
Rebuttal additional experiments

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1 Benchmark datasets

Table 1 gather the datasets information.

2 Overall Benchmark performances

2.1 Regression

Table 2 presents the overall performance of 25 regression models over the 16 regression datasets.
See Section 4 for the dataset-wise performance

2.2 Classification

Table 3 and Table 4 present presents the overall performance of 26 classification models over the 16 classification datasets.
See Section 5 for the dataset-wise performance

3 HPO for MLR and GBDT

We study the impact of HPO on performance. Due to time limitation, we compared 4 methods (RF, CatBoost, XgBoost and MLR) as well as their bagging and ensemble versions on 9 regression datasets. For each dataset, we ran 10 repetitions.

We are currently running this new experiment, preliminary results for 9 regression datasets are presented here. The experiment will include eventually all the datasets.

We used the Optuna library (Akiba et al., 2019) to tune HP, running 50 step of hyperparameter search with 5 fold cross validation to evaluate candidates. The hyperparameter search spaces were set as prescribed in their original papers for XGB and Catboost. See for instance the following reference for more details:

Shwartz-Ziv and Armon. Tabular Data: Deep Learning is Not All You Need. arXiv:2106.03253.

Table 5 summarizes the overall performance on 9 regression datasets.

Predictably, applying ensemble strategies to RF, XgBoost, CatBoost marginally improve their performances. Ensemble-MLR performs significantly better than ensemble of HPO-RF, HPO-XgBoost, HPO-CatBoost on 1 dataset. Ensemble of HPO-CatBoost performs significantly better than the other methods on 1 dataset. On the remaining datasets, all the methods have similar performances.

So far, These preliminary results confirm what we claim in our contribution section:

“MLR is not tied with any of the well-known class of methods. Thus they should be a great addition to the stack of models aggregated by meta-learners.”

3.1 MLR

The list of hyperparameters and their search spaces for MLR:

- min batch size: float $16/n_{train}$
- Max runtime: [6]
- depth: integer in [1,5]
- width: integer logarithmic scale [16, 4096]
- ridge init: logarithmic scale [$1e-1$, $1e7$]
- Learning rate: logarithmic scale [$\max(e^{-2}/width, e^{-5})$, $\max(e^1/width, e^{-5})$]
- max_{iter} : integer $\max(\min(width * e^{-5})^{1/2}, 10), 300)$

3.2 CATBOOST

The list of hyperparameters and their search spaces for Catboost:

- Learning rate: Log-Uniform distribution [e^{-5} , 1]
- Random strength: Discrete uniform distribution [1, 20]
- Max size: Discrete uniform distribution [0, 25]
- L2 leaf regularization: Log-Uniform distribution [1, 10]
- Bagging temperature: Uniform distribution [0, 1]
- Leaf estimation iterations: Discrete uniform distribution [1, 20]

3.3 XGBoost

The list of hyperparameters and their search spaces for XGBoost:

- Eta: Log-Uniform distribution [e^{-7} , 1]
- Max depth: Discrete uniform distribution [1, 10]
- Subsample: Uniform distribution [0.2, 1]

- Colsample bytree: Uniform distribution $[0.2, 1]$
- Colsample bylevel: Uniform distribution $[0.2, 1]$
- Min child weight: Log-Uniform distribution $[e^{-16}, e^5]$
- Alpha: Uniform choice $\{0, \text{Log-Uniform distribution } [e^{-16}, e^2]\}$
- Lambda: Uniform choice $\{0, \text{Log-Uniform distribution } [e^{-16}, e^2]\}$
- Gamma: Uniform choice $\{0, \text{Log-Uniform distribution } [e^{-16}, e^2]\}$

3.4 RF

The list of hyperparameters and their search spaces for RF:

- $n_{estimators}$: 100
- Max features: ["auto", "sqrt", "log2"]
- Max depth: log scale $[2, 100]$
- Max leaf nodes: log scale $[2, 1024]$
- Max samples leaf: log scale $[1, 16]$
- Bootstrap: ["True", "False"]
- max samples: ["max samples", 0.05, 1.]

4 Dataset-wise regression benchmark performances

For each dataset, we provide the R2-test score performance table of all the models in the benchmark.

5 Dataset-wise classification benchmark performances

For each dataset, we provide the ACC and ACU test performance table of all the models in the benchmark.

6 Dataset-wise HPO and Ensemble performances

Table 1: Benchmark datasets. # Num. and # Cat. denote the initial number of numerical and categorical features respectively. We denote by d the number of features after the pre-processing and one-hot encoding.

Description	Task	n	d	# Num.	# Cat.	Field	Link
Concrete Slump Test -2	Reg	103	8	8	0	Construction Materials	https://archive.ics.uci.edu/ml/datasets/Concrete+Slump+Test-2
Concrete Slump Test -3	Reg	103	8	8	0	Construction Materials	https://archive.ics.uci.edu/ml/datasets/Concrete+Slump+Test-3
Concrete Slump Test -1	Reg	103	8	8	0	Construction Materials	https://archive.ics.uci.edu/ml/datasets/Concrete+Slump+Test-1
Servo	Reg	168	24	2	4	Control Engineering	https://archive.ics.uci.edu/ml/datasets/Servo
Computer Hardware	Reg	210	7	7	0	Computer	https://archive.ics.uci.edu/ml/datasets/Computer+Hardware
Yacht Hydrodynamics	Reg	308	33	5	3	Hydromechanics	http://archive.ics.uci.edu/ml/datasets/yacht+hydrodynamics
QSAR aquatic toxicity	Reg	546	34	8	3	Earth and Environmental Sciences	https://archive.ics.uci.edu/ml/datasets/QSAR+aquatic+toxicity
QSAR Bioconcentration classes	Reg	779	25	8	4	Life and Environmental Sciences	https://archive.ics.uci.edu/ml/datasets/QSAR+Bioconcentration+classes
QSAR fish toxicity	Reg	909	18	6	2	Life and Environmental Sciences	https://archive.ics.uci.edu/ml/datasets/QSAR+fish+toxicity
insurance	Reg	1338	15	3	4	insurance	https://www.kaggle.com/mirichoi0218/insurance
Communities and Crime	Reg	1994	108	99	2	Social sciences	http://archive.ics.uci.edu/ml/datasets/communities+and+crime
Abalone R	Reg	4178	11	7	1	Biology	https://archive.ics.uci.edu/ml/datasets/abalone
squark automotive CLV training	Reg	8099	77	7	16	Marketing	https://www.kaggle.com/arashnic/marketing-seris-customer-li
Seoul Bike Sharing Demand	Reg	8760	15	9	3	Computer	https://archive.ics.uci.edu/ml/datasets/Seoul+Bike+Sharing+Demand
Electrical Grid Stability Simu	Reg	10000	12	12	0	Power Grid	https://archive.ics.uci.edu/ml/datasets/Electrical+Grid+Stability+Simulation
blr real estate prices	Reg	13320	2	2	0	Real Estate	https://www.kaggle.com/ambabhajoy/bengaluru-house-price-c
Cervical Cancer Behavior Risk	Classif	72	149	19	14	Medicine	https://archive.ics.uci.edu/ml/datasets/Cervical+Cancer+Behavior+Risk
Post-Operative Patient	Classif	91	32	0	8	Medicine	https://archive.ics.uci.edu/ml/datasets/Post-Operative+Patient
Breast Cancer Coimbra	Classif	116	9	9	0	Medicine	https://archive.ics.uci.edu/ml/datasets/Breast+Cancer+Coimbra
Heart failure clinical records	Classif	299	12	7	5	Medicine	https://archive.ics.uci.edu/ml/datasets/Heart+failure+clinical+records
Ionosphere	Classif	352	34	32	2	Earth and Communication systems	http://archive.ics.uci.edu/ml/datasets/Ionosphere
Congressional Voting Records	Classif	436	64	0	16	Political science	https://archive.ics.uci.edu/ml/datasets/congressional+voting+records
Cylinder Bands	Classif	541	111	1	19	Manufacturing quality control	https://archive.ics.uci.edu/ml/datasets/Cylinder+Bands
Credit Approval	Classif	691	42	4	8	Finance	https://archive.ics.uci.edu/ml/datasets/credit+approval
Tic-Tac-Toe Endgame	Classif	959	36	0	9	Game	https://archive.ics.uci.edu/ml/datasets/Tic-Tac-Toe+Endgame
QSAR biodegradation	Classif	1056	141	41	15	Chemometrics	https://archive.ics.uci.edu/ml/datasets/QSAR+biodegradation
Chess (King-Rook vs. King-Pawn)	Classif	3196	102	0	36	Game	https://archive.ics.uci.edu/ml/machine-learning-databases/chess-kn
Mushroom	Classif	8125	125	0	21	Life	https://archive.ics.uci.edu/ml/datasets/mushroom
Electrical Grid Stability Simu	Classif	10000	12	12	0	Power Grid	https://archive.ics.uci.edu/ml/datasets/Electrical+Grid+Stability+Simulation
MAGIC Gamma Telescope	Classif	19021	10	10	0	Earth Science	https://archive.ics.uci.edu/ml/datasets/magic+gamma+telescope
Adult	Classif	32561	34	6	5	Social sciences	https://archive.ics.uci.edu/ml/datasets/adult
Internet Firewall Data	Classif	65532	11	11	0	Digital Forensic and Security	https://archive.ics.uci.edu/ml/datasets/Internet+Firewall+Data

