National Research Tomsk State University

Лаборатория анализа данных физики высоких энергий Томского государственного университета

Measurement of differential cross-sections of a single top quark produced in association with a W boson with ATLAS at $\sqrt{s} = 13$ TeV

Progress Report

Neda Firoz

Goal: separate **tW (top+anti-top)** from **$t\bar{t}$** in the **1j1b dilepton** region

•**Inputs (9 variables used):**
bdt_centrality_ll_recalc_NOSYS,
bdt_delta_pT_ll_MET_recalc_NOSYS,
bdt_delta_pT_llb_MET_recalc_NOSYS,
bdt_eta_llMetB_recalc_NOSYS,
bdt_m_l1b_recalc_NOSYS,
bdt_m_l2b_recalc_NOSYS,
bdt_pT_llMetB_recalc_NOSYS,
bdt_pT_llb_recalc_NOSYS,
bdt_sum_ET_recalc_NOSYS.

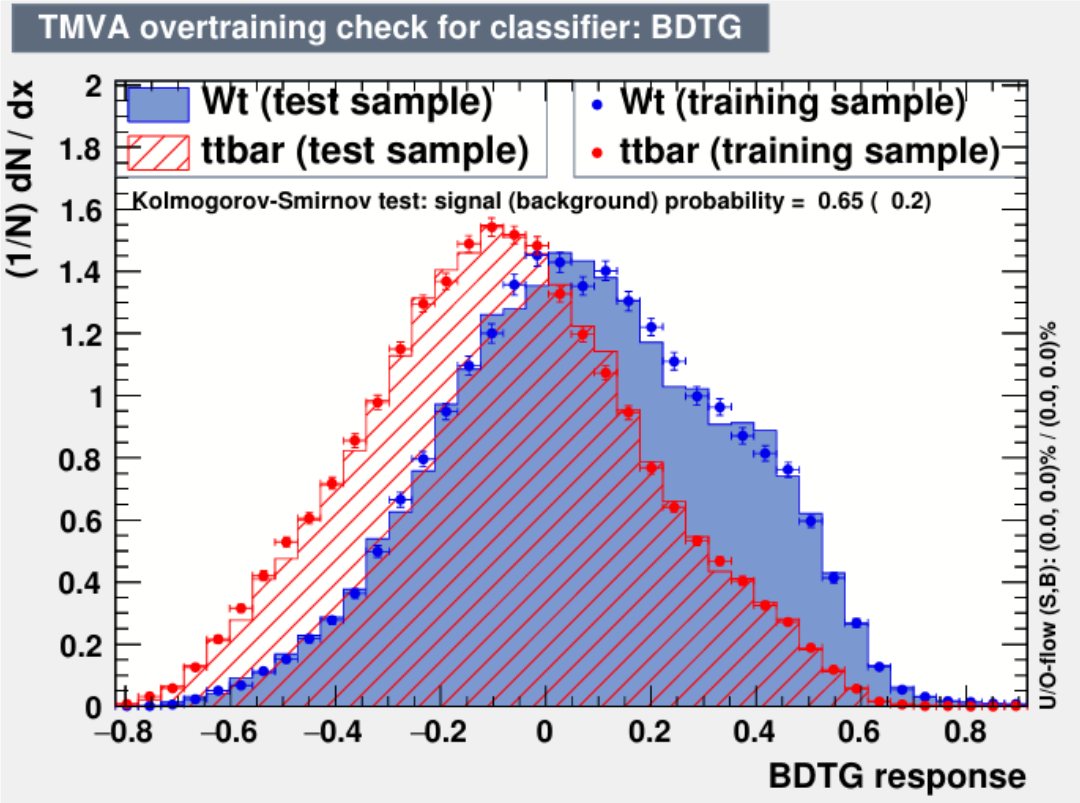
•**Samples / tree:** all files' tree name is analysis

Signal: tW (top) + $\bar{t}$W (anti-top)
Background: $t\bar{t}$ (non-all-had)

•**Event weights:** auto-resolved to weight_mc_NOSYS * weight_pileup_NOSYS * globalTriggerEffSF_NOSYS.

•**Bad values:** any variable ≤ **−990** or non-finite is masked per event.

Article's Report on BDT



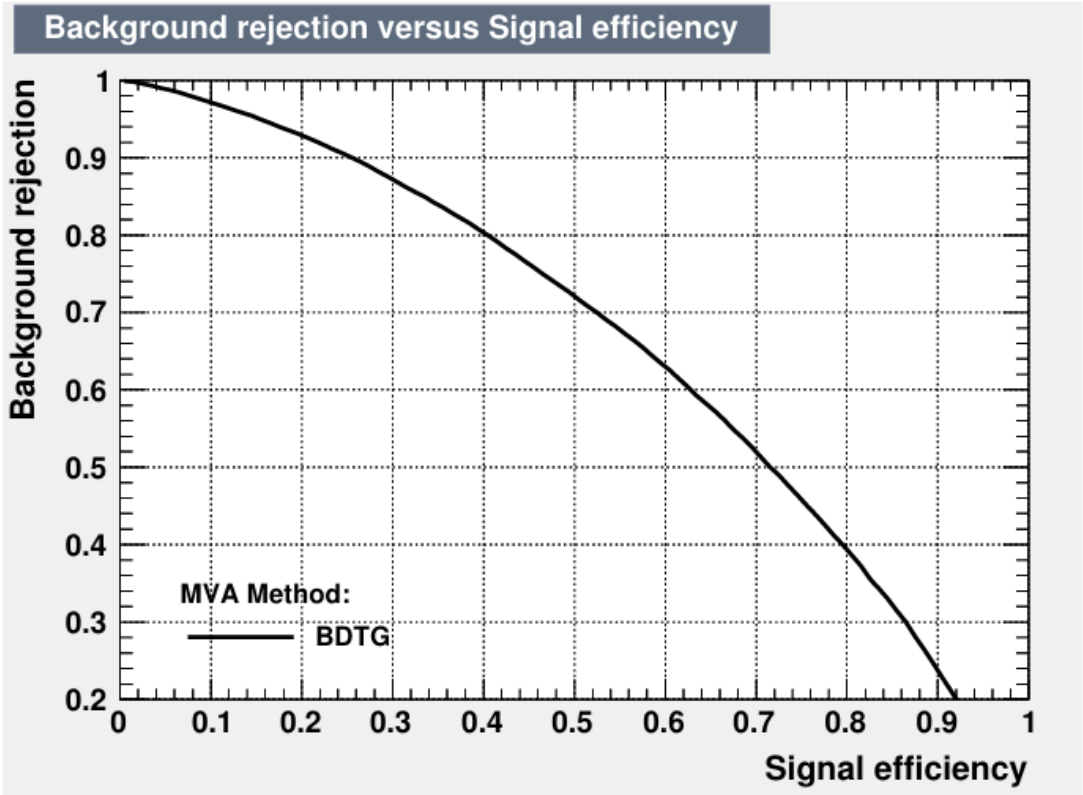


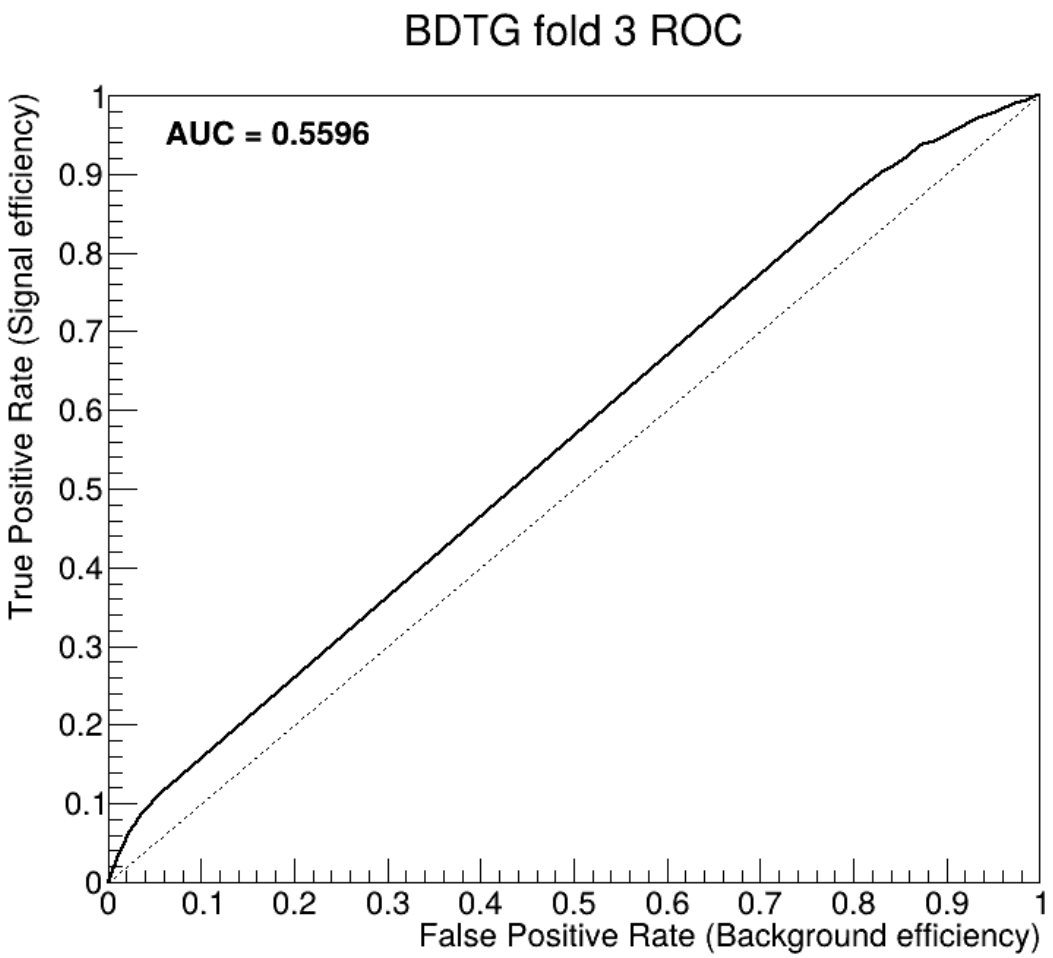
Figure 9: Comparison of test/training sample distributions and background rejection factor versus signal efficiency.

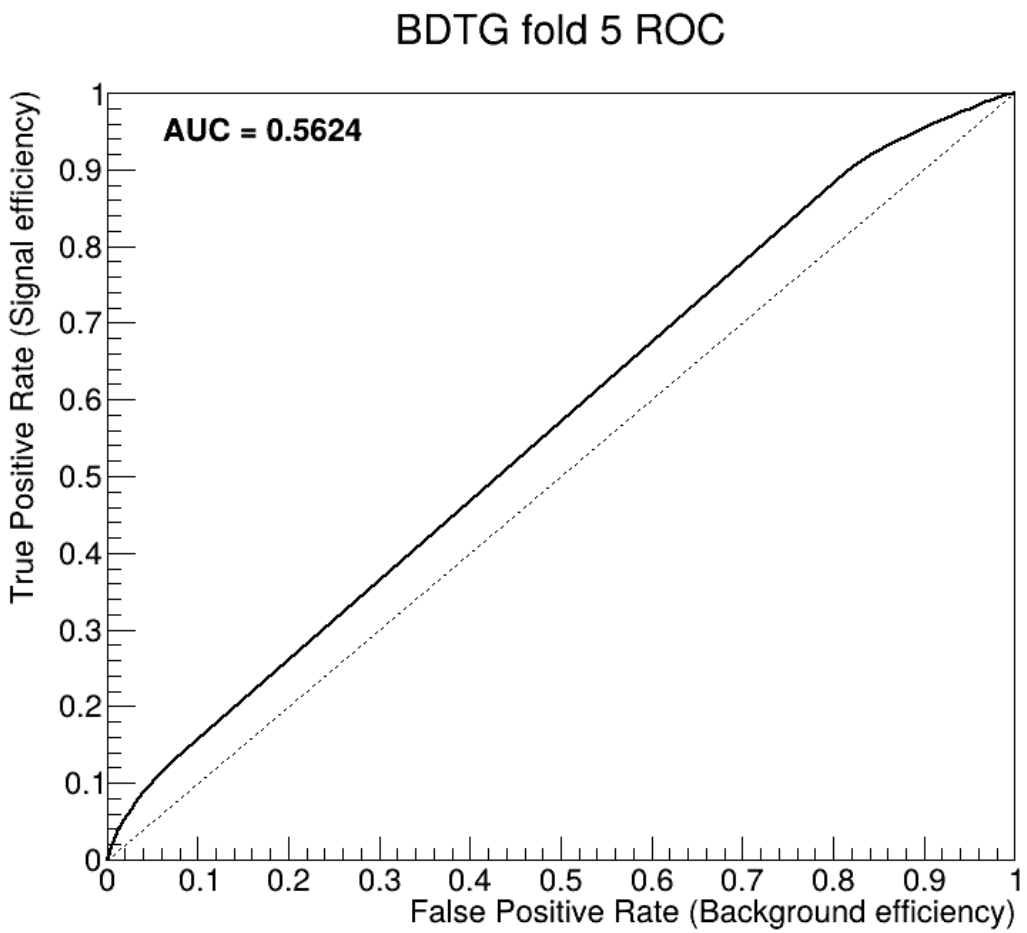
Results of Performance of ML Algorithms using K-fold on TMVA

