CSE 472 - Machine Learning Sessional

Offline-2 Report

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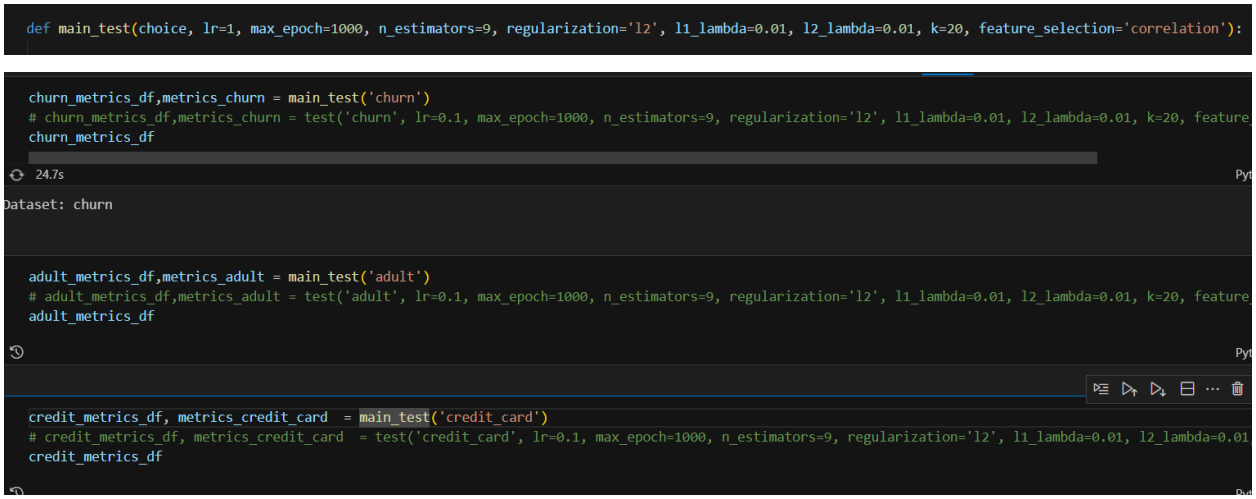
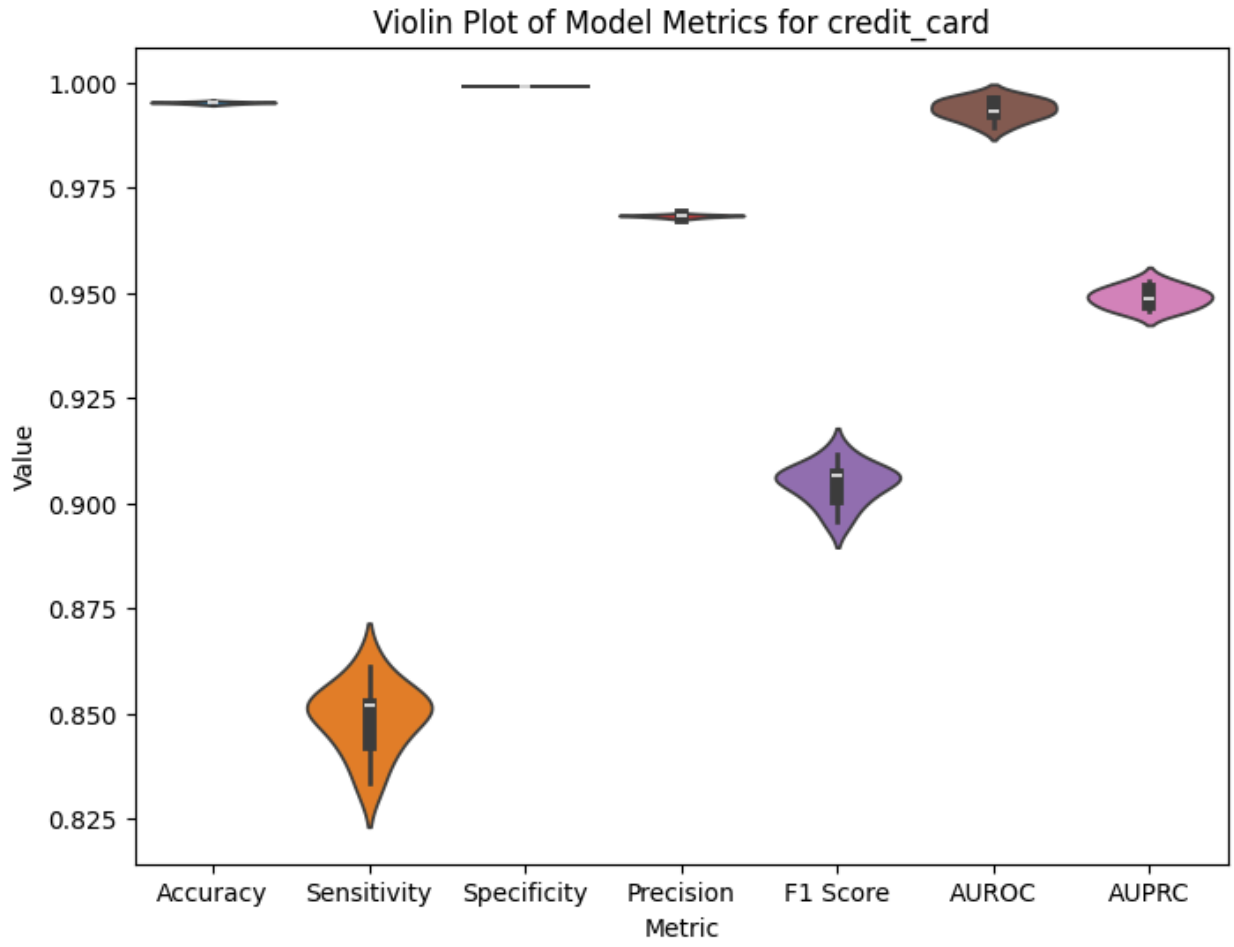
How to run the code:

1. First, install the ucmlrepo package by running **pip install ucimlrepo.**
2. main_test is the main function of getting the metrics of normal logistic regression(average of 9), stacking, and voting ensemble. Input your choice (‘adult’, ‘churn’, or ‘credit_card’) to get the metrics of the corresponding dataset. You can also pass in parameters like learning rate, lambda 1, lambda 2, regularization choice, maximum epoch, and the value of k(in the selection of top k features), in the function instead of using the default hyperparameters. I have kept the respective calls for each dataset in separate cells to make it easy to run any of your choices.



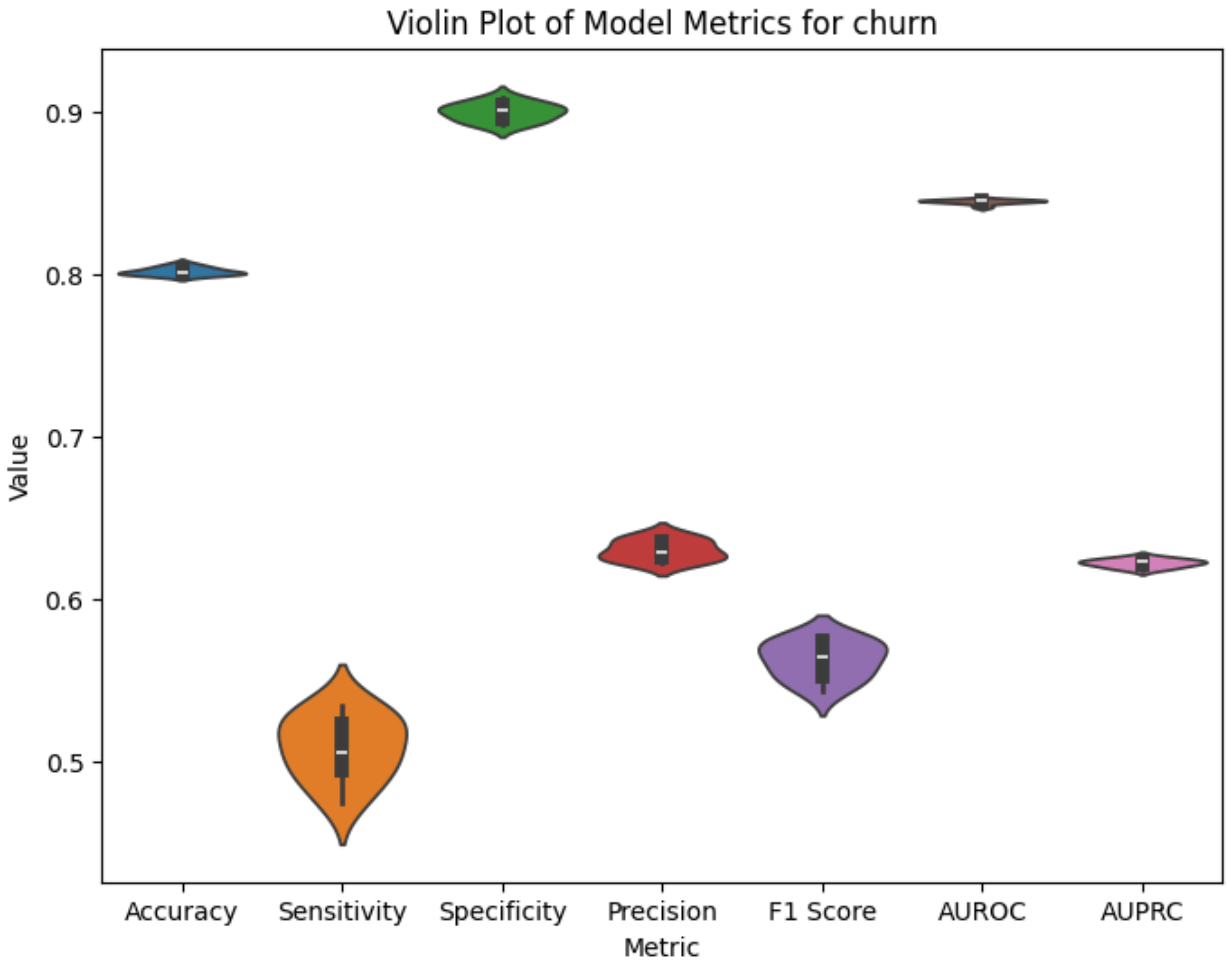
Telco-customer churn:

Method	Accuracy	Sensitivity	Specificity	Precision	F1-score	AUROC	AUPRC
LR	0.801977 ± 0.002194	0.508207 ± 0.018722	0.900179 ± 0.005171	0.630024 ± 0.005927	0.562361 ± 0.010936	0.844862 ± 0.001314	0.622140 ± 0.002311
Voting ensemble	0.802135	0.502841	0.902184	0.632143	0.560127	0.845351	0.624513
Stacking ensemble	0.800712	0.536932	0.888889	0.617647	0.574468	0.839853	0.616814