Table 2: Overall R2-test score for the regression task over the 16 regression datasets

	method	R2
1	Ensemble-MLR	0.7383±0.0409
2	Top5_MLR	0.7381±0.0426
3	MLR2_bagging	0.7364±0.0457
4	MLR1_bagging	0.734±0.039
5	Best_MLR	0.7284±0.0548
6	MLR3	0.722±0.0572
7	MLR1	0.7218±0.0393
8	MLR2	0.7203±0.0463
9	CATBOOST	0.7187±0.0497
10	XRF	0.7185±0.0516
11	MLR4	0.7122±0.0531
12	RF	0.7101±0.0525
13	LGBM	0.7063±0.0472
14	NuSVM	0.706±0.0469
15	XGBOOST	0.7001±0.063
16	xgb	0.6994±0.0649
17	MARS	0.6771±0.053
18	MLP	0.6664±0.1088
19	LAS	0.6559±0.0429
20	Ridge	0.6552±0.0448
21	Enet	0.6551±0.0415
22	Kernel	0.6453±0.0607
23	CART	0.5116±0.1148
24	FASTAI	-147159839.4601±247083157.4674
25	Intercept	-0.023±0.0278

Table 3: Overall test Accuracy for the classification task over the 16 classification datasets

	method	ACC
1	CATBOOST	0.887±0.0284
2	XRF	0.8772±0.0282
3	Top5_MLR	0.8759±0.0337
4	MLR1_bagging	0.8743±0.0314
5	MLR2_bagging	0.8741±0.034
6	Ensemble-MLR	0.8738±0.0332
7	RF	0.8731±0.0291
8	xgb	0.873±0.0294
9	XGBOOST	0.8696±0.0355
10	MLR1	0.8683±0.0277
11	MLR2	0.8679±0.028
12	Best_MLR	0.8676±0.0386
13	MLR3	0.8662±0.0361
14	MLR4	0.8648±0.0332
15	Bagging	0.8616±0.0309
16	Ridge	0.8594±0.0313
17	Enet	0.8555±0.032
18	LAS	0.8547±0.0328
19	ADABOOST	0.8499±0.0289
20	LinearRidge	0.8437±0.0374
21	CART	0.8352±0.0355
22	XCART	0.8024±0.0395
23	QDA	0.7232±0.0561
24	Class prob.	0.5935±0.0413
25	FASTAI	0.5647±0.0687
26	LGBM	0.4055±0.146

Table 4: Overall test AUC for the classification task over the 16 classification datasets

	method	AUC
1	CATBOOST	0.9152±0.0313
2	MLR1_bagging	0.9052±0.0279
3	RF	0.9049±0.0266
4	XRF	0.9048±0.0242
5	XGBOOST	0.9043±0.0391
6	Ensemble-MLR	0.9043±0.0272
7	xgb	0.9036±0.0396
8	Top5_MLR	0.9032±0.0282
9	MLR2_bagging	0.9025±0.0269
10	LGBM	0.9022±0.0306
11	MLR1	0.8975±0.0271
12	MLR3	0.894±0.034
13	Best_MLR	0.8935±0.0357
14	MLR2	0.8935±0.0268
15	MLR4	0.8893±0.0371
16	ADABOOST	0.8875±0.0359
17	Enet	0.8871±0.0272
18	Ridge	0.8864±0.0349
19	Bagging	0.8854±0.0467
20	LAS	0.8806±0.0307
21	LinearRidge	0.878±0.0409
22	FASTAI	0.8426±0.0532
23	CART	0.813±0.0403
24	XCART	0.7752±0.0482
25	QDA	0.7717±0.0515
26	Class prob.	0.4989±0.005

Table 5: Overall impact of HPO and Ensemble on R2-test performance for the regression task over 9 regression datasets

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.741±0.046	0.744±0.045	0.747±0.041
2	MLR	0.736±0.04	0.755±0.035	0.756±0.034
3	RF	0.736±0.036	0.737±0.036	0.739±0.035
4	XGB	0.729±0.039	0.735±0.038	0.74±0.034

	method	R2
1	Best_MLR	0.462±0.1
2	CART	0.07±0.118
3	CATBOOST	0.524±0.098
4	Enet	0.441±0.06
5	Ensemble-MLR	0.494±0.07
6	FASTAI	-888326445.962±1226426418.478
7	Intercept	-0.005±0.006
8	Kernel	0.318±0.155
9	LAS	0.446±0.057
10	LGBM	0.482±0.087
11	MARS	0.408±0.11
12	MLP	0.27±0.319
13	MLR1_bagging	0.481±0.075
14	MLR1	0.448±0.081
15	MLR2_bagging	0.495±0.068
16	MLR2	0.459±0.071
17	MLR3	0.458±0.09
18	MLR4	0.47±0.087
19	NuSVM	0.478±0.088
20	RF	0.475±0.093
21	Ridge	0.421±0.072
22	Top5_MLR	0.482±0.075
23	xgb	0.479±0.076
24	XGBOOST	0.489±0.088
25	XRF	0.5±0.101