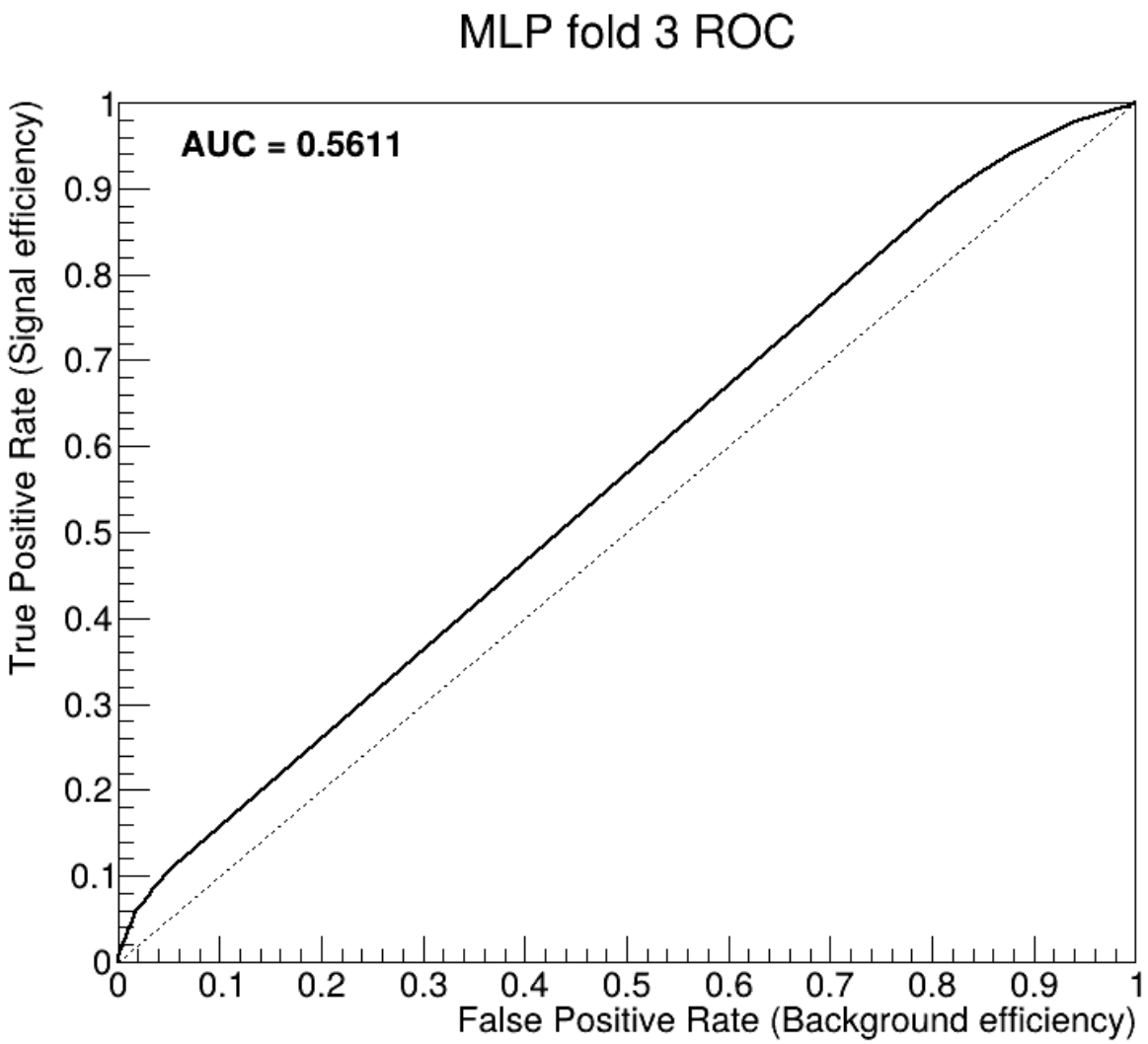
27^{th} January 2026

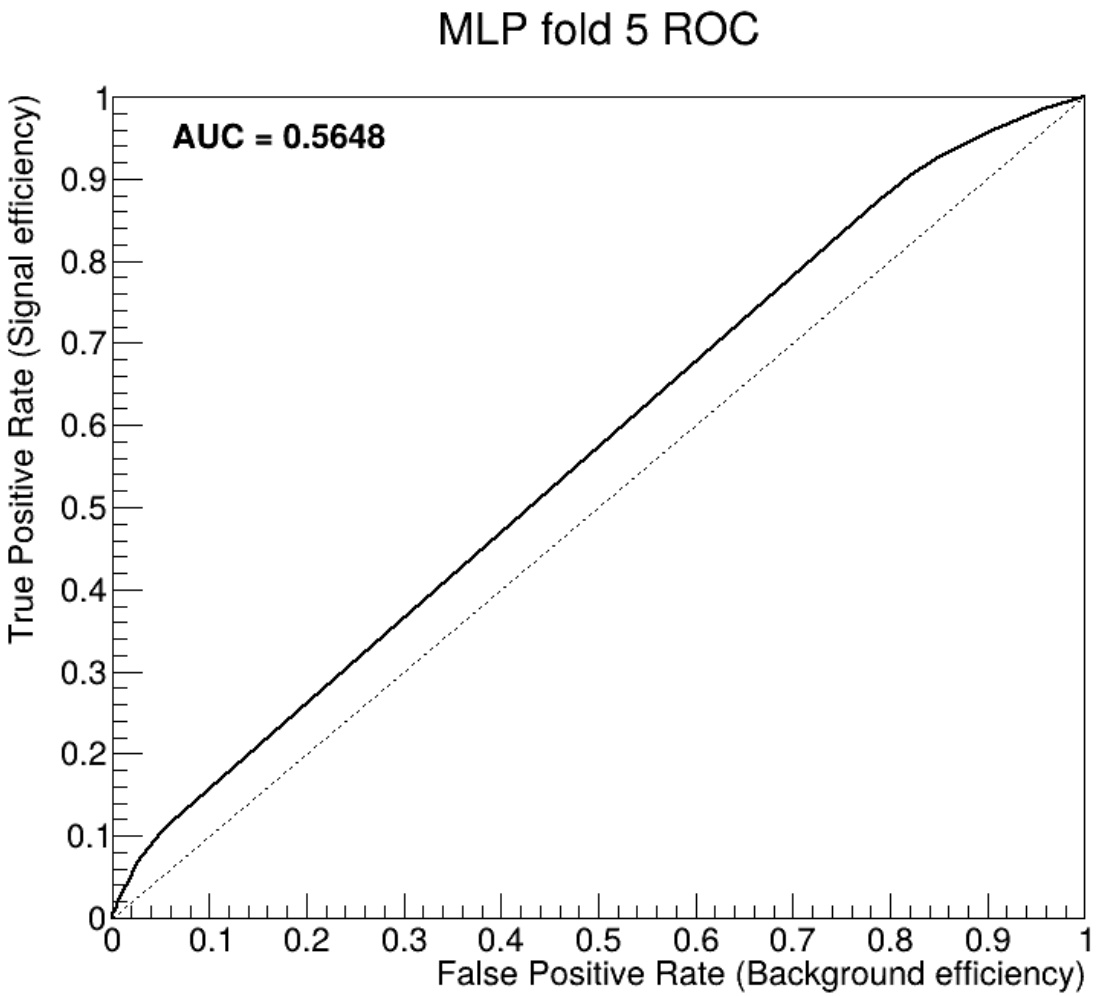
Algorithms	ROC_AUC_MEAN	ROC_AUC_STD	n_folds_used
BDTB	0.560854	0.003277	5
BDTG	0.55978	0.003049	5
Fisher	0.550102	0.00274	5
KNN	0.549632	0.003916	5
LD	0.547795	0.001821	5
Likelihood	0.523526	0.004158	5
MLP	0.561797	0.002013	5

I was doing an ordinary train/test split before cross-validation (CV).
So, CV was effectively training on (roughly) half the data, then splitting that again into folds. That alone could have pushed AUC down noticeably and make results unstable.
So, I faced three times unstable results on tmva. I am still trying to prepare correct code with kfold on TMVA.


BDTG fold 3 ROC
AUC = 0.5596
True Positive Rate (Signal efficiency)
False Positive Rate (Background efficiency)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

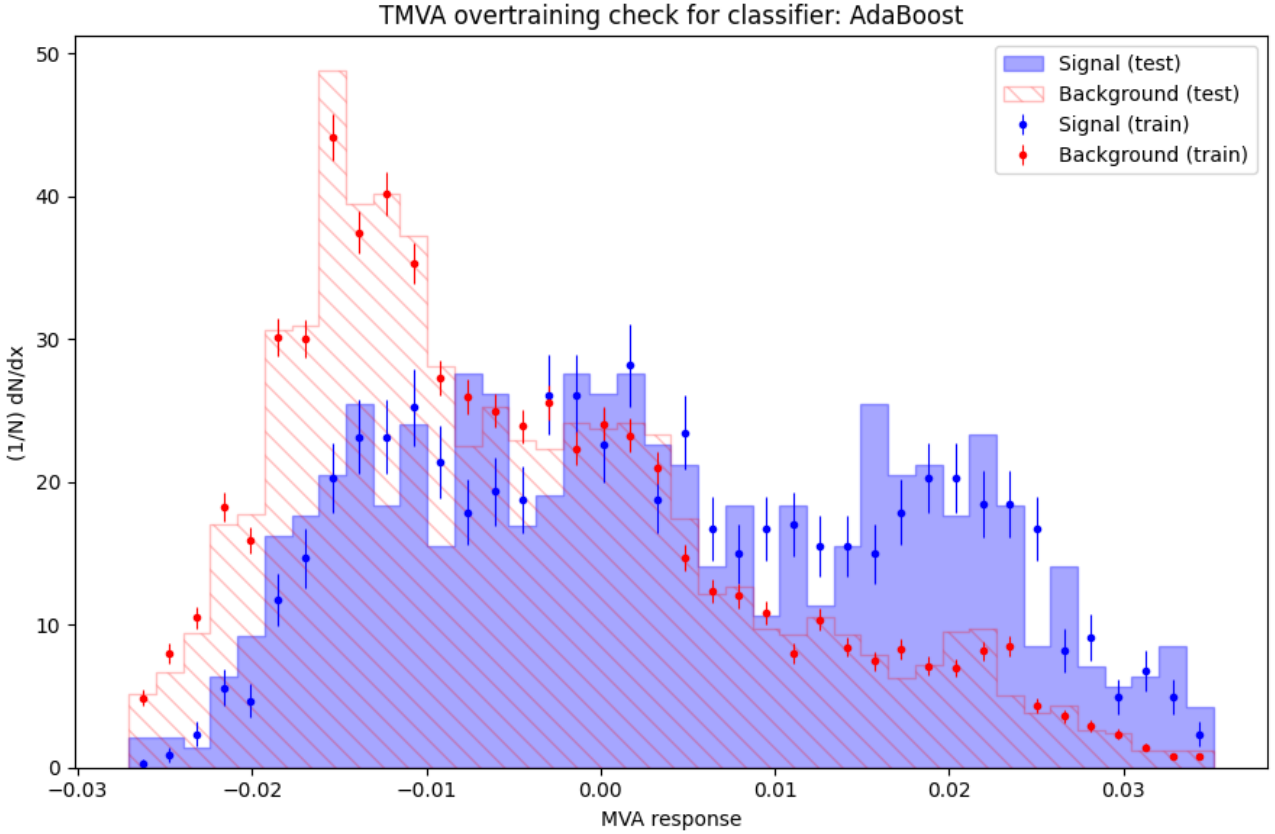

BDTG fold 5 ROC
AUC = 0.5624
True Positive Rate (Signal efficiency)
False Positive Rate (Background efficiency)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

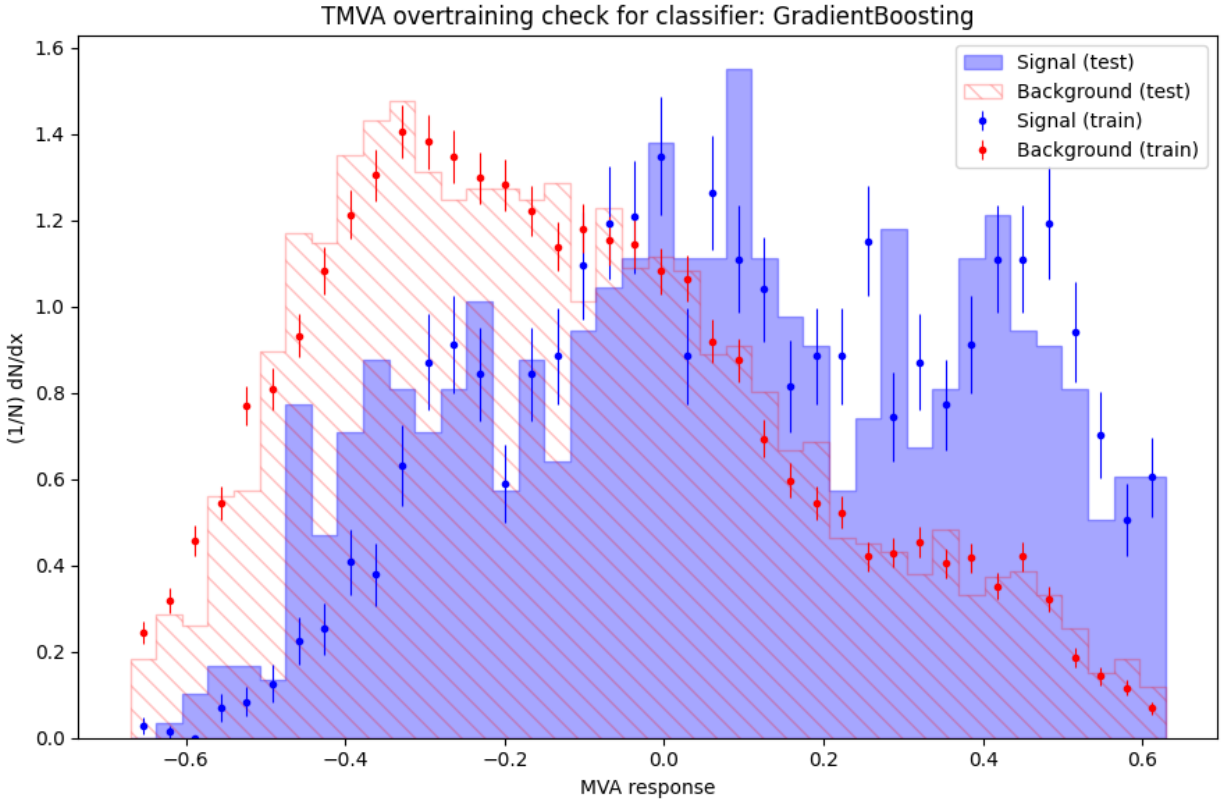

MLP fold 3 ROC
AUC = 0.5611
True Positive Rate (Signal efficiency)
False Positive Rate (Background efficiency)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

