	roc	acc	recall	sensitivity	specificity
voting	**0.8327**	0.7497	0.7294	0.7294	0.7694

t-SNE

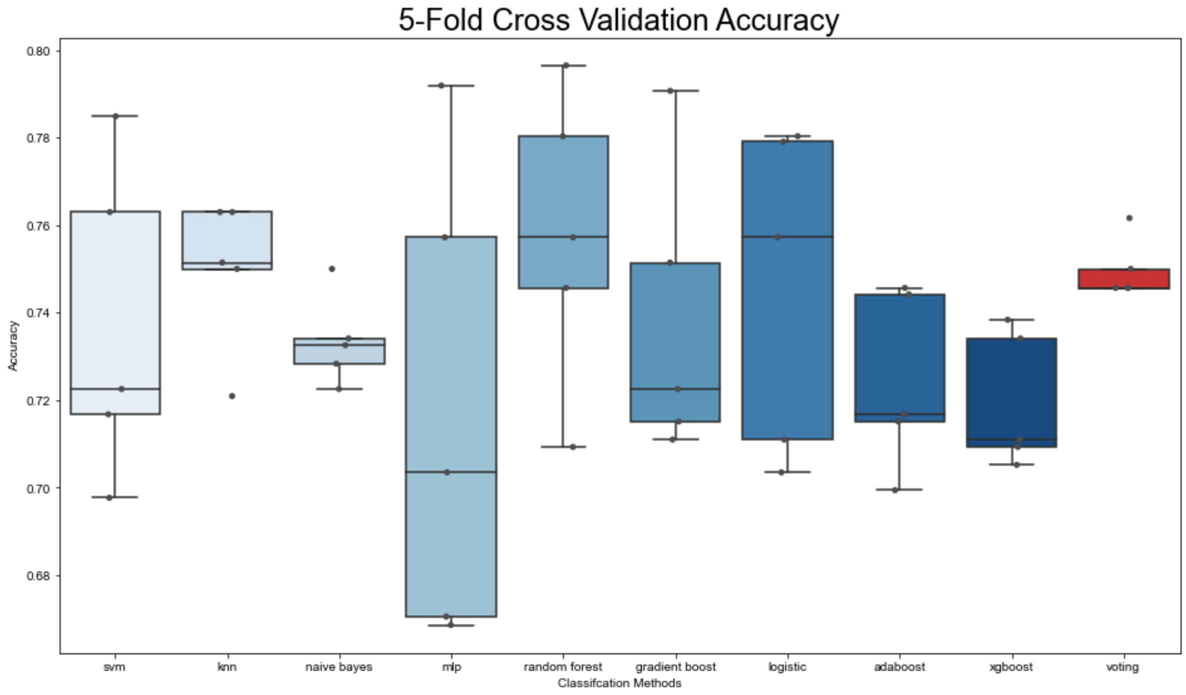


ROC curve

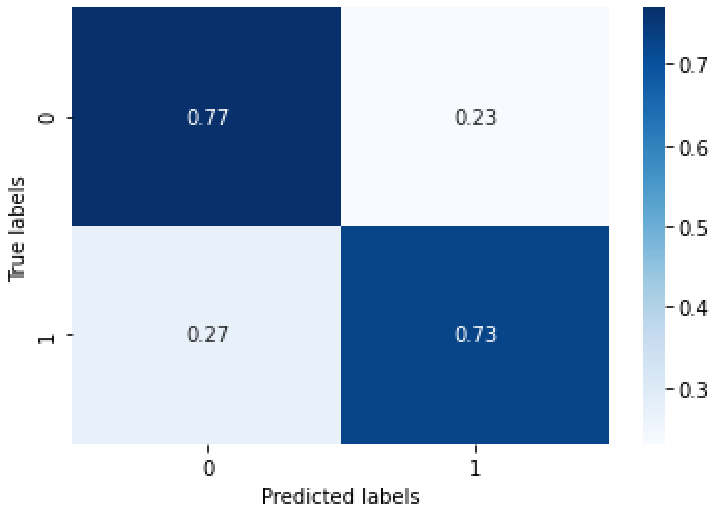


ROC AUC score of voting methods: **0.8327**

Accuracy@0.5



Confusion matrix@0.5


True labels
Predicted labels