Table 6: QSAR aquatic toxicity

	method	R2
1	Best_MLR	0.598±0.041
2	CART	0.342±0.09
3	CATBOOST	0.632±0.05
4	Enet	0.569±0.053
5	Ensemble-MLR	0.602±0.042
6	FASTAI	-81850246.21±175833485.896
7	Intercept	-0.009±0.012
8	Kernel	0.562±0.044
9	LAS	0.569±0.054
10	LGBM	0.612±0.046
11	MARS	0.564±0.066
12	MLP	0.576±0.047
13	MLR1_bagging	0.598±0.044
14	MLR1	0.59±0.043
15	MLR2_bagging	0.602±0.039
16	MLR2	0.586±0.037
17	MLR3	0.582±0.043
18	MLR4	0.579±0.046
19	NuSVM	0.611±0.041
20	RF	0.619±0.054
21	Ridge	0.57±0.055
22	Top5_MLR	0.599±0.043
23	xgb	0.606±0.051
24	XGBOOST	0.602±0.051
25	XRF	0.622±0.049

Table 7: QSAR fish toxicity

	method	R2
1	Best_MLR	0.668±0.048
2	CART	0.52±0.06
3	CATBOOST	0.733±0.051
4	Enet	0.665±0.048
5	Ensemble-MLR	0.686±0.043
6	FASTAI	-1288226651.558±2256805003.815
7	Intercept	-0.006±0.008
8	Kernel	0.609±0.122
9	LAS	0.665±0.049
10	LGBM	0.713±0.054
11	MARS	0.67±0.042
12	MLP	0.559±0.169
13	MLR1_bagging	0.682±0.042
14	MLR1	0.672±0.042
15	MLR2_bagging	0.683±0.048
16	MLR2	0.668±0.049
17	MLR3	0.666±0.051
18	MLR4	0.67±0.051
19	NuSVM	0.672±0.042
20	RF	0.731±0.049
21	Ridge	0.659±0.043
22	Top5_MLR	0.682±0.045
23	xgb	0.725±0.048
24	XGBOOST	0.725±0.047
25	XRF	0.722±0.051

Table 8: QSAR Bioconcentration classes

	method	R2
1	Best_MLR	0.879±0.008
2	CART	0.837±0.01
3	CATBOOST	0.924±0.005
4	Enet	0.73±0.012
5	Ensemble-MLR	0.87±0.008
6	FASTAI	0.906±0.006
7	Intercept	-0.001±0.001
8	Kernel	0.73±0.012
9	LAS	0.73±0.012
10	LGBM	0.919±0.005
11	MARS	0.738±0.013
12	MLP	0.89±0.007
13	MLR1_bagging	0.851±0.009
14	MLR1	0.85±0.009
15	MLR2_bagging	0.882±0.007
16	MLR2	0.878±0.008
17	MLR3	0.901±0.008
18	MLR4	0.893±0.008
19	NuSVM	0.846±0.009
20	RF	0.915±0.006
21	Ridge	0.73±0.012
22	Top5_MLR	0.882±0.008
23	xgb	0.899±0.005
24	XGBOOST	0.899±0.005
25	XRF	0.92±0.004

Table 9: Seoul Bike Sharing Demand

	method	R2
1	Best_MLR	0.958±0.002
2	CART	0.716±0.016
3	CATBOOST	0.965±0.002
4	Enet	0.648±0.017
5	Ensemble-MLR	0.952±0.002
6	FASTAI	0.964±0.002
7	Intercept	-0.001±0.001
8	Kernel	0.648±0.017
9	LAS	0.648±0.017
10	LGBM	0.947±0.002
11	MARS	0.781±0.009
12	MLP	0.954±0.003
13	MLR1_bagging	0.938±0.003
14	MLR1	0.937±0.003
15	MLR2_bagging	0.961±0.002
16	MLR2	0.958±0.002
17	MLR3	0.963±0.002
18	MLR4	0.955±0.002
19	NuSVM	0.958±0.002
20	RF	0.899±0.005
21	Ridge	0.648±0.017
22	Top5_MLR	0.96±0.002
23	xgb	0.906±0.003
24	XGBOOST	0.906±0.003
25	XRF	0.918±0.003

Table 10: Electrical Grid Stability Simu

	method	R2
1	Best_MLR	0.832±0.062
2	CART	0.797±0.093
3	CATBOOST	0.878±0.044
4	Enet	0.812±0.052
5	Ensemble-MLR	0.857±0.035
6	FASTAI	-83785006.191±264951455.96
7	Intercept	-0.073±0.074
8	Kernel	0.812±0.053
9	LAS	0.812±0.053
10	LGBM	0.803±0.056
11	MARS	0.798±0.091
12	MLP	0.797±0.088
13	MLR1_bagging	0.85±0.031
14	MLR1	0.836±0.031
15	MLR2_bagging	0.856±0.047
16	MLR2	0.839±0.046
17	MLR3	0.854±0.043
18	MLR4	0.842±0.049
19	NuSVM	0.83±0.047
20	RF	0.847±0.061
21	Ridge	0.816±0.053
22	Top5_MLR	0.856±0.034
23	xgb	0.863±0.043
24	XGBOOST	0.857±0.045
25	XRF	0.807±0.085

Table 11: Servo

	method	R2
1	Best_MLR	0.956±0.015
2	CART	0.613±0.246
3	CATBOOST	0.836±0.043
4	Enet	0.891±0.046
5	Ensemble-MLR	0.963±0.019
6	FASTAI	0.941±0.024
7	Intercept	-0.095±0.158
8	Kernel	0.891±0.046
9	LAS	0.891±0.046
10	LGBM	0.794±0.048
11	MARS	0.943±0.029
12	MLP	0.957±0.027
13	MLR1_bagging	0.953±0.028
14	MLR1	0.94±0.029
15	MLR2_bagging	0.967±0.017
16	MLR2	0.954±0.018
17	MLR3	0.954±0.025
18	MLR4	0.935±0.032
19	NuSVM	0.911±0.022
20	RF	0.776±0.064
21	Ridge	0.89±0.047
22	Top5_MLR	0.968±0.014
23	xgb	0.829±0.052
24	XGBOOST	0.836±0.053
25	XRF	0.893±0.037

Table 12: Concrete Slump Test -1

	method	R2
1	Best_MLR	0.502±0.178
2	CART	0.088±0.478
3	CATBOOST	0.375±0.172
4	Enet	0.392±0.096
5	Ensemble-MLR	0.503±0.143
6	FASTAI	0.415±0.197
7	Intercept	-0.051±0.049
8	Kernel	0.395±0.112
9	LAS	0.392±0.094
10	LGBM	0.402±0.155
11	MARS	0.451±0.132
12	MLP	0.407±0.188
13	MLR1_bagging	0.492±0.135
14	MLR1	0.455±0.133
15	MLR2_bagging	0.502±0.156
16	MLR2	0.453±0.159
17	MLR3	0.505±0.171
18	MLR4	0.425±0.245
19	NuSVM	0.415±0.161
20	RF	0.414±0.184
21	Ridge	0.383±0.108
22	Top5_MLR	0.494±0.153
23	xgb	0.331±0.265
24	XGBOOST	0.308±0.271
25	XRF	0.45±0.169