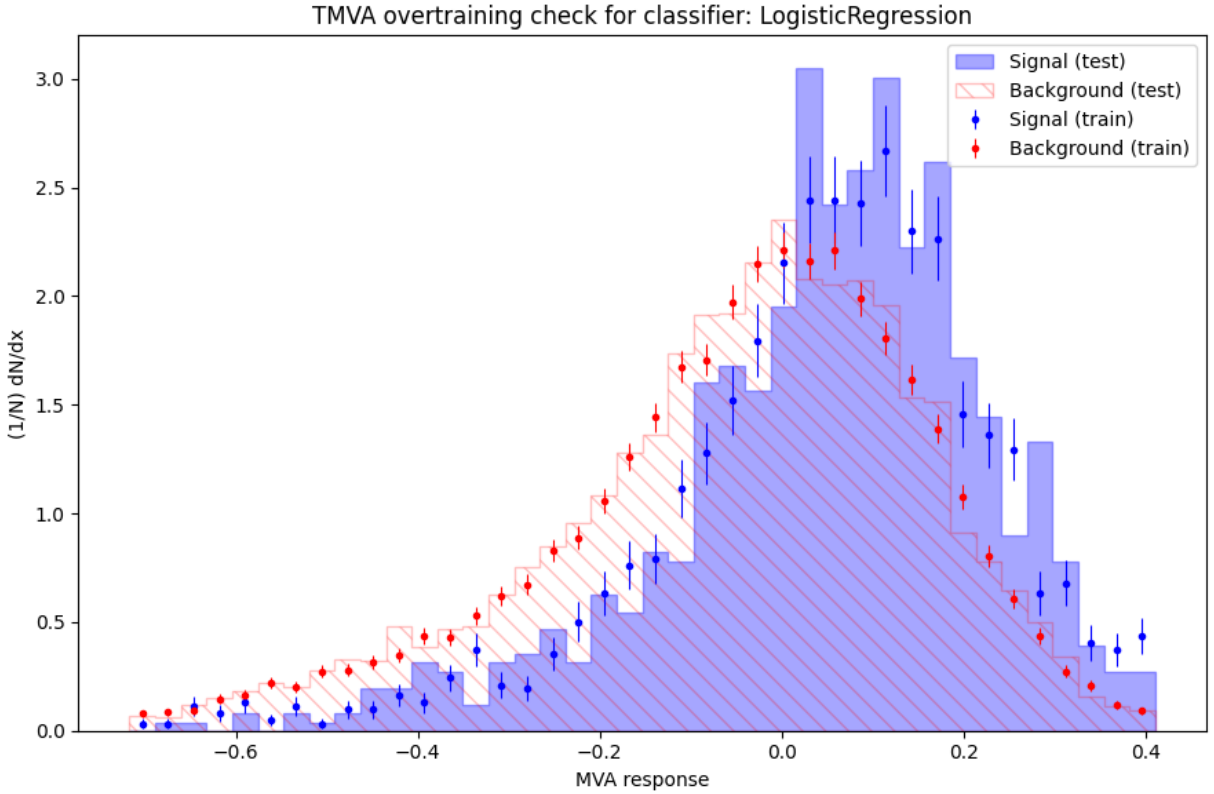

MLP fold 5 ROC
AUC = 0.5648
True Positive Rate (Signal efficiency)
False Positive Rate (Background efficiency)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

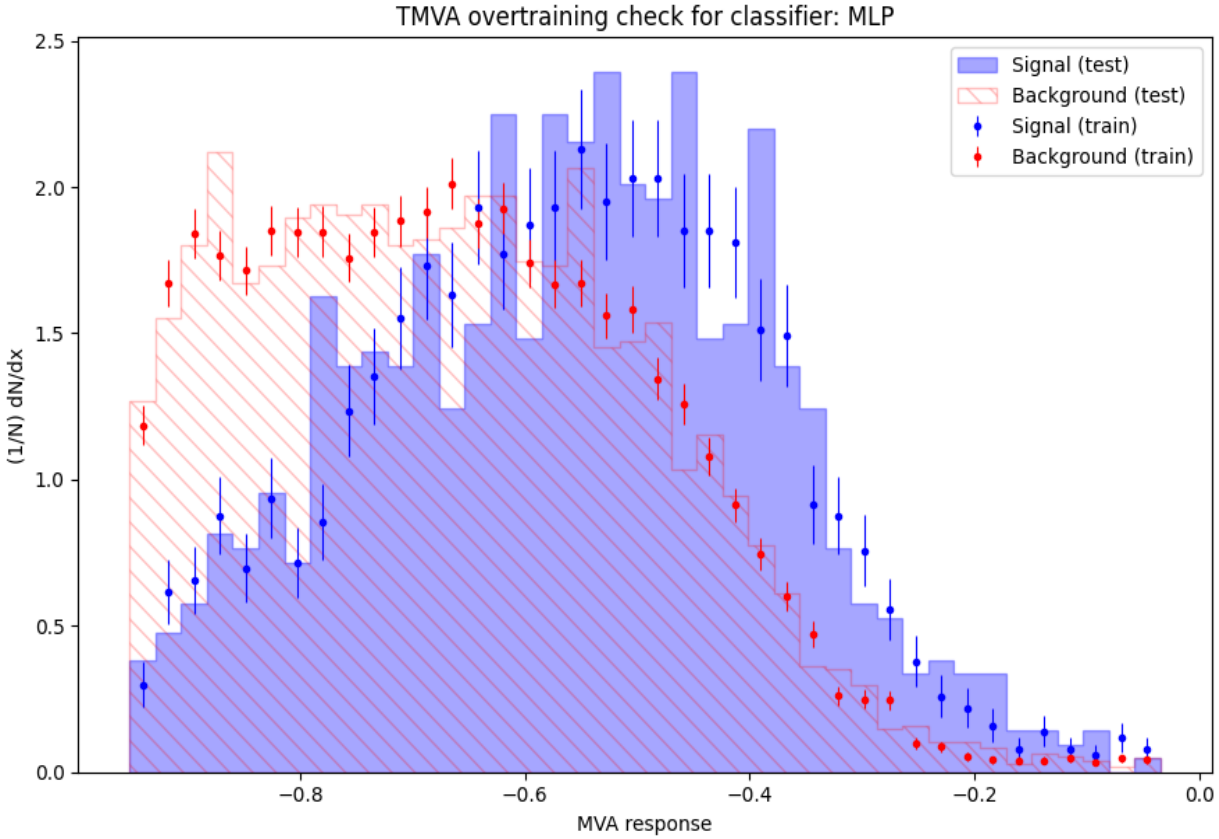
Results of Performance of ML Algorithms using K-fold on Python Trial 3
27th January 2026

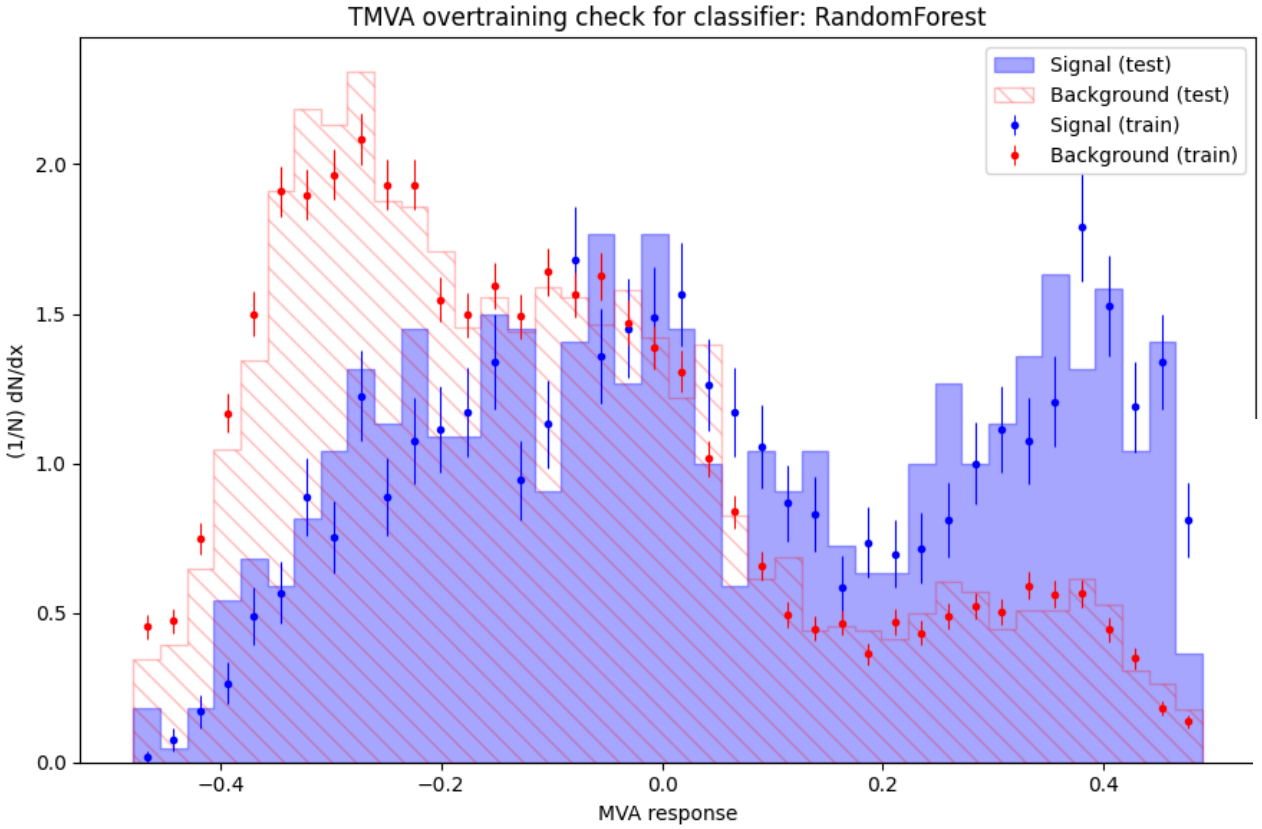
Algorithms	outer_k	inner_k	n_iters	mean_fold_auc	std_fold_auc	overall_oof_auc
AdaBoost	5	3	25	0.668024	0.008952	0.662409
Gaussian-NB	5	3	25	0.6407	0.006545	0.639867
Gradient Boosting	5	3	25	0.675134	0.01051	0.67482
KNN	5	3	25	0.643668	0.007173	0.643566
Logistic Regression	5	3	25	0.639506	0.011228	0.639507
MLP	5	3	25	0.665761	0.010691	0.664427
Random Forest	5	3	25	0.672187	0.010309	0.671608
SVC	5	3	10	0.676572	0.01301	0.676277

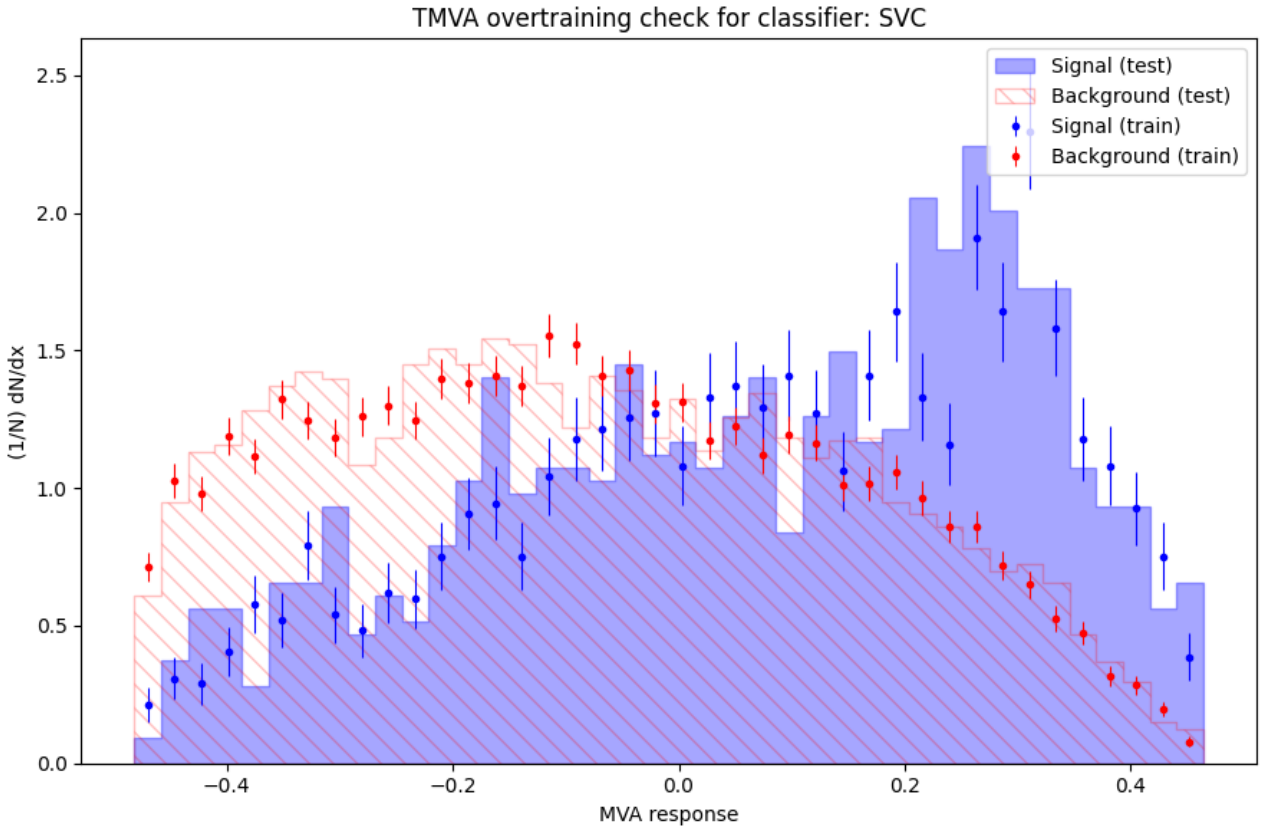

TMVA overtraining check for classifier: AdaBoost
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
50
40
30
20
10
0
−0.03
−0.02
−0.01
0.00
0.01
0.02
0.03