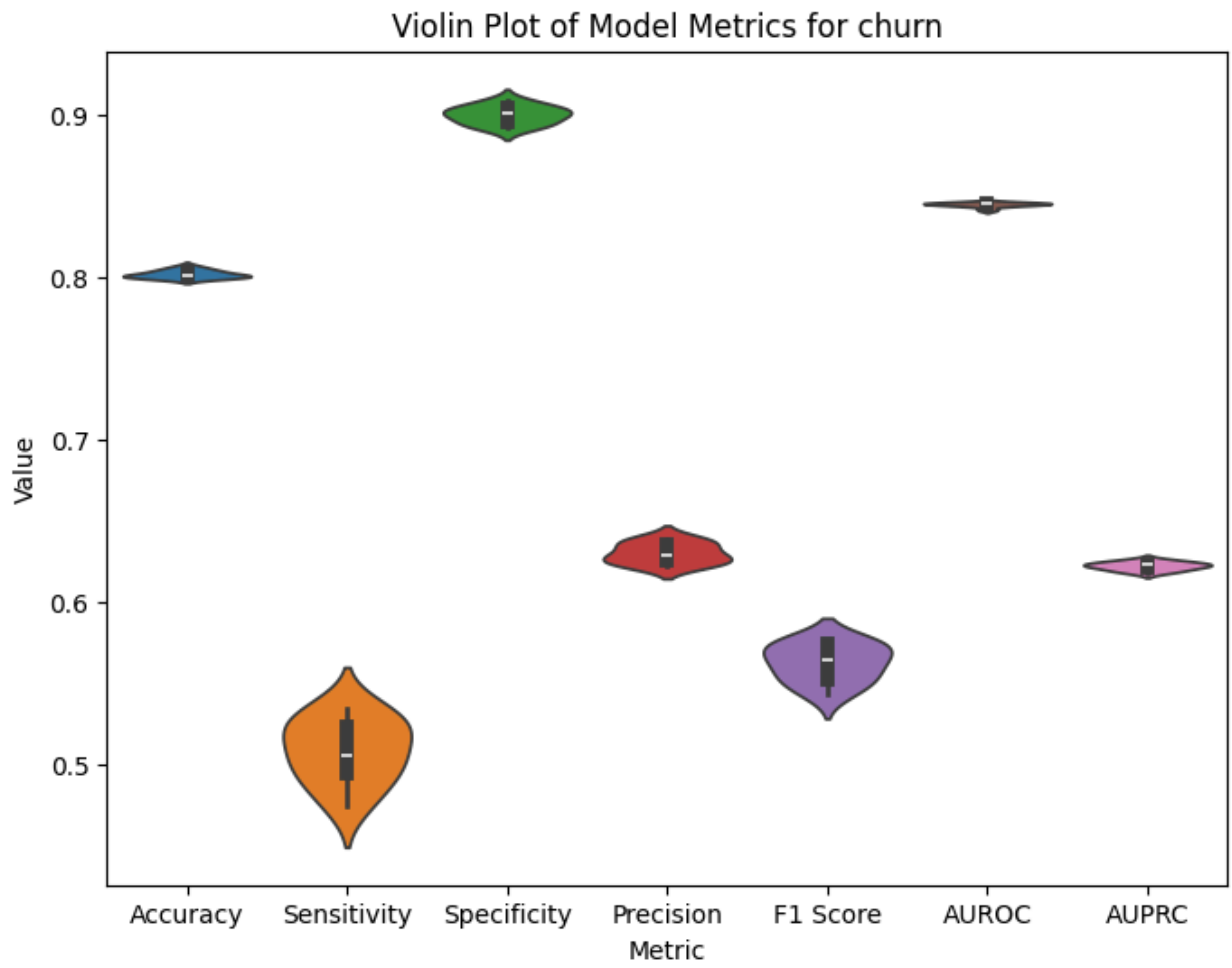
Adult:

Method	Accuracy	Sensitivity	Specificity	Precision	F1-score	AUROC	AUPRC
LR	0.841647 ± 0.000845	0.524846 ± 0.006208	0.944226 ± 0.001103	0.752922 ± 0.001924	0.618502 ± 0.003987	0.895662 ± 0.000202	0.742335 ± 0.000829
Voting ensemble	0.841647	0.525544	0.944	0.752398	0.618836	0.89572	0.742479
Stacking ensemble	0.841954	0.526801	0.944	0.752843	0.619857	0.895754	0.743677



Creditcard fraud:

Method	Accuracy	Sensitivity	Specificity	Precision	F1-score	AUROC	AUPRC
LR	0.995253 ± 0.000200	0.848765 ± 0.007560	0.999243 ± 0.000000	0.968307 ± 0.000275	0.904587 ± 0.004423	0.993636 ± 0.002241	0.948934 ± 0.002314
Voting ensemble	0.995335	0.851852	0.999243	0.968421	0.906404	0.994629	0.949548
Stacking ensemble	0.995335	0.851852	0.999243	0.968421	0.906404	0.988471	0.947661



Observation:

1. For 9 9 LR models and Voting ensemble, F1 score decreases drastically if learning rate is decreases