Table 13: Concrete Slump Test -2

	method	R2
1	Best_MLR	0.379±0.226
2	CART	-0.156±0.446
3	CATBOOST	0.208±0.202
4	Enet	0.154±0.124
5	Ensemble-MLR	0.422±0.154
6	FASTAI	0.299±0.277
7	Intercept	-0.072±0.08
8	Kernel	0.209±0.146
9	LAS	0.166±0.142
10	LGBM	0.255±0.17
11	MARS	0.266±0.198
12	MLP	0.23±0.207
13	MLR1_bagging	0.447±0.141
14	MLR1	0.399±0.132
15	MLR2_bagging	0.377±0.177
16	MLR2	0.313±0.171
17	MLR3	0.274±0.21
18	MLR4	0.226±0.149
19	NuSVM	0.269±0.164
20	RF	0.284±0.202
21	Ridge	0.189±0.139
22	Top5_MLR	0.424±0.169
23	xgb	0.11±0.379
24	XGBOOST	0.125±0.328
25	XRF	0.284±0.21

Table 14: Concrete Slump Test -3

	method	R2
1	Best_MLR	0.986±0.011
2	CART	0.935±0.05
3	CATBOOST	0.977±0.017
4	Enet	0.943±0.027
5	Ensemble-MLR	0.986±0.008
6	FASTAI	0.986±0.008
7	Intercept	-0.03±0.027
8	Kernel	0.946±0.028
9	LAS	0.942±0.028
10	LGBM	0.963±0.01
11	MARS	0.97±0.019
12	MLP	0.982±0.009
13	MLR1_bagging	0.982±0.008
14	MLR1	0.981±0.008
15	MLR2_bagging	0.987±0.008
16	MLR2	0.984±0.008
17	MLR3	0.985±0.008
18	MLR4	0.985±0.007
19	NuSVM	0.943±0.054
20	RF	0.973±0.011
21	Ridge	0.945±0.027
22	Top5_MLR	0.988±0.008
23	xgb	0.978±0.01
24	XGBOOST	0.979±0.01
25	XRF	0.986±0.008

Table 15: Computer Hardware

	method	R2
1	Best_MLR	0.962±0.02
2	CART	0.971±0.017
3	CATBOOST	0.984±0.011
4	Enet	0.963±0.02
5	Ensemble-MLR	0.964±0.021
6	FASTAI	0.972±0.019
7	Intercept	-0.015±0.016
8	Kernel	0.963±0.02
9	LAS	0.963±0.02
10	LGBM	0.966±0.019
11	MARS	0.962±0.019
12	MLP	0.964±0.02
13	MLR1_bagging	0.958±0.021
14	MLR1	0.952±0.021
15	MLR2_bagging	0.968±0.021
16	MLR2	0.962±0.02
17	MLR3	0.965±0.02
18	MLR4	0.96±0.021
19	NuSVM	0.922±0.025
20	RF	0.98±0.009
21	Ridge	0.963±0.02
22	Top5_MLR	0.965±0.022
23	xgb	0.988±0.007
24	XGBOOST	0.987±0.008
25	XRF	0.98±0.008

Table 16: Yacht Hydrodynamics

	method	R2
1	Best_MLR	0.548±0.086
2	CART	0.119±0.054
3	CATBOOST	0.543±0.022
4	Enet	0.531±0.015
5	Ensemble-MLR	0.566±0.035
6	FASTAI	-12369089.738±29314154.7
7	Intercept	-0.001±0.001
8	Kernel	0.496±0.119
9	LAS	0.527±0.021
10	LGBM	0.528±0.025
11	MARS	0.534±0.043
12	MLP	0.391±0.555
13	MLR1_bagging	0.571±0.017
14	MLR1	0.566±0.023
15	MLR2_bagging	0.553±0.065
16	MLR2	0.543±0.078
17	MLR3	0.523±0.163
18	MLR4	0.538±0.078
19	NuSVM	0.55±0.009
20	RF	0.53±0.026
21	Ridge	0.523±0.029
22	Top5_MLR	0.566±0.035
23	xgb	0.54±0.018
24	XGBOOST	0.545±0.016
25	XRF	0.522±0.023

Table 17: Abalone R

	method	R2
1	Ensemble-MLR	0.69±0.029
2	MLR1_bagging	0.689±0.03
3	MLR2_bagging	0.689±0.029
4	Top5_MLR	0.685±0.029
5	MLR3	0.68±0.03
6	MLR4	0.68±0.027
7	Kernel	0.679±0.033
8	MLR1	0.679±0.031
9	Ridge	0.679±0.031
10	Enet	0.677±0.029
11	MLR2	0.677±0.029
12	LAS	0.676±0.029
13	CATBOOST	0.676±0.028
14	Best_MLR	0.675±0.035
15	XGBOOST	0.672±0.032
16	XRF	0.672±0.024
17	LGBM	0.668±0.028
18	MARS	0.667±0.031
19	xgb	0.667±0.031
20	NuSVM	0.665±0.025
21	RF	0.664±0.026
22	FASTAI	0.619±0.037
23	MLP	0.518±0.051
24	CART	0.298±0.083
25	Intercept	-0.003±0.004

Table 18: Communities and Crime

	method	R2
1	XGBOOST	0.848±0.03
2	xgb	0.847±0.03
3	Ensemble-MLR	0.843±0.025
4	MLR2_bagging	0.842±0.026
5	MLR1_bagging	0.842±0.024
6	Top5_MLR	0.841±0.025
7	MLR1	0.839±0.024
8	MLP	0.837±0.028
9	MLR2	0.837±0.026
10	Best_MLR	0.837±0.025
11	NuSVM	0.836±0.034
12	MLR3	0.833±0.033
13	MLR4	0.832±0.028
14	RF	0.824±0.032
15	CATBOOST	0.822±0.03
16	LGBM	0.822±0.03
17	FASTAI	0.805±0.033
18	XRF	0.798±0.033
19	Kernel	0.774±0.027
20	Ridge	0.774±0.027
21	Enet	0.774±0.026
22	LAS	0.774±0.026
23	MARS	0.77±0.026
24	CART	0.69±0.047
25	Intercept	-0.004±0.007

Table 19: Insurance

	method	R2
1	RF	0.909±0.006
2	LGBM	0.905±0.008
3	CATBOOST	0.904±0.008
4	xgb	0.903±0.007
5	XGBOOST	0.902±0.007
6	XRF	0.902±0.006
7	Ensemble-MLR	0.898±0.006
8	MLR2_bagging	0.898±0.006
9	Enet	0.897±0.007
10	Kernel	0.897±0.007
11	LAS	0.897±0.007
12	MARS	0.896±0.008
13	Ridge	0.896±0.007
14	MLR1_bagging	0.896±0.006
15	Top5_MLR	0.896±0.006
16	Best_MLR	0.892±0.006
17	MLR1	0.891±0.006
18	MLR2	0.89±0.006
19	MLR3	0.889±0.006
20	MLR4	0.883±0.007
21	FASTAI	0.878±0.008
22	NuSVM	0.871±0.014
23	CART	0.827±0.017
24	MLP	0.807±0.01
25	Intercept	-0.001±0.003