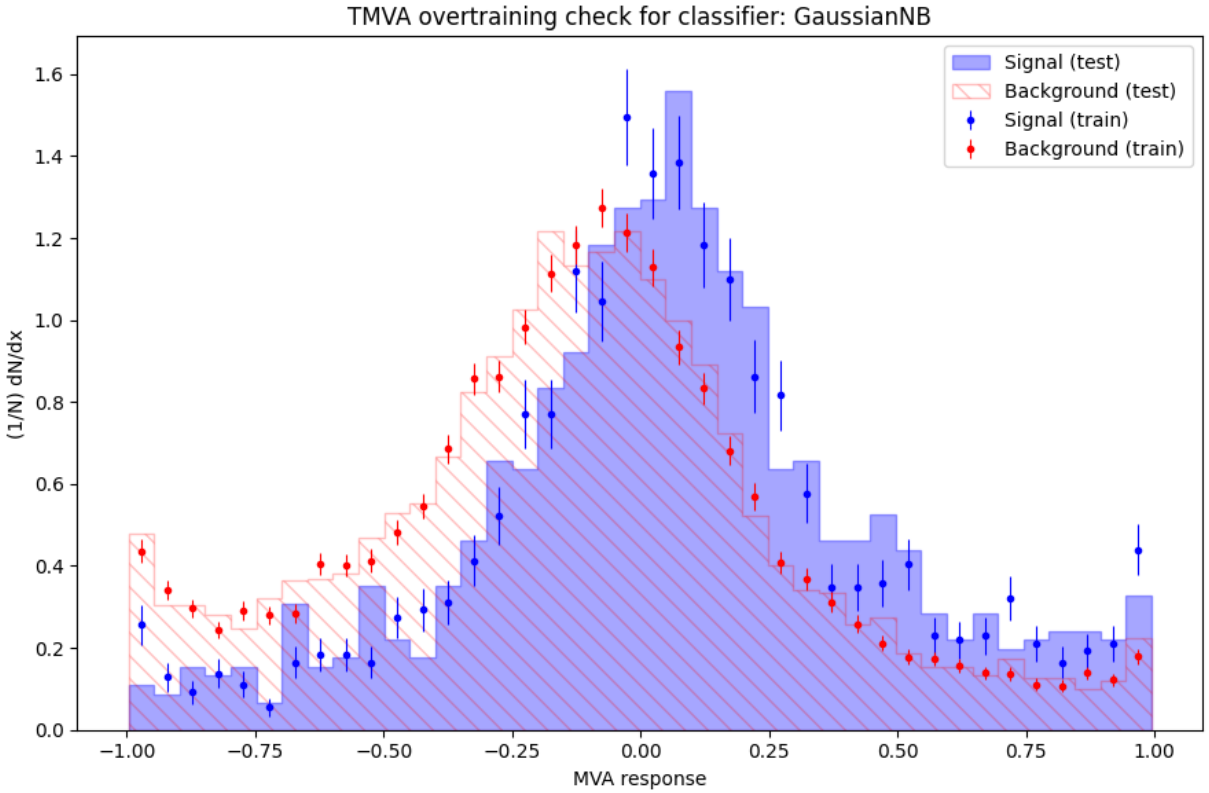

TMVA overtraining check for classifier: GradientBoosting
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6

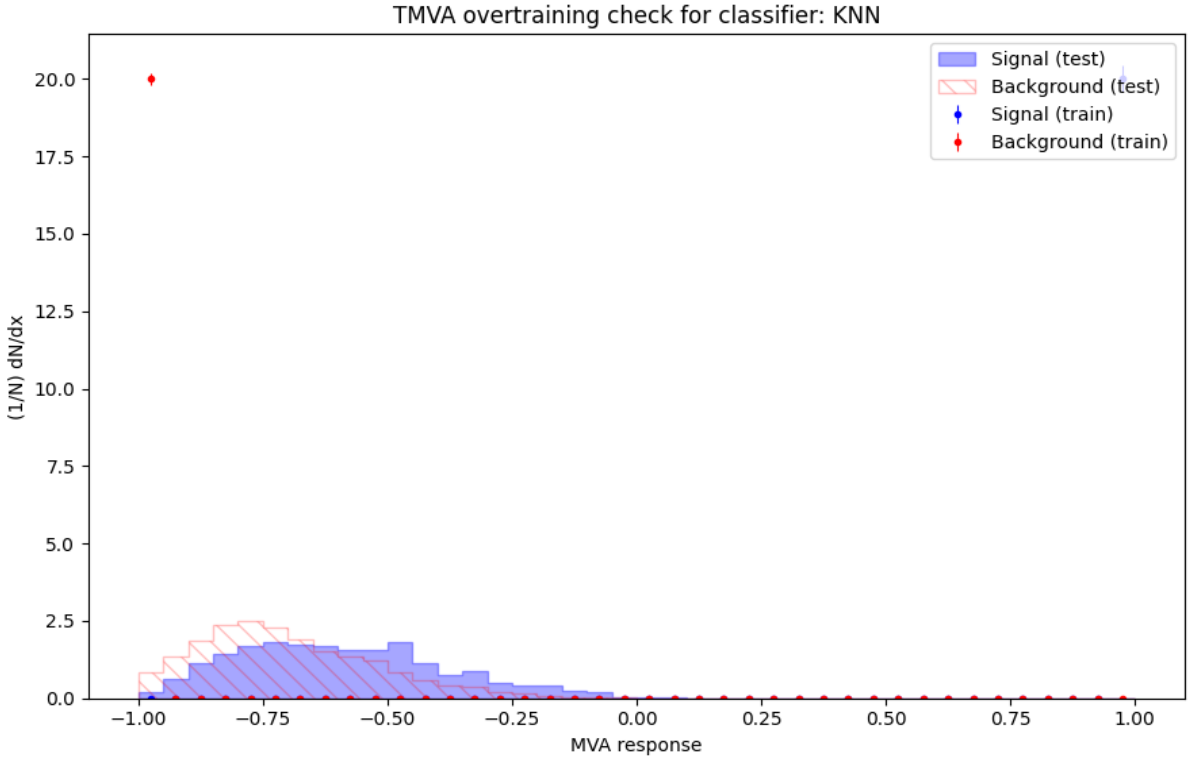

TMVA overtraining check for classifier: LogisticRegression
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
0.5
1.0
1.5
2.0
2.5
3.0
−0.6
−0.4
−0.2
0.0
0.2
0.4

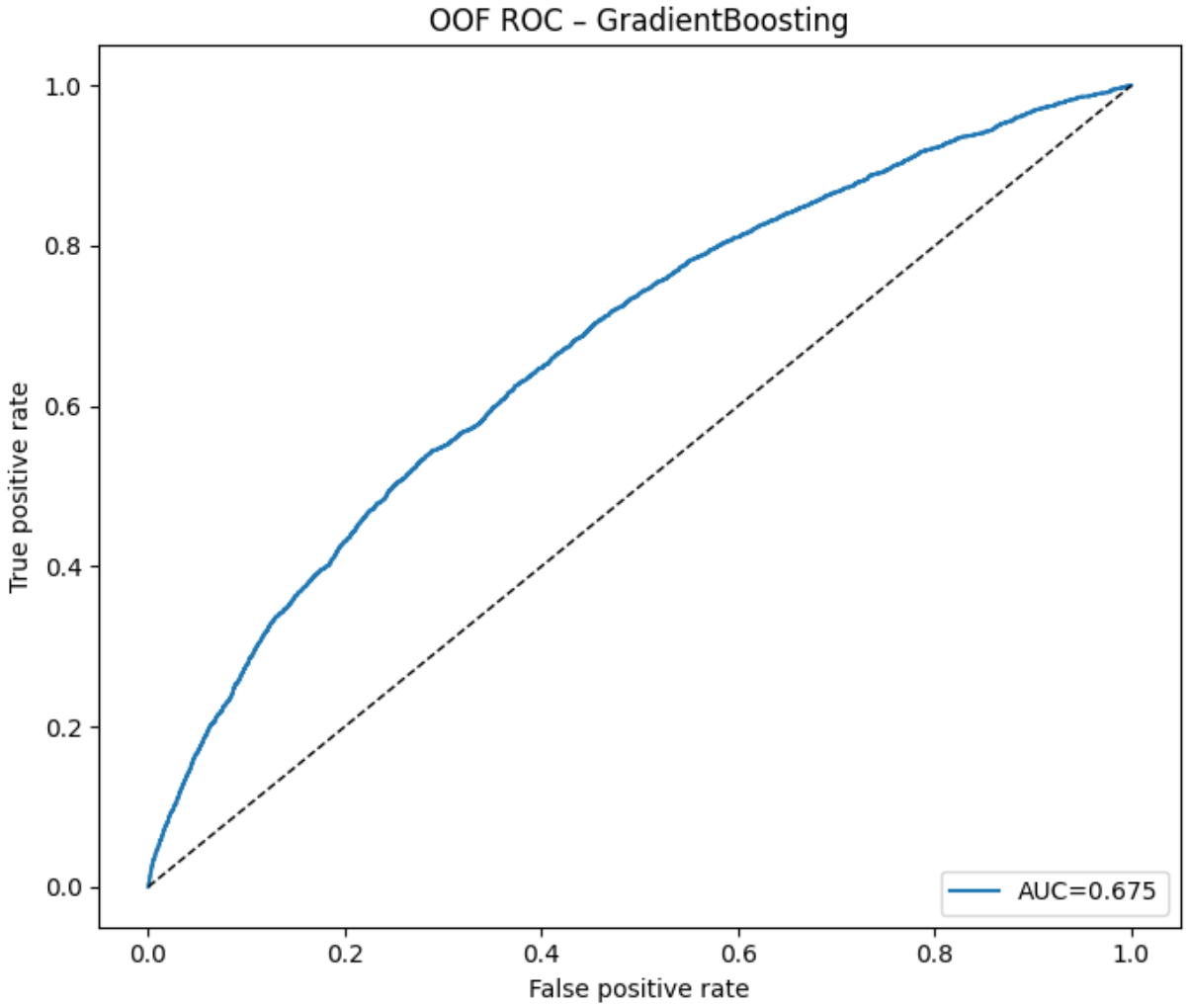

TMVA overtraining check for classifier: MLP
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
0.5
1.0
1.5
2.0
2.5
−0.8
−0.6
−0.4
−0.2
0.0

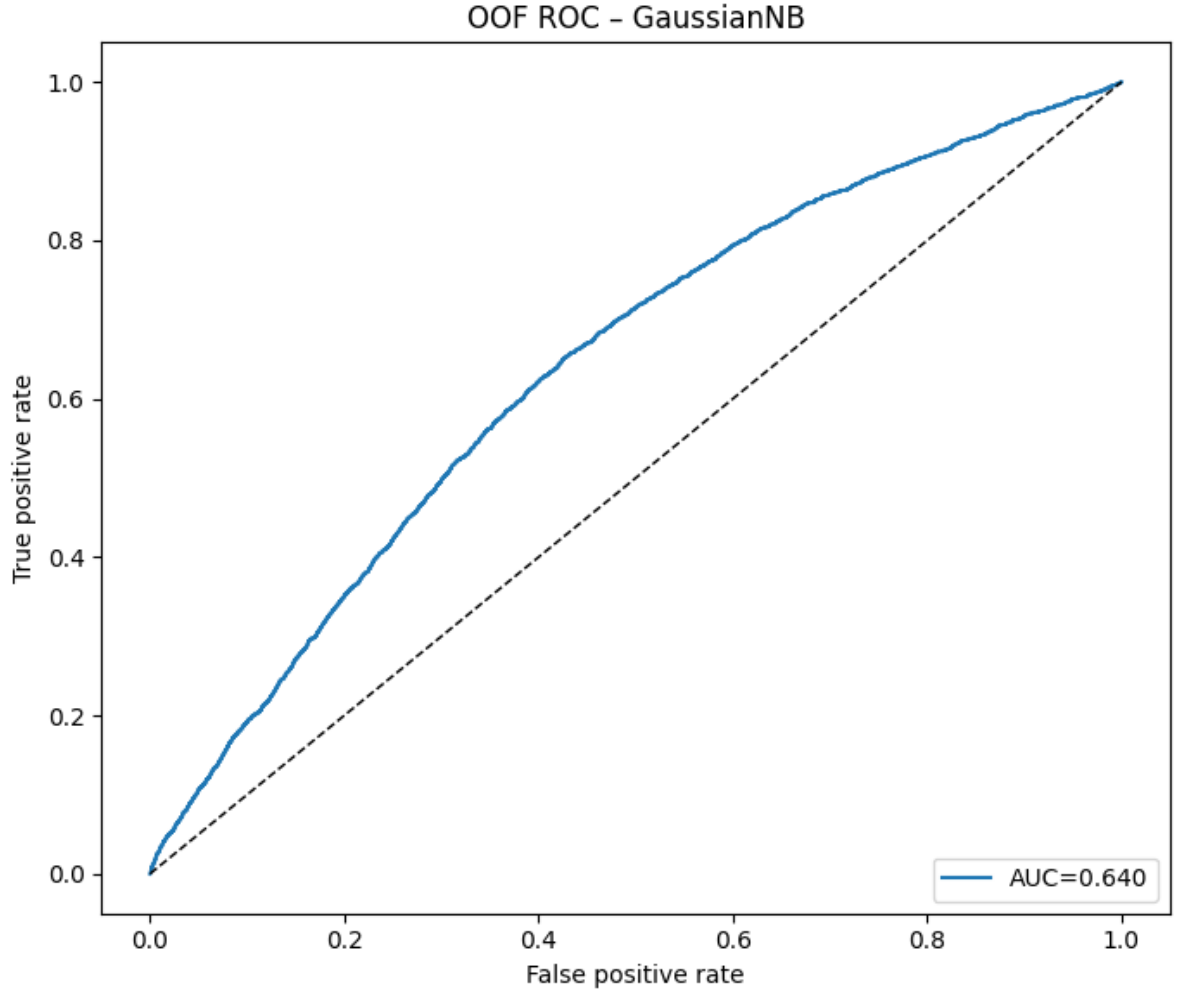

TMVA overtraining check for classifier: RandomForest
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
0.5
1.0
1.5
2.0
−0.4
−0.2
0.0
0.2
0.4

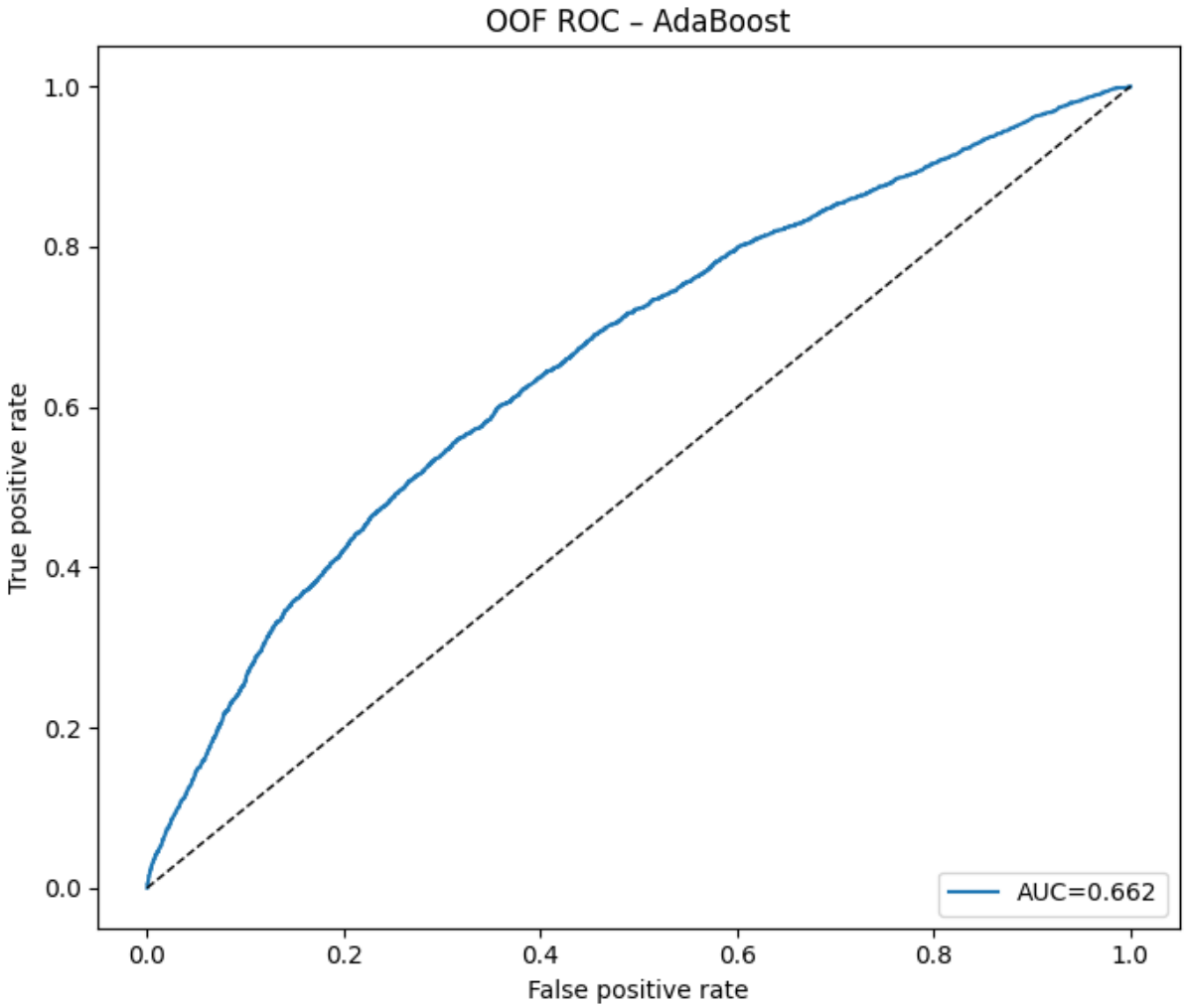

TMVA overtraining check for classifier: SVC
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
0.5
1.0
1.5
2.0
2.5
−0.4
−0.2
0.0
0.2
0.4