Table 20: squark automotive CLV training

	method	R2
1	Intercept	0±0
2	Best_MLR	0.522±0.013
3	MLR3	0.522±0.013
4	XGBOOST	0.522±0.013
5	MLR2_bagging	0.522±0.012
6	MLR2	0.522±0.012
7	xgb	0.522±0.012
8	LGBM	0.521±0.013
9	MLP	0.521±0.013
10	MLR4	0.521±0.013
11	NuSVM	0.521±0.012
12	Top5_MLR	0.521±0.012
13	RF	0.52±0.013
14	Ensemble-MLR	0.52±0.012
15	CART	0.519±0.013
16	CATBOOST	0.519±0.013
17	XRF	0.519±0.013
18	MLR1_bagging	0.515±0.012
19	MLR1	0.514±0.012
20	FASTAI	0.513±0.018
21	MARS	0.416±0.014
22	Kernel	0.396±0.031
23	LAS	0.396±0.031
24	Ridge	0.396±0.031
25	Enet	0.395±0.03

Table 21: blr real estate prices

	method	ACC	AUC
1	XRF	0.733±0.063	0.83±0.038
2	xgb	0.729±0.066	0.824±0.048
3	Top5_MLR	0.713±0.101	0.808±0.07
4	MLR1_bagging	0.713±0.084	0.813±0.063
5	Ensemble-MLR	0.708±0.096	0.809±0.059
6	MLR1	0.705±0.082	0.791±0.059
7	Enet	0.704±0.107	0.782±0.081
8	ADABOOST	0.704±0.063	0.764±0.09
9	CATBOOST	0.704±0.06	0.822±0.06
10	LAS	0.7±0.125	0.775±0.085
11	MLR2_bagging	0.7±0.092	0.8±0.062
12	Ridge	0.696±0.123	0.779±0.07
13	XGBOOST	0.696±0.068	0.798±0.073
14	CART	0.688±0.091	0.69±0.09
15	MLR2	0.685±0.077	0.774±0.054
16	Best_MLR	0.679±0.108	0.781±0.037
17	MLR4	0.675±0.07	0.804±0.057
18	Bagging	0.675±0.047	0.773±0.065
19	RF	0.667±0.065	0.785±0.074
20	LinearRidge	0.662±0.122	0.754±0.12
21	MLR3	0.658±0.094	0.774±0.051
22	FASTAI	0.629±0.112	0.745±0.096
23	QDA	0.625±0.081	0.749±0.045
24	XCART	0.575±0.1	0.574±0.085
25	Class prob.	0.496±0.123	0.5±0
26	LGBM	-0.191±0.224	0.801±0.067

Table 22: Breast Cancer Coimbra

	method	ACC	AUC
1	MLR1_bagging	0.907±0.064	0.932±0.086
2	XRF	0.9±0.079	0.909±0.096
3	CATBOOST	0.893±0.064	0.911±0.103
4	Ridge	0.88±0.069	0.877±0.133
5	Top5_MLR	0.873±0.08	0.931±0.072
6	Ensemble-MLR	0.867±0.089	0.933±0.088
7	RF	0.867±0.077	0.917±0.102
8	Enet	0.86±0.091	0.896±0.099
9	Bagging	0.853±0.108	0.795±0.279
10	LinearRidge	0.853±0.103	0.842±0.154
11	MLR2_bagging	0.853±0.098	0.921±0.09
12	ADABOOST	0.853±0.053	0.9±0.087
13	XGBOOST	0.847±0.122	0.851±0.19
14	MLR1	0.832±0.071	0.878±0.098
15	Best_MLR	0.827±0.084	0.841±0.212
16	MLR4	0.82±0.114	0.799±0.179
17	MLR2	0.819±0.088	0.863±0.119
18	MLR3	0.807±0.124	0.85±0.126
19	xgb	0.807±0.086	0.825±0.215
20	XCART	0.793±0.119	0.714±0.189
21	LAS	0.793±0.08	0.808±0.145
22	CART	0.78±0.126	0.709±0.192
23	Class prob.	0.773±0.11	0.5±0
24	QDA	0.567±0.079	0.498±0.152
25	FASTAI	0.52±0.201	0.521±0.217
26	LGBM	-0.616±0.939	0.784±0.139

Table 23: Cervical Cancer Behavior Risk

	method	ACC	AUC
1	CATBOOST	0.873±0.048	0.923±0.037
2	RF	0.873±0.042	0.919±0.038
3	xgb	0.842±0.051	0.896±0.039
4	XGBOOST	0.842±0.047	0.902±0.036
5	ADABOOST	0.835±0.046	0.873±0.033
6	XRF	0.832±0.049	0.898±0.045
7	Bagging	0.828±0.054	0.882±0.042
8	Ridge	0.827±0.065	0.871±0.039
9	LAS	0.825±0.067	0.869±0.041
10	LinearRidge	0.825±0.067	0.87±0.035
11	Enet	0.82±0.061	0.871±0.039
12	MLR3	0.808±0.059	0.851±0.054
13	Ensemble-MLR	0.807±0.073	0.858±0.043
14	MLR2_bagging	0.805±0.077	0.855±0.04
15	MLR1_bagging	0.798±0.071	0.863±0.043
16	CART	0.797±0.049	0.763±0.051
17	Top5_MLR	0.795±0.078	0.856±0.044
18	MLR1	0.794±0.069	0.848±0.04
19	MLR4	0.793±0.06	0.839±0.057
20	MLR2	0.793±0.058	0.841±0.04
21	Best_MLR	0.792±0.08	0.84±0.046
22	QDA	0.75±0.068	0.78±0.065
23	Class prob.	0.702±0.058	0.5±0
24	XCART	0.7±0.038	0.638±0.063
25	FASTAI	0.483±0.056	0.777±0.054
26	LGBM	0.339±0.171	0.916±0.038

Table 24: Heart failure clinical records

	method	ACC	AUC
1	CATBOOST	0.869±0.03	0.932±0.022
2	MLR1_bagging	0.866±0.032	0.924±0.022
3	Ensemble-MLR	0.865±0.031	0.926±0.021
4	MLR2_bagging	0.865±0.03	0.923±0.022
5	Top5_MLR	0.861±0.03	0.921±0.023
6	RF	0.86±0.029	0.933±0.022
7	xgb	0.857±0.03	0.924±0.025
8	XRF	0.857±0.028	0.922±0.019
9	MLR3	0.856±0.028	0.906±0.034
10	MLR1	0.854±0.023	0.914±0.023
11	Ridge	0.854±0.016	0.915±0.022
12	MLR4	0.853±0.033	0.907±0.025
13	LAS	0.853±0.017	0.917±0.021
14	MLR2	0.851±0.025	0.912±0.023
15	Best_MLR	0.85±0.034	0.909±0.028
16	XGBOOST	0.848±0.034	0.918±0.026
17	Enet	0.845±0.026	0.918±0.022
18	Bagging	0.843±0.019	0.902±0.024
19	ADABOOST	0.842±0.026	0.905±0.026
20	LinearRidge	0.836±0.017	0.912±0.022
21	CART	0.794±0.025	0.77±0.032
22	XCART	0.791±0.023	0.768±0.026
23	Class prob.	0.658±0.03	0.5±0
24	FASTAI	0.568±0.038	0.862±0.026
25	QDA	0.556±0.029	0.657±0.012
26	LGBM	0.379±0.144	0.925±0.027

Table 25: QSAR biodegradation

	method	ACC	AUC
1	ADABOOST	1±0	1±0
2	Bagging	1±0	1±0
3	CART	1±0	1±0
4	CATBOOST	1±0	1±0
5	RF	1±0	1±0
6	xgb	1±0	1±0
7	XGBOOST	1±0	1±0
8	XRF	1±0	1±0
9	LGBM	0.999±0.001	1±0
10	QDA	0.999±0	1±0
11	XCART	0.999±0	1±0
12	MLR3	0.998±0	1±0
13	LAS	0.997±0	1±0
14	MLR2_bagging	0.997±0	1±0
15	MLR2	0.997±0	1±0
16	MLR4	0.997±0	1±0
17	Ridge	0.997±0	1±0
18	Best_MLR	0.996±0.003	1±0
19	Ensemble-MLR	0.996±0.001	1±0
20	Top5_MLR	0.996±0.001	1±0
21	MLR1_bagging	0.992±0.001	1±0
22	MLR1	0.992±0.001	1±0
23	Enet	0.971±0.004	0.998±0
24	LinearRidge	0.923±0.002	0.996±0
25	Class prob.	0.514±0.006	0.5±0.004
26	FASTAI	0.483±0.13	0.67±0.206

Table 26: Internet Firewall Data

	method	ACC	AUC
1	MLR3	0.958±0.007	0.992±0.002
2	MLR2_bagging	0.956±0.004	0.993±0.001
3	Top5_MLR	0.956±0.004	0.993±0.001
4	CATBOOST	0.955±0.005	0.993±0.001
5	Ensemble-MLR	0.953±0.005	0.992±0.001
6	Best_MLR	0.953±0.004	0.992±0.001
7	MLR2	0.953±0.004	0.992±0.001
8	MLR4	0.949±0.007	0.989±0.002
9	MLR1_bagging	0.946±0.004	0.99±0.002
10	MLR1	0.943±0.005	0.989±0.002
11	XRF	0.923±0.007	0.984±0.002
12	xgb	0.92±0.007	0.977±0.003
13	RF	0.919±0.006	0.979±0.003
14	XGBOOST	0.915±0.006	0.976±0.003
15	Bagging	0.895±0.007	0.961±0.005
16	QDA	0.878±0.009	0.951±0.006
17	ADABOOST	0.849±0.007	0.931±0.008
18	CART	0.846±0.008	0.832±0.008
19	LinearRidge	0.817±0.011	0.892±0.011
20	Enet	0.817±0.01	0.892±0.011
21	LAS	0.817±0.01	0.892±0.011
22	Ridge	0.816±0.011	0.892±0.011
23	XCART	0.764±0.013	0.742±0.014
24	LGBM	0.744±0.028	0.988±0.002
25	FASTAI	0.605±0.01	0.99±0.002
26	Class prob.	0.535±0.011	0.497±0.009

Table 27: Electrical Grid Stability Simu

	method	ACC	AUC
1	Class prob.	0.689±0.091	0.5±0
2	Ridge	0.689±0.091	0.492±0.174
3	Enet	0.684±0.093	0.473±0.075
4	LAS	0.684±0.093	0.476±0.066
5	LinearRidge	0.653±0.145	0.453±0.2
6	QDA	0.653±0.145	0.484±0.179
7	Best_MLR	0.647±0.129	0.432±0.14
8	CATBOOST	0.642±0.126	0.45±0.196
9	MLR1	0.639±0.085	0.449±0.126
10	Top5_MLR	0.632±0.129	0.395±0.156
11	MLR2	0.624±0.087	0.403±0.11
12	MLR3	0.621±0.138	0.439±0.162
13	MLR4	0.621±0.102	0.42±0.152
14	XRF	0.616±0.119	0.468±0.117
15	xgb	0.611±0.114	0.448±0.209
16	MLR1_bagging	0.605±0.114	0.426±0.144
17	XGBOOST	0.6±0.163	0.484±0.194
18	ADABOOST	0.6±0.114	0.458±0.19
19	MLR2_bagging	0.6±0.112	0.396±0.136
20	Ensemble-MLR	0.6±0.106	0.403±0.141
21	RF	0.595±0.134	0.413±0.112
22	CART	0.568±0.135	0.443±0.131
23	Bagging	0.563±0.14	0.427±0.21
24	XCART	0.558±0.139	0.433±0.171
25	FASTAI	0.484±0.158	0.579±0.138
26	LGBM	-0.724±0.372	0.461±0.128

Table 28: Post-Operative Patient

	method	ACC	AUC
1	CATBOOST	0.957±0.015	0.992±0.006
2	xgb	0.955±0.017	0.989±0.009
3	XGBOOST	0.953±0.015	0.983±0.015
4	LinearRidge	0.952±0.02	0.992±0.007
5	MLR1_bagging	0.952±0.017	0.991±0.004
6	RF	0.952±0.014	0.989±0.007
7	XRF	0.952±0.014	0.987±0.009
8	MLR2_bagging	0.951±0.02	0.991±0.005
9	Enet	0.951±0.019	0.991±0.009
10	Ensemble-MLR	0.951±0.019	0.992±0.004
11	ADABOOST	0.949±0.022	0.989±0.008
12	LAS	0.949±0.02	0.986±0.021
13	Top5_MLR	0.949±0.018	0.99±0.006
14	MLR4	0.949±0.017	0.98±0.019
15	Ridge	0.948±0.011	0.99±0.006
16	MLR1	0.947±0.016	0.986±0.005
17	MLR3	0.947±0.014	0.978±0.021
18	Bagging	0.945±0.014	0.973±0.02
19	MLR2	0.945±0.014	0.986±0.008
20	Best_MLR	0.94±0.023	0.986±0.008
21	CART	0.936±0.017	0.93±0.011
22	XCART	0.905±0.025	0.896±0.021
23	LGBM	0.804±0.058	0.989±0.005
24	QDA	0.798±0.104	0.849±0.081
25	FASTAI	0.644±0.039	0.966±0.019
26	Class prob.	0.632±0.053	0.5±0

Table 29: Congressional Voting Records

	method	ACC	AUC
1	CATBOOST	0.988±0.007	0.998±0.003
2	XRF	0.986±0.01	0.999±0.001
3	RF	0.982±0.01	0.998±0.002
4	MLR3	0.982±0.007	0.998±0.002
5	LinearRidge	0.981±0.007	0.994±0.005
6	Ridge	0.981±0.007	0.993±0.005
7	MLR2_bagging	0.981±0.006	0.999±0
8	MLR2	0.981±0.004	0.997±0.003
9	MLR1_bagging	0.98±0.007	0.999±0
10	MLR4	0.98±0.007	0.997±0.004
11	Ensemble-MLR	0.98±0.006	0.999±0
12	LAS	0.98±0.006	0.994±0.005
13	Top5_MLR	0.98±0.005	0.999±0.001
14	MLR1	0.98±0.004	0.997±0.002
15	XGBOOST	0.979±0.009	0.993±0.007
16	Enet	0.978±0.007	0.991±0.006
17	xgb	0.976±0.008	0.988±0.004
18	Best_MLR	0.975±0.013	0.996±0.006
19	Bagging	0.974±0.015	0.99±0.006
20	LGBM	0.952±0.017	0.997±0.005
21	CART	0.94±0.012	0.936±0.014
22	ADABOOST	0.834±0.039	0.935±0.029
23	XCART	0.833±0.036	0.815±0.045
24	QDA	0.569±0.084	0.7±0.075
25	Class prob.	0.542±0.032	0.489±0.043
26	FASTAI	0.491±0.032	0.995±0.007