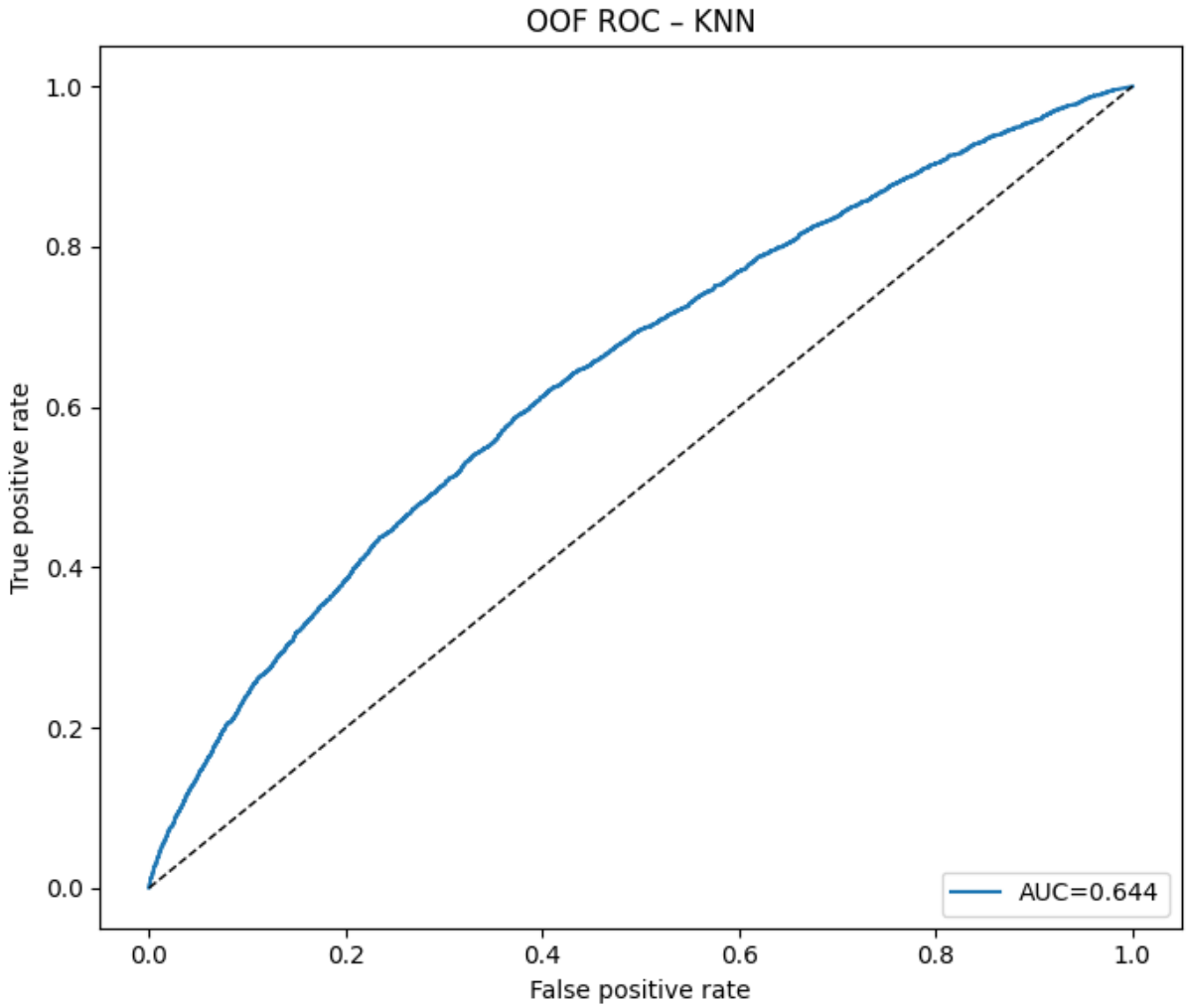

TMVA overtraining check for classifier: GaussianNB
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00

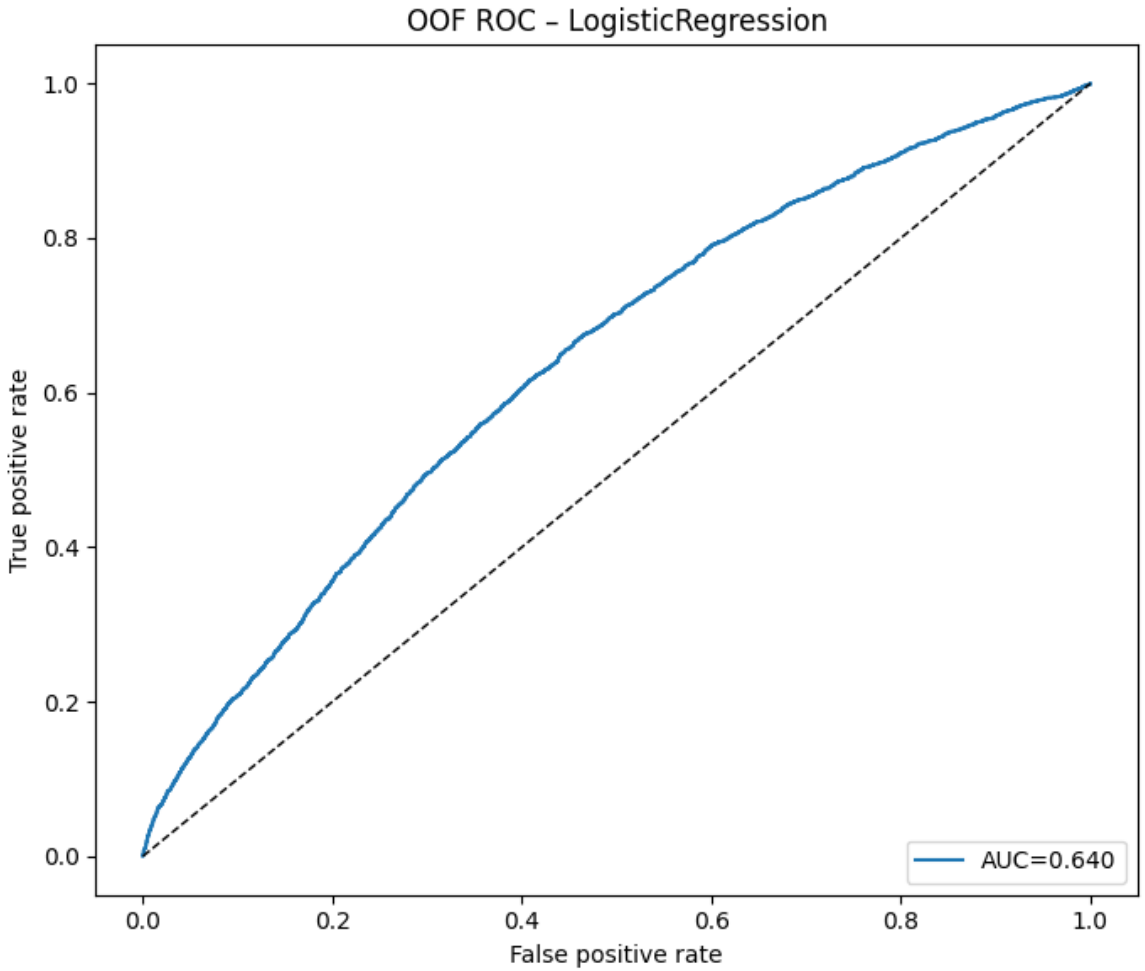

TMVA overtraining check for classifier: KNN
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00

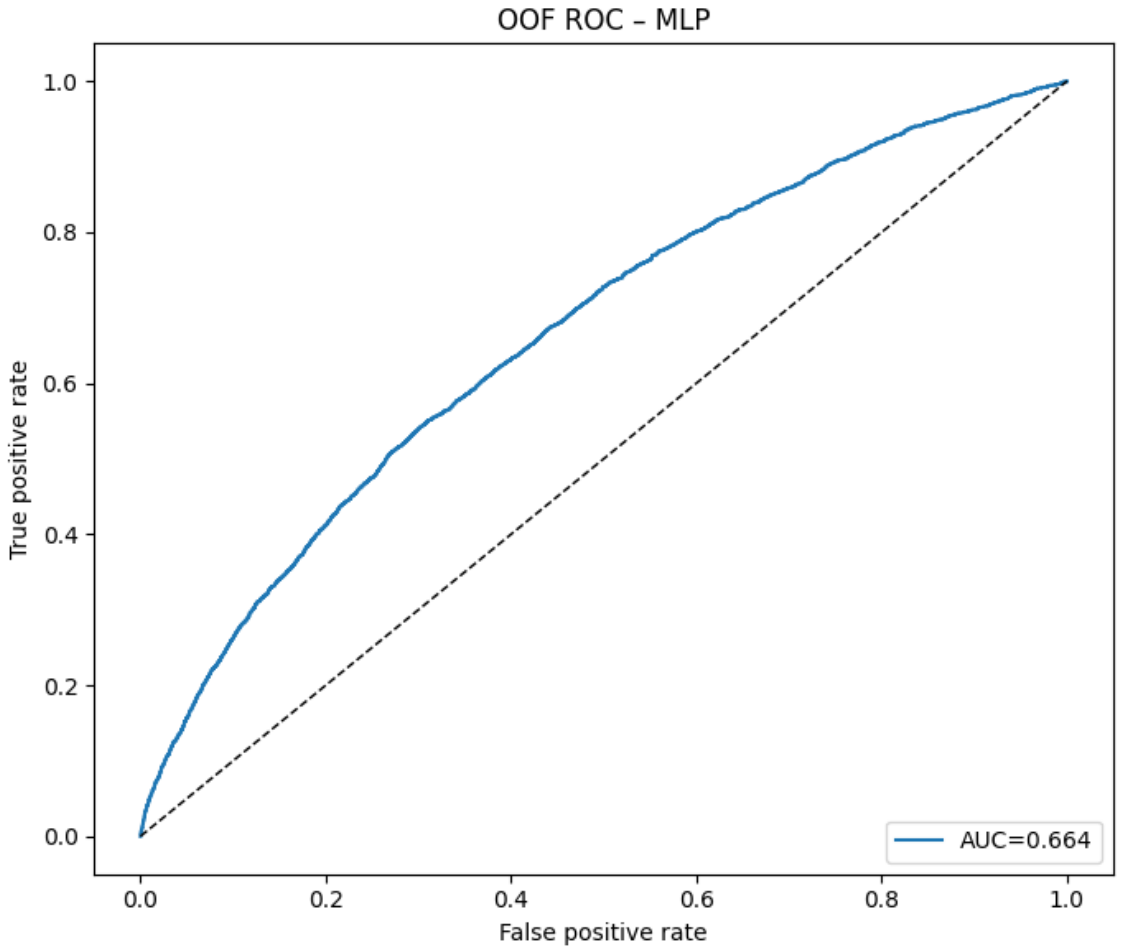

OOF ROC – GradientBoosting
True positive rate
False positive rate
AUC=0.675
0.0
0.2
0.4
0.6
0.8
1.0