Table 30: Tic-Tac-Toe Endgame

	method	ACC	AUC
1	CATBOOST	0.855±0.025	0.932±0.021
2	XGBOOST	0.853±0.025	0.921±0.023
3	Ridge	0.852±0.029	0.912±0.027
4	Ensemble-MLR	0.852±0.028	0.913±0.024
5	LinearRidge	0.85±0.034	0.912±0.027
6	MLR1_bagging	0.85±0.026	0.914±0.024
7	MLR2_bagging	0.85±0.026	0.911±0.025
8	MLR2	0.85±0.025	0.907±0.024
9	RF	0.85±0.025	0.912±0.019
10	xgb	0.85±0.025	0.925±0.023
11	LAS	0.848±0.033	0.906±0.03
12	Enet	0.848±0.029	0.911±0.028
13	Best_MLR	0.848±0.025	0.911±0.028
14	Top5_MLR	0.848±0.024	0.913±0.025
15	MLR1	0.847±0.023	0.91±0.023
16	XRF	0.844±0.026	0.886±0.022
17	MLR3	0.843±0.028	0.899±0.025
18	Bagging	0.842±0.026	0.907±0.023
19	MLR4	0.842±0.022	0.898±0.029
20	ADABOOST	0.837±0.025	0.901±0.028
21	XCART	0.801±0.05	0.801±0.051
22	CART	0.799±0.026	0.801±0.027
23	FASTAI	0.656±0.052	0.866±0.021
24	QDA	0.636±0.082	0.708±0.045
25	Class prob.	0.556±0.031	0.5±0
26	LGBM	0.359±0.102	0.919±0.026

Table 31: Credit Approval

	method	ACC	AUC
1	XRF	0.942±0.024	0.992±0.006
2	RF	0.937±0.028	0.983±0.012
3	MLR2_bagging	0.931±0.033	0.985±0.012
4	CATBOOST	0.927±0.033	0.981±0.017
5	xgb	0.927±0.032	0.971±0.021
6	Top5_MLR	0.923±0.035	0.981±0.016
7	MLR3	0.923±0.024	0.973±0.023
8	MLR2	0.922±0.027	0.976±0.015
9	Best_MLR	0.921±0.04	0.969±0.029
10	Ensemble-MLR	0.918±0.033	0.98±0.016
11	QDA	0.918±0.026	0.957±0.02
12	XGBOOST	0.917±0.032	0.967±0.02
13	Bagging	0.914±0.032	0.958±0.031
14	MLR4	0.91±0.031	0.965±0.022
15	ADABOOST	0.907±0.037	0.94±0.033
16	MLR1_bagging	0.906±0.033	0.973±0.02
17	MLR1	0.905±0.028	0.962±0.022
18	Enet	0.877±0.031	0.916±0.029
19	LAS	0.873±0.032	0.909±0.022
20	CART	0.869±0.036	0.858±0.041
21	XCART	0.868±0.038	0.855±0.043
22	Ridge	0.868±0.037	0.904±0.031
23	LinearRidge	0.856±0.034	0.902±0.037
24	LGBM	0.707±0.087	0.974±0.021
25	FASTAI	0.663±0.072	0.972±0.023
26	Class prob.	0.635±0.032	0.5±0

Table 32: Ionosphere

	method	ACC	AUC
1	XGBOOST	0.783±0.031	0.844±0.031
2	xgb	0.783±0.023	0.85±0.03
3	CATBOOST	0.78±0.028	0.847±0.029
4	MLR2_bagging	0.777±0.032	0.838±0.028
5	Top5_MLR	0.772±0.023	0.836±0.027
6	Ensemble-MLR	0.769±0.032	0.837±0.028
7	MLR1_bagging	0.764±0.035	0.834±0.029
8	MLR2	0.749±0.025	0.819±0.023
9	LAS	0.748±0.027	0.824±0.034
10	RF	0.748±0.023	0.819±0.026
11	Bagging	0.748±0.021	0.812±0.034
12	XRF	0.748±0.017	0.793±0.023
13	MLR1	0.745±0.024	0.817±0.024
14	MLR3	0.742±0.045	0.819±0.034
15	Best_MLR	0.739±0.06	0.812±0.027
16	LinearRidge	0.739±0.019	0.821±0.023
17	Enet	0.739±0.016	0.826±0.026
18	MLR4	0.734±0.055	0.809±0.036
19	Ridge	0.733±0.025	0.825±0.029
20	ADABOOST	0.727±0.014	0.806±0.033
21	CART	0.724±0.033	0.736±0.035
22	XCART	0.696±0.022	0.709±0.03
23	QDA	0.65±0.061	0.665±0.062
24	Class prob.	0.571±0.047	0.5±0
25	FASTAI	0.552±0.046	0.755±0.029
26	LGBM	0.006±0.147	0.823±0.027

Table 33: Cylinder Bands

	method	ACC	AUC
1	CATBOOST	0.995±0.003	1±0
2	Bagging	0.995±0.002	0.999±0.001
3	CART	0.995±0.002	0.995±0.002
4	MLR2_bagging	0.994±0.003	0.999±0.001
5	Ensemble-MLR	0.993±0.003	0.999±0.001
6	MLR3	0.993±0.003	0.999±0.001
7	Top5_MLR	0.993±0.003	0.999±0.001
8	MLR1_bagging	0.992±0.004	0.999±0.001
9	MLR2	0.992±0.003	0.999±0.001
10	MLR4	0.992±0.003	0.998±0.002
11	RF	0.992±0.003	0.999±0.001
12	Best_MLR	0.991±0.004	0.999±0.001
13	XRF	0.991±0.004	0.999±0.001
14	MLR1	0.99±0.003	0.998±0.001
15	LGBM	0.98±0.008	1±0
16	xgb	0.978±0.004	0.998±0.001
17	LAS	0.975±0.006	0.996±0.001
18	Ridge	0.975±0.006	0.995±0.002
19	ADABOOST	0.965±0.007	0.994±0.003
20	XCART	0.963±0.013	0.963±0.013
21	Enet	0.959±0.008	0.992±0.002
22	XGBOOST	0.953±0.008	0.996±0.001
23	LinearRidge	0.937±0.009	0.984±0.003
24	FASTAI	0.73±0.048	0.997±0.004
25	QDA	0.621±0.047	0.757±0.047
26	Class prob.	0.523±0.013	0.5±0

Table 34: Chess (King-Rook vs. King-Pawn)

	method	ACC	AUC
1	Bagging	1±0.001	1±0.001
2	CART	1±0.001	1±0.001
3	LGBM	1±0.001	1±0
4	xgb	1±0.001	1±0
5	ADABOOST	1±0	1±0
6	CATBOOST	1±0	1±0
7	LAS	1±0	1±0
8	LinearRidge	1±0	1±0
9	QDA	1±0	1±0
10	RF	1±0	1±0
11	XCART	1±0	1±0
12	XRF	1±0	1±0
13	Best_MLR	0.999±0.001	1±0
14	Enet	0.999±0.001	1±0
15	Ensemble-MLR	0.999±0.001	1±0
16	MLR1_bagging	0.999±0.001	1±0
17	MLR1	0.999±0.001	1±0
18	MLR2_bagging	0.999±0.001	1±0
19	MLR2	0.999±0.001	1±0
20	MLR3	0.999±0.001	1±0.001
21	Ridge	0.999±0.001	1±0
22	Top5_MLR	0.999±0.001	1±0
23	XGBOOST	0.999±0.001	1±0
24	MLR4	0.998±0.003	0.999±0.001
25	FASTAI	0.601±0.079	0.999±0.001
26	Class prob.	0.494±0.009	0.5±0.009

Table 35: Mushroom

	method	ACC	AUC
1	CATBOOST	0.89±0.005	0.941±0.003
2	RF	0.882±0.004	0.936±0.002
3	MLR2_bagging	0.876±0.004	0.927±0.003
4	XRF	0.876±0.004	0.935±0.003
5	MLR3	0.876±0.003	0.926±0.003
6	Best_MLR	0.875±0.004	0.927±0.003
7	MLR2	0.875±0.004	0.926±0.003
8	Top5_MLR	0.875±0.004	0.927±0.003
9	MLR4	0.875±0.003	0.925±0.004
10	Ensemble-MLR	0.874±0.005	0.925±0.003
11	xgb	0.873±0.004	0.925±0.004
12	XGBOOST	0.869±0.005	0.923±0.003
13	MLR1_bagging	0.869±0.004	0.921±0.003
14	MLR1	0.869±0.004	0.921±0.003
15	Bagging	0.868±0.004	0.916±0.004
16	ADABOOST	0.841±0.005	0.895±0.004
17	CART	0.817±0.004	0.799±0.004
18	XCART	0.794±0.011	0.773±0.011
19	Ridge	0.791±0.005	0.839±0.006
20	Enet	0.79±0.005	0.839±0.006
21	LAS	0.79±0.005	0.839±0.006
22	QDA	0.784±0.005	0.873±0.005
23	LinearRidge	0.782±0.004	0.838±0.005
24	Class prob.	0.54±0.006	0.497±0.009
25	FASTAI	0.534±0.013	0.924±0.004
26	LGBM	0.487±0.015	0.937±0.002

Table 36: MAGIC Gamma Telescope

	method	ACC	AUC
1	CATBOOST	0.866±0.004	0.922±0.003
2	xgb	0.862±0.004	0.917±0.003
3	XGBOOST	0.859±0.003	0.915±0.003
4	ADABOOST	0.857±0.004	0.91±0.003
5	Ensemble-MLR	0.85±0.005	0.903±0.004
6	MLR2_bagging	0.85±0.005	0.903±0.004
7	Top5_MLR	0.85±0.005	0.903±0.004
8	MLR1_bagging	0.85±0.004	0.903±0.004
9	MLR1	0.85±0.004	0.902±0.004
10	Best_MLR	0.849±0.005	0.902±0.004
11	MLR2	0.849±0.005	0.902±0.004
12	MLR4	0.849±0.005	0.901±0.004
13	MLR3	0.849±0.004	0.901±0.004
14	RF	0.848±0.006	0.895±0.005
15	Enet	0.845±0.004	0.899±0.004
16	LAS	0.845±0.004	0.899±0.004
17	Ridge	0.845±0.004	0.899±0.004
18	Bagging	0.841±0.003	0.872±0.002
19	XRF	0.835±0.005	0.875±0.005
20	LinearRidge	0.834±0.004	0.885±0.004
21	CART	0.812±0.004	0.746±0.006
22	XCART	0.798±0.005	0.722±0.007
23	Class prob.	0.636±0.007	0.499±0.006
24	QDA	0.569±0.079	0.719±0.03
25	FASTAI	0.389±0.014	0.863±0.004
26	LGBM	0.262±0.023	0.921±0.003

Table 37: Adult

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.165±0.241	0.176±0.234	0.215±0.187
2	MLR	0.276±0.2	0.375±0.165	0.385±0.161
3	RF	0.262±0.147	0.266±0.147	0.299±0.135
4	XGB	0.154±0.18	0.169±0.176	0.222±0.133

Table 38: HPO, Dataset 0

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.541±0.099	0.543±0.1	0.54±0.101
2	MLR	0.453±0.083	0.483±0.074	0.486±0.065
3	RF	0.481±0.075	0.485±0.076	0.491±0.08
4	XGB	0.488±0.099	0.501±0.098	0.502±0.09

Table 39: HPO, Dataset 1

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.978±0.019	0.979±0.018	0.98±0.015
2	MLR	0.988±0.007	0.992±0.007	0.993±0.006
3	RF	0.974±0.01	0.975±0.01	0.974±0.01
4	XGB	0.977±0.01	0.982±0.011	0.982±0.01

Table 40: HPO, Dataset 2

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.985±0.01	0.986±0.01	0.985±0.01
2	MLR	0.975±0.014	0.977±0.015	0.976±0.015
3	RF	0.978±0.012	0.978±0.012	0.978±0.013
4	XGB	0.986±0.007	0.988±0.008	0.987±0.008

Table 41: HPO,

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.686±0.026	0.689±0.026	0.689±0.026
2	MLR	0.675±0.029	0.684±0.028	0.686±0.028
3	RF	0.676±0.023	0.678±0.023	0.678±0.023
4	XGB	0.67±0.022	0.677±0.022	0.68±0.023

Table 42: HPO,

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.847±0.026	0.848±0.026	0.847±0.026
2	MLR	0.838±0.027	0.843±0.026	0.843±0.027
3	RF	0.846±0.029	0.847±0.029	0.847±0.029
4	XGB	0.835±0.024	0.839±0.024	0.835±0.023

Table 43: HPO,

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.909±0.007	0.909±0.007	0.91±0.007
2	MLR	0.893±0.007	0.898±0.006	0.898±0.007
3	RF	0.906±0.008	0.907±0.008	0.906±0.009
4	XGB	0.905±0.007	0.906±0.007	0.907±0.007

Table 44: HPO and ensemble for regression dataset 6

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.522±0.012	0.522±0.012	0.522±0.012
2	MLR	0.522±0.013	0.522±0.013	0.523±0.013
3	RF	0.522±0.013	0.522±0.013	0.522±0.013
4	XGB	0.518±0.014	0.518±0.014	0.518±0.014

Table 45: HPO and ensemble for regression dataset 7

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.924±0.005	0.926±0.006	0.926±0.005
2	MLR	0.903±0.007	0.914±0.007	0.913±0.007
3	RF	0.912±0.007	0.912±0.007	0.911±0.007
4	XGB	0.916±0.009	0.921±0.007	0.919±0.007

Table 46: HPO and ensemble for regression dataset 8

	method	R2	Bagging.R2	Ensemble.R2
1	CAT	0.856±0.015	0.86±0.015	0.858±0.017
2	MLR	0.839±0.011	0.863±0.01	0.857±0.016
3	RF	0.798±0.037	0.799±0.037	0.785±0.036
4	XGB	0.842±0.018	0.849±0.017	0.851±0.021

Table 47: HPO and ensemble for regression dataset 9