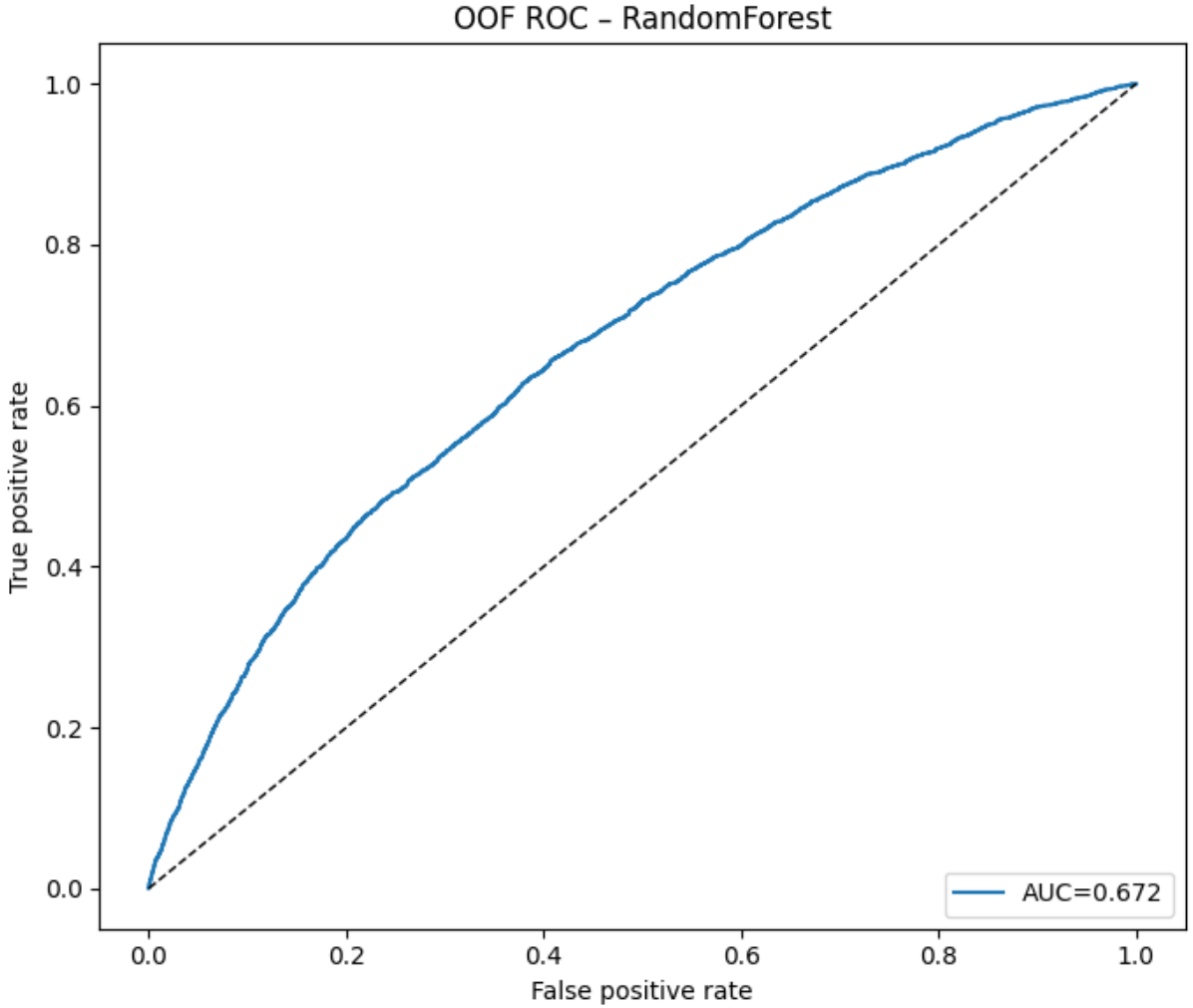

OOF ROC – GaussianNB
True positive rate
False positive rate
AUC=0.640
0.0
0.2
0.4
0.6
0.8
1.0

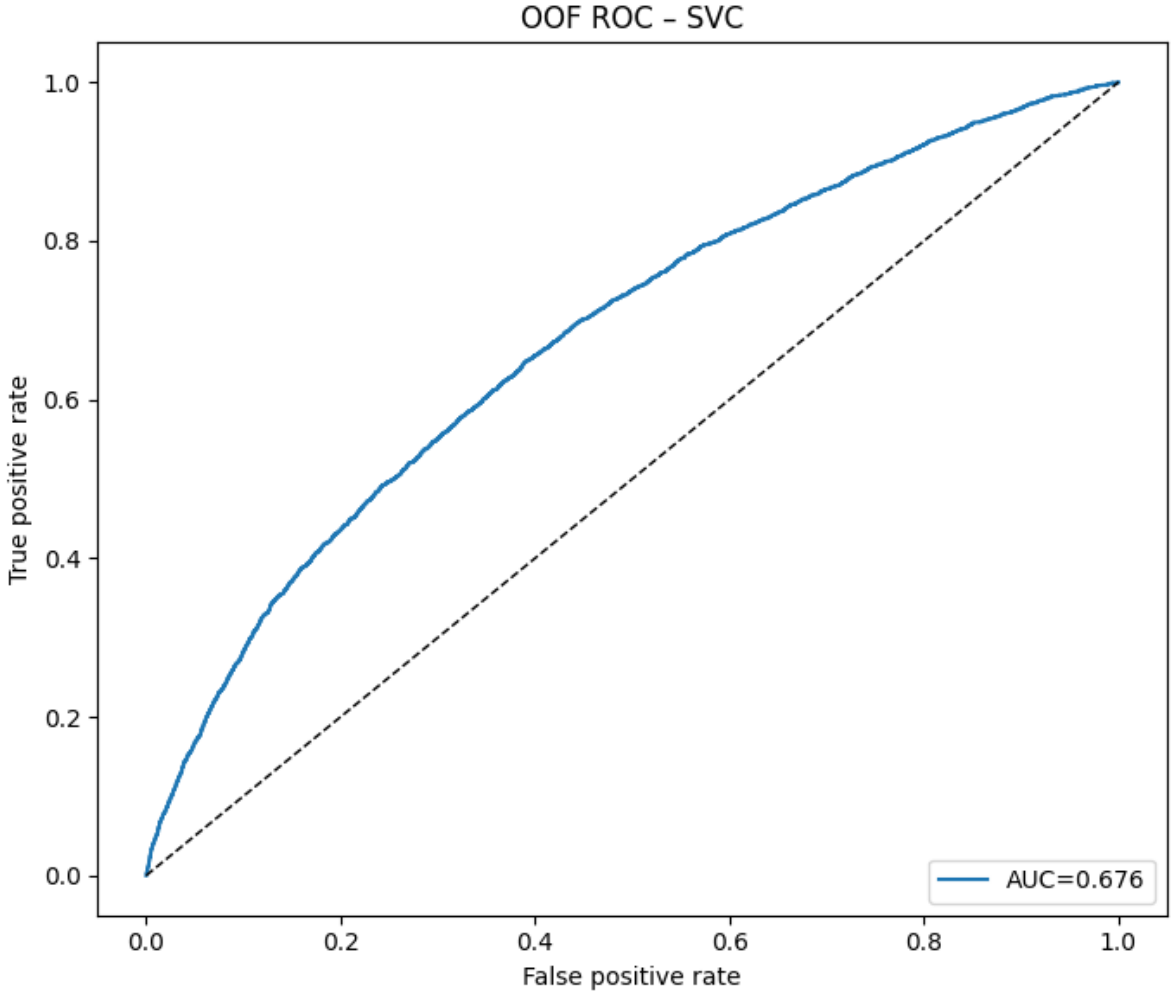

OOF ROC – AdaBoost
True positive rate
False positive rate
AUC=0.662
0.0
0.2
0.4
0.6
0.8
1.0


OOF ROC – KNN
True positive rate
False positive rate
AUC=0.644
0.0
0.2
0.4
0.6
0.8
1.0


OOF ROC – LogisticRegression
True positive rate
False positive rate
AUC=0.640
0.0
0.2
0.4
0.6
0.8
1.0


OOF ROC – MLP
True positive rate
False positive rate
AUC=0.664
0.0
0.2
0.4
0.6
0.8
1.0


OOF ROC – RandomForest
True positive rate
False positive rate
AUC=0.672
0.0
0.2
0.4
0.6
0.8
1.0

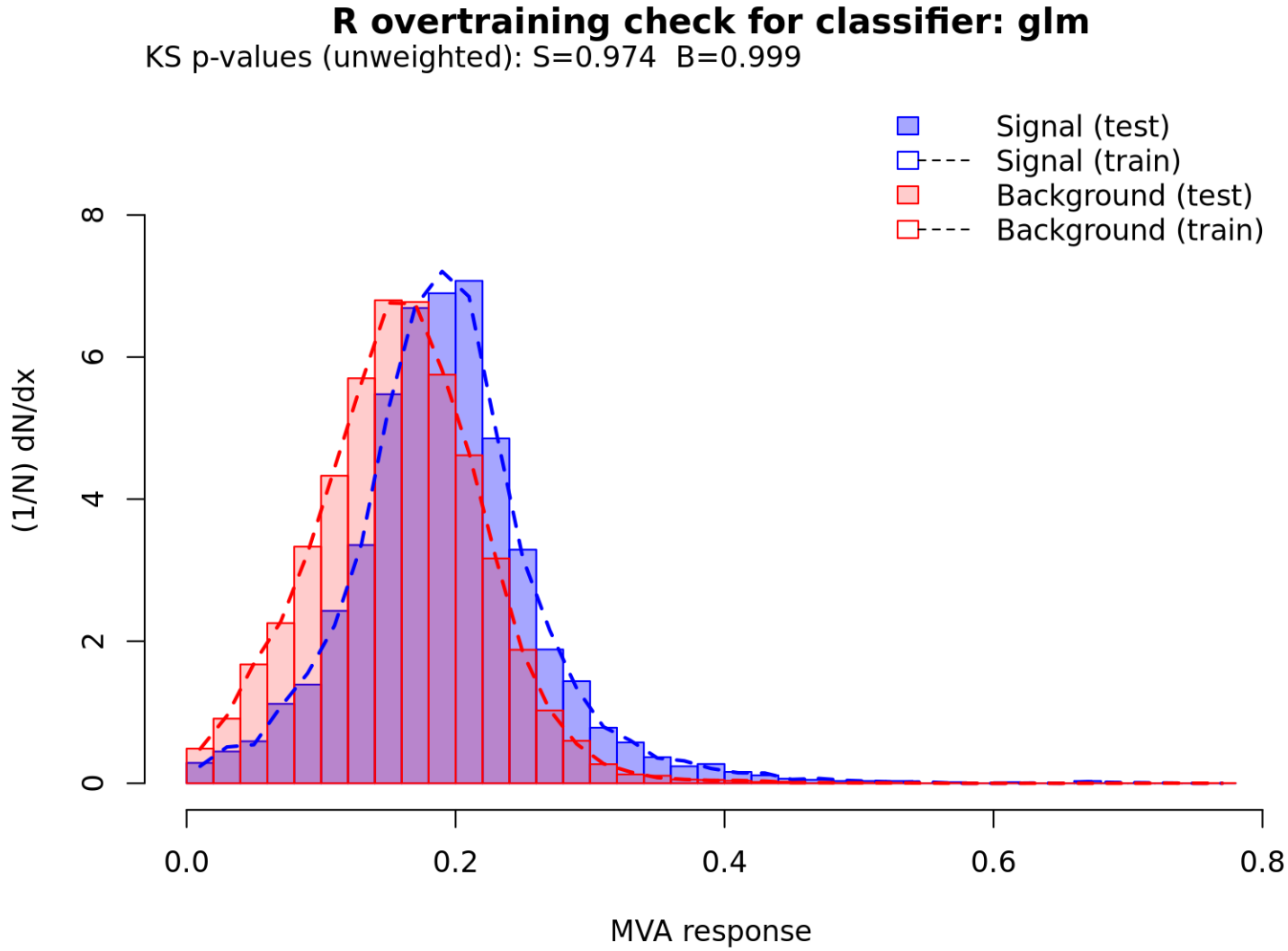

OOF ROC – SVC
True positive rate
False positive rate
AUC=0.676
0.0
0.2
0.4
0.6
0.8
1.0

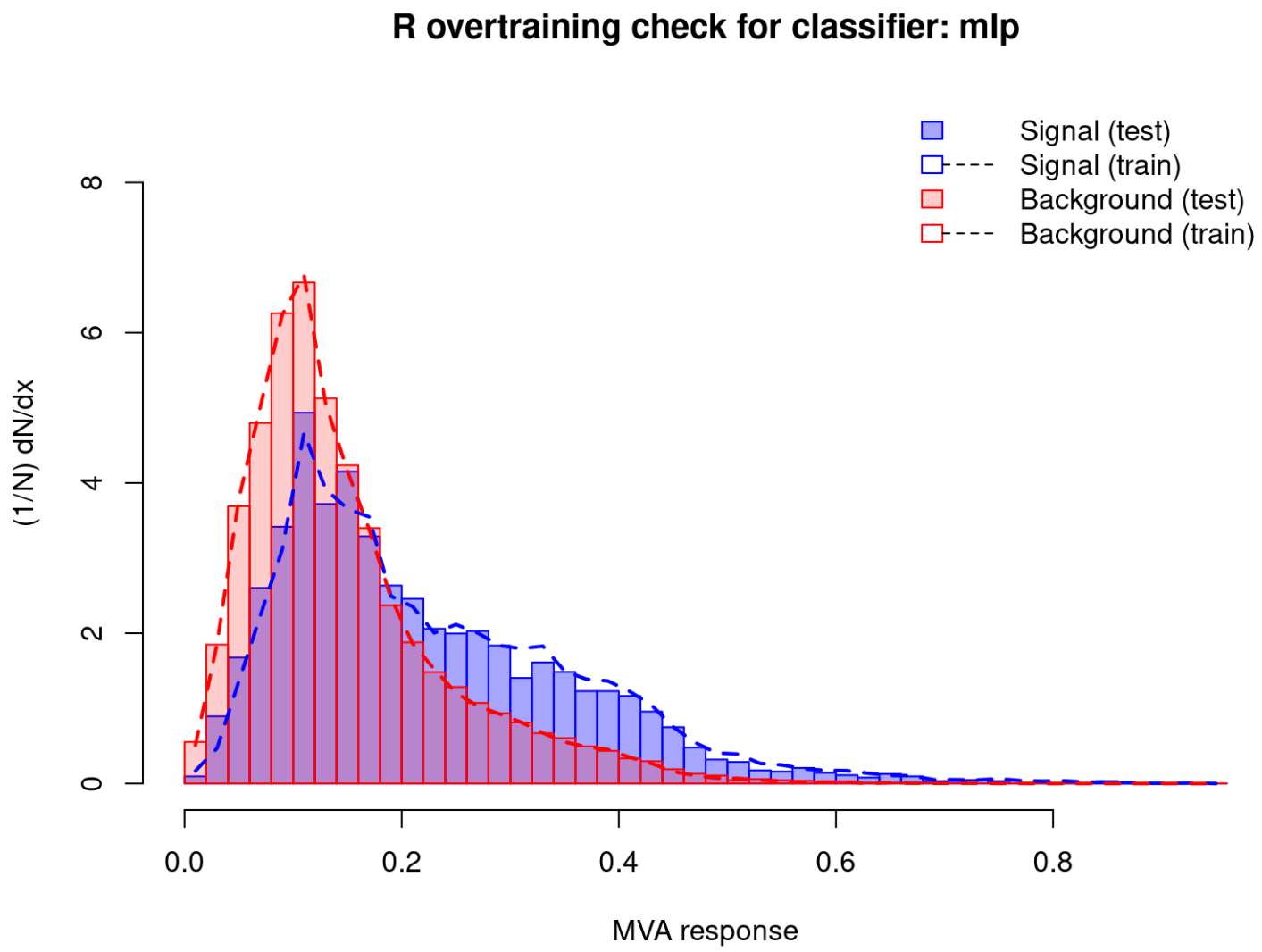
Results of Performance of ML Algorithms using K-fold on R without caret package.
03 Feb 2026

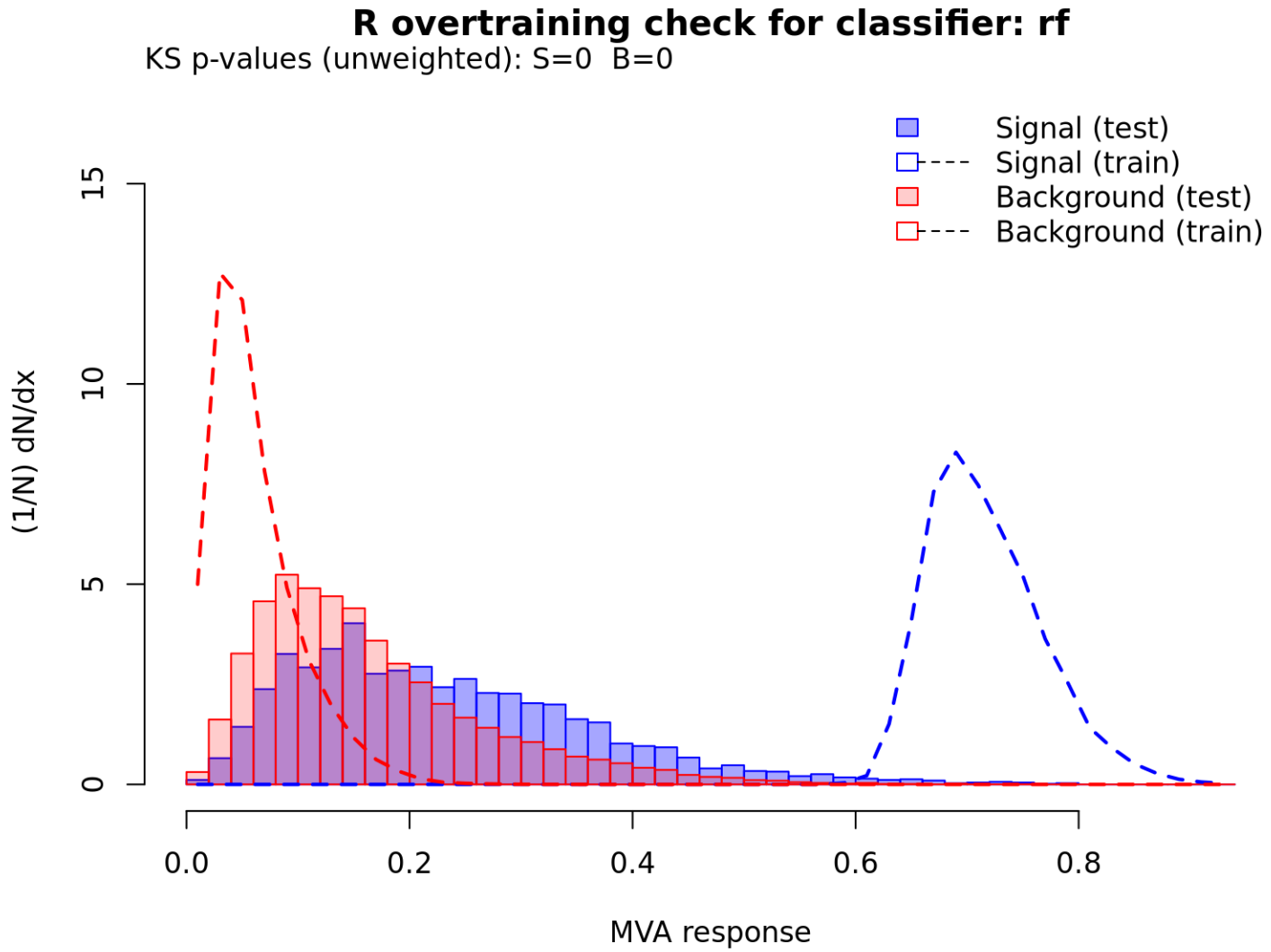
Methods: GLM, RF, GBM, XGBOOST, SVM, KNN, NB, MLP

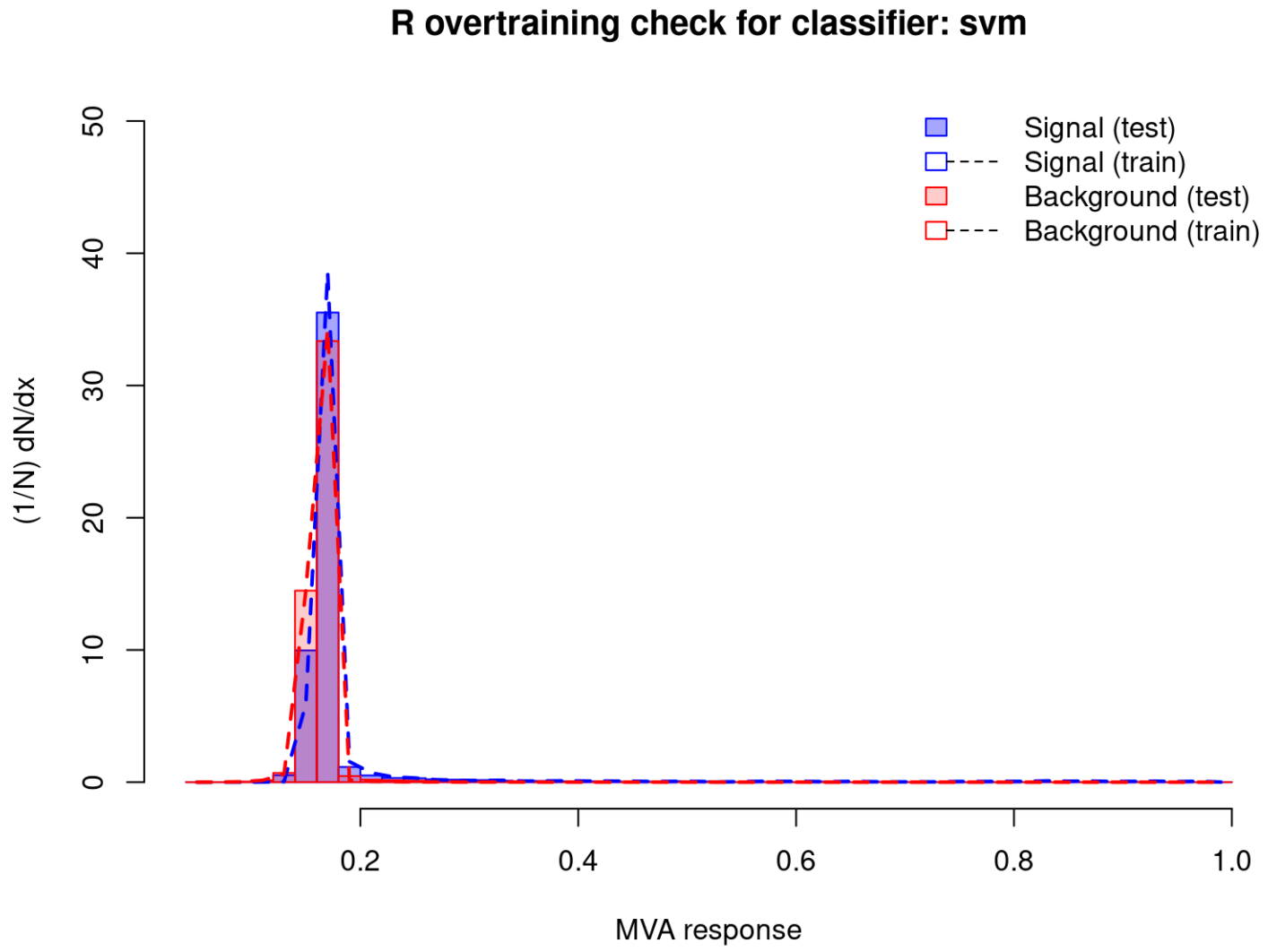
R-Platform (k-fold) Results on New Data

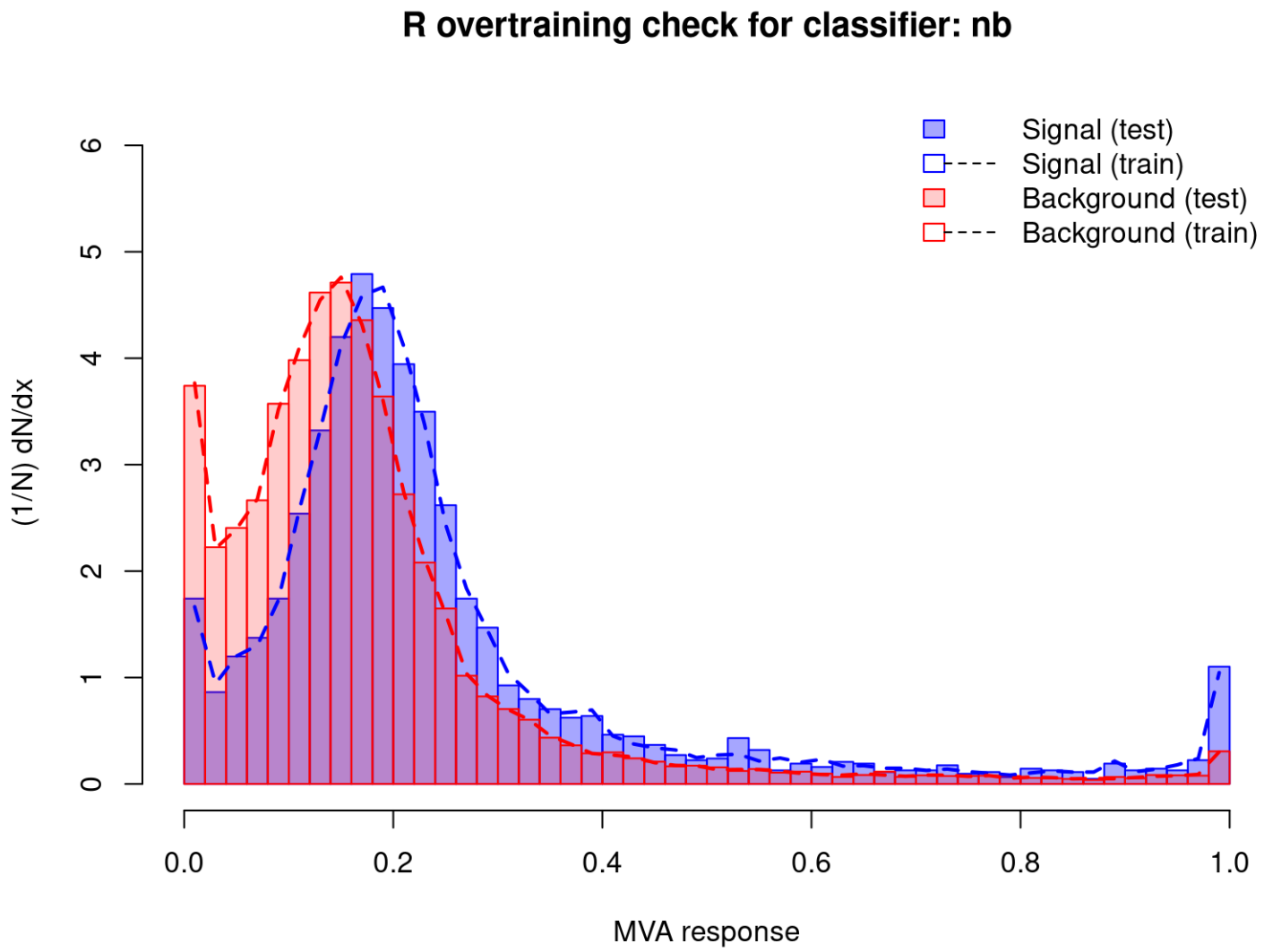
Algorithm (R)	*auc_oof_weighted*	*acc_oof_weighted*
GBM	1	1
MLP	0.660152	0.836995
XGBOOST	0.659179	0.835844
RF	0.656103	0.835792
GLM	0.643484	0.836315
NB	0.640344	0.813926
SVM	0.590384	0.836263

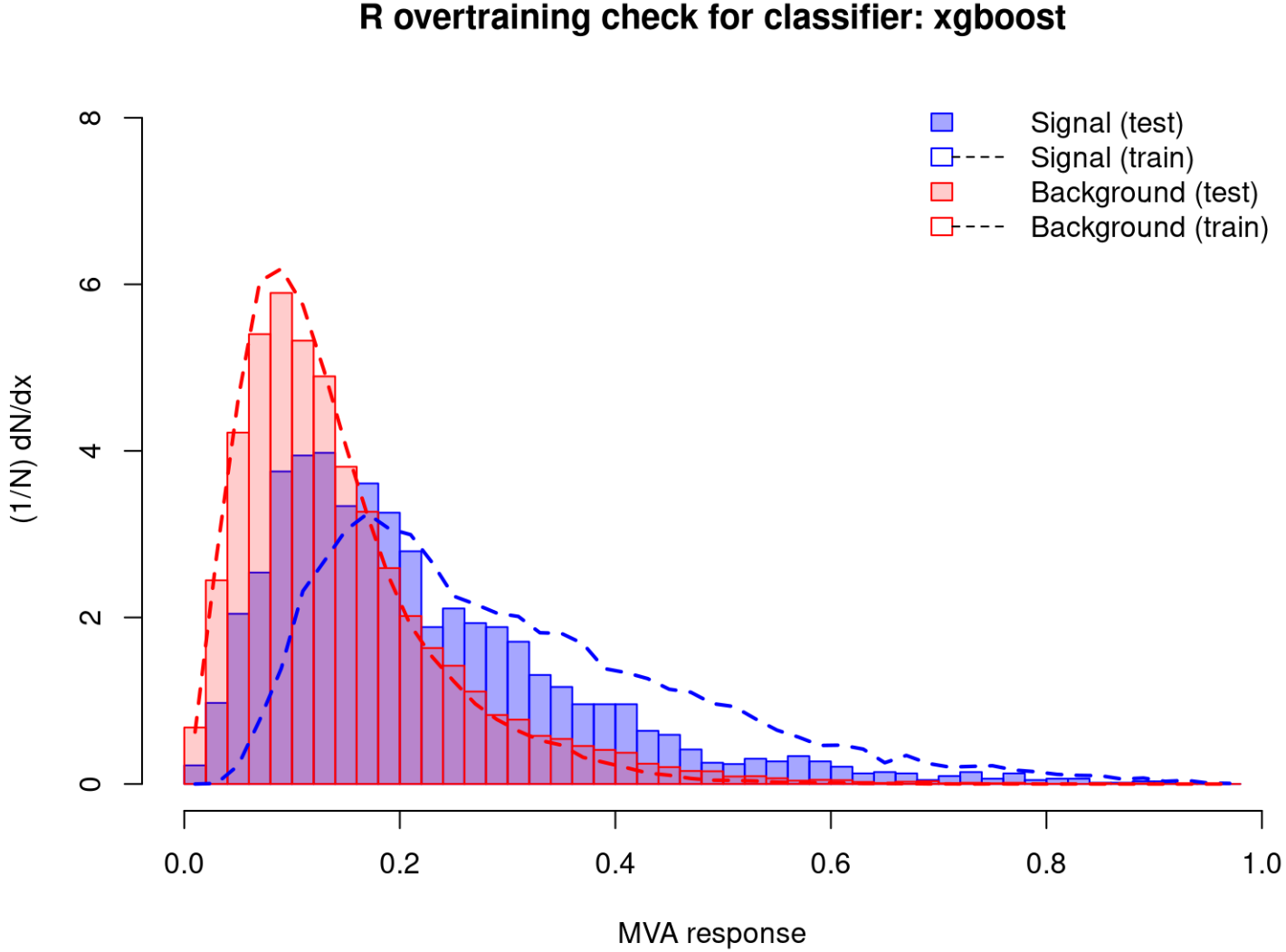

R overtraining check for classifier: glm
KS p-values (unweighted): S=0.974 B=0.999
Signal (test)
Signal (train)
Background (test)
Background (train)
(1/N) dN/dx
0
2
4
6
8
0.0
0.2
0.4
0.6
0.8
MVA response

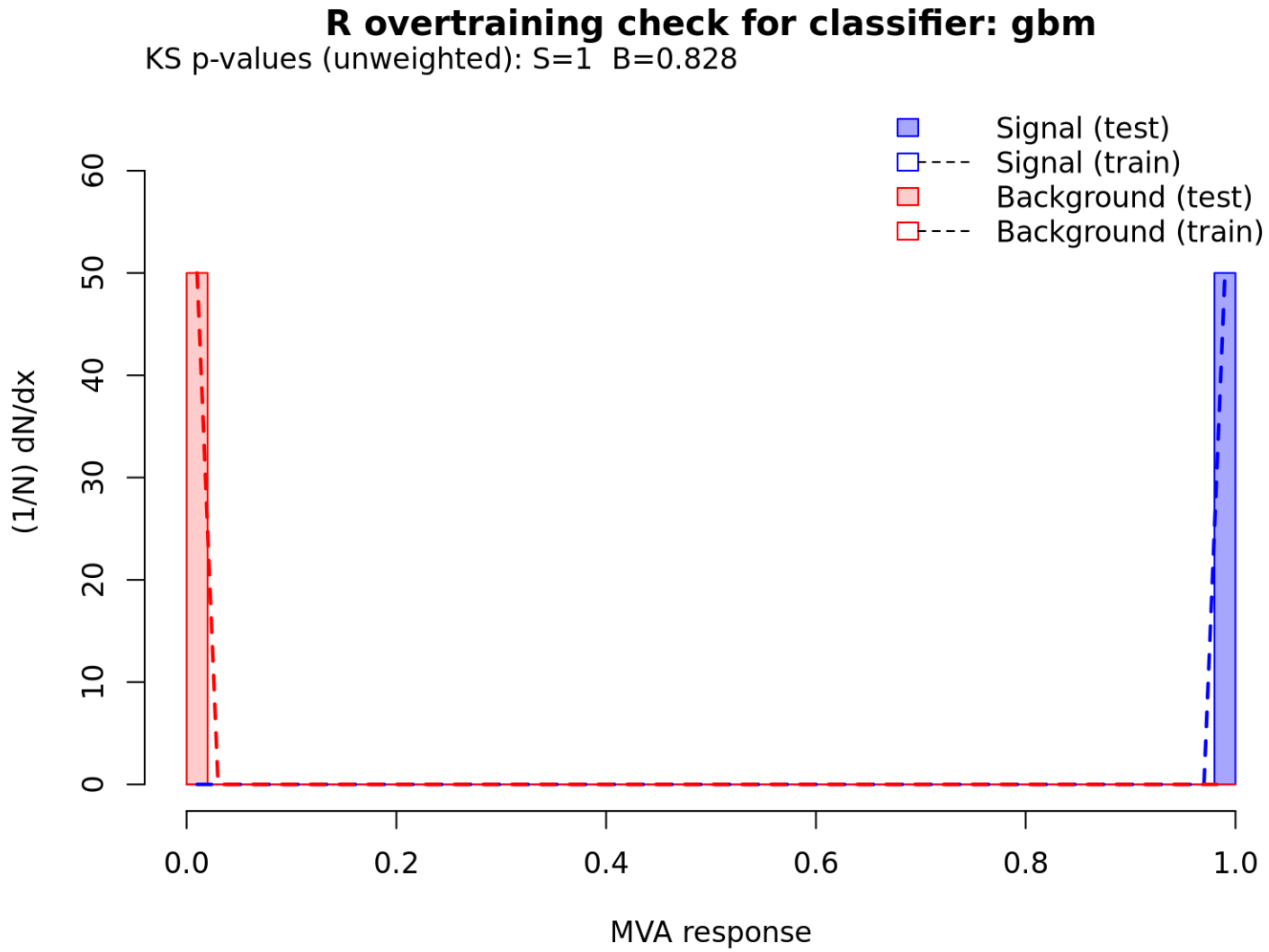

R overtraining check for classifier: mlp
Signal (test)
Signal (train)
Background (test)
Background (train)
(1/N) dN/dx
0
2
4
6
8
0.0
0.2
0.4
0.6
0.8
MVA response

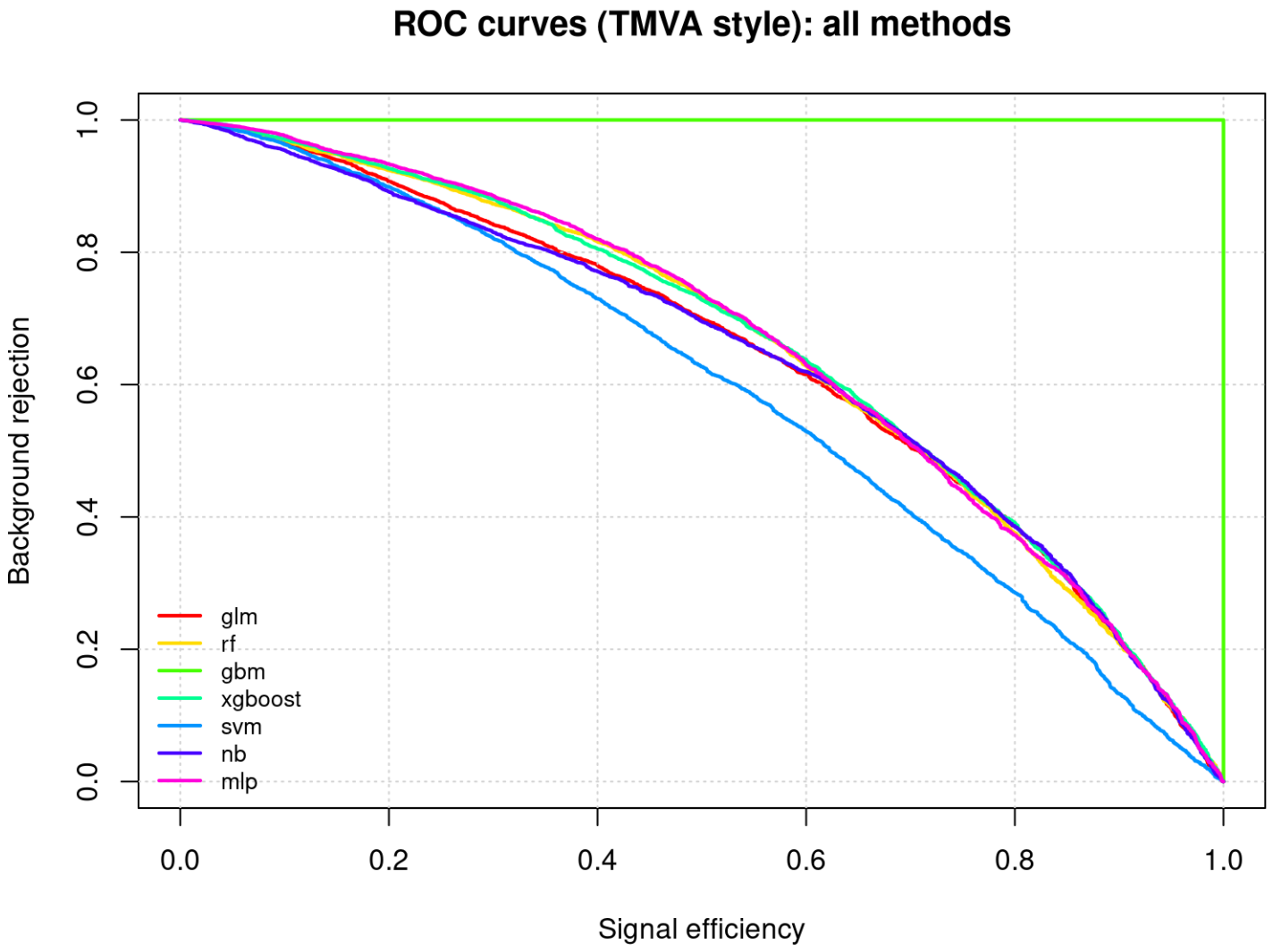

R overtraining check for classifier: rf
KS p-values (unweighted): S=0 B=0
Signal (test)
Signal (train)
Background (test)
Background (train)
(1/N) dN/dx
0
5
10
15
0.0
0.2
0.4
0.6
0.8
MVA response


R overtraining check for classifier: svm
Signal (test)
Signal (train)
Background (test)
Background (train)
(1/N) dN/dx
0
10
20
30
40
50
0.2
0.4
0.6
0.8
1.0
MVA response


R overtraining check for classifier: nb
Signal (test)
Signal (train)
Background (test)
Background (train)
(1/N) dN/dx
0
1
2
3
4
5
6
0.0
0.2
0.4
0.6
0.8
1.0
MVA response


R overtraining check for classifier: xgboost
Signal (test)
Signal (train)
Background (test)
Background (train)
(1/N) dN/dx
0
2
4
6
8
0.0
0.2
0.4
0.6
0.8
1.0
MVA response


R overtraining check for classifier: gbm
KS p-values (unweighted): S=1 B=0.828
Signal (test)
Signal (train)
Background (test)
Background (train)
(1/N) dN/dx
0
10
20
30
40
50
60
0.0
0.2
0.4
0.6
0.8
1.0
MVA response


ROC curves (TMVA style): all methods
Background rejection
Signal efficiency
0.0
0.2
0.4
0.6
0.8
1.0
glm
rf
gbm
xgboost
svm
nb
mlp

Comparison of Results from Python and R (k-fold)

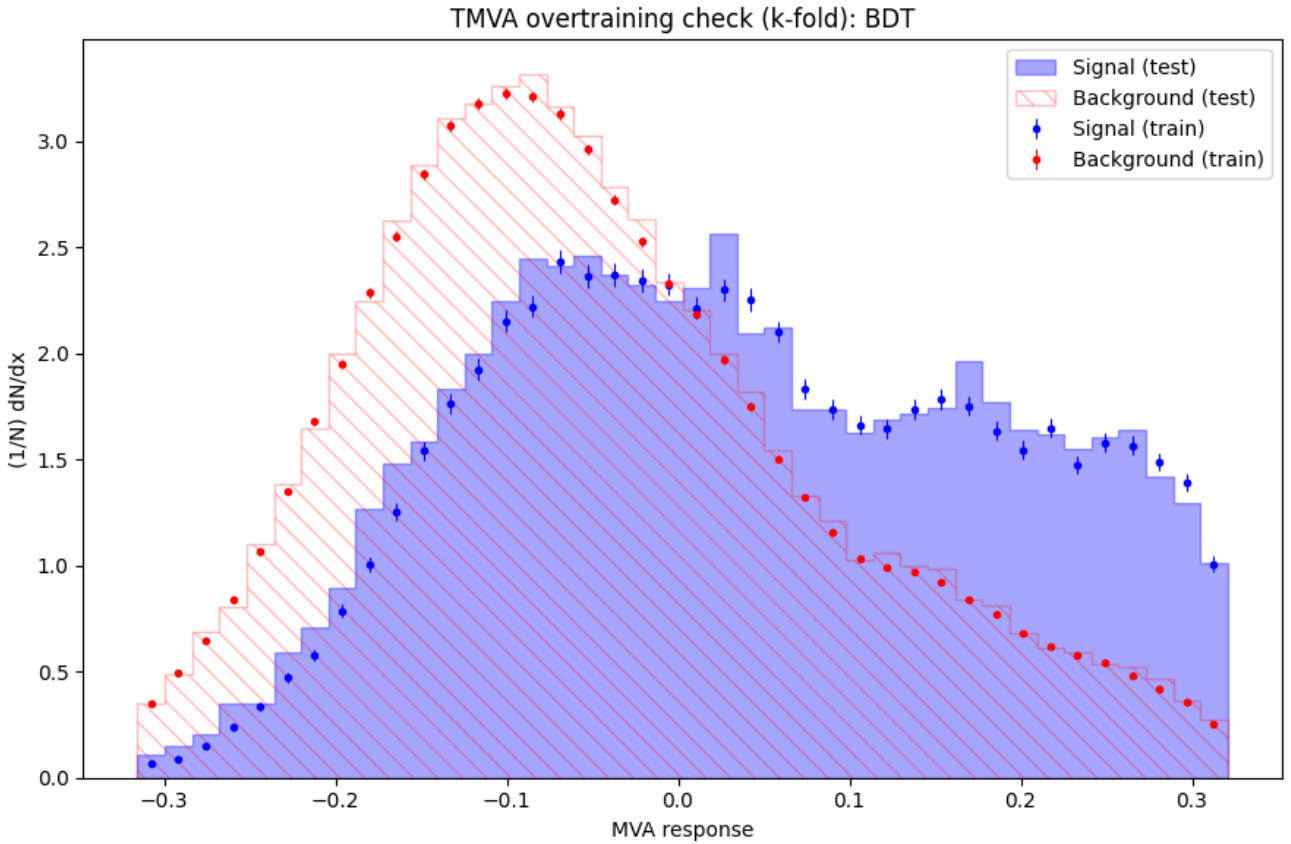
Model	R AUC (oof_weighted)	Python mean_fold_auc	Python overall_oof_auc	Δ AUC (R − Py overall)
Gradient Boosting (gbm)	**1.000000**	0.675134	0.674820	**+0.325180**
MLP (mlp)	0.661500	0.665761	0.664427	−0.002927
Random Forest (rf)	0.656103	0.672187	0.671608	−0.015505
Logistic Regression (glm)	0.643484	0.639506	0.639507	+0.003977
Naive Bayes (nb)	0.640344	0.640700	0.639867	+0.000477
SVM / SVC (svm)	0.590934	0.676572	0.676277	−0.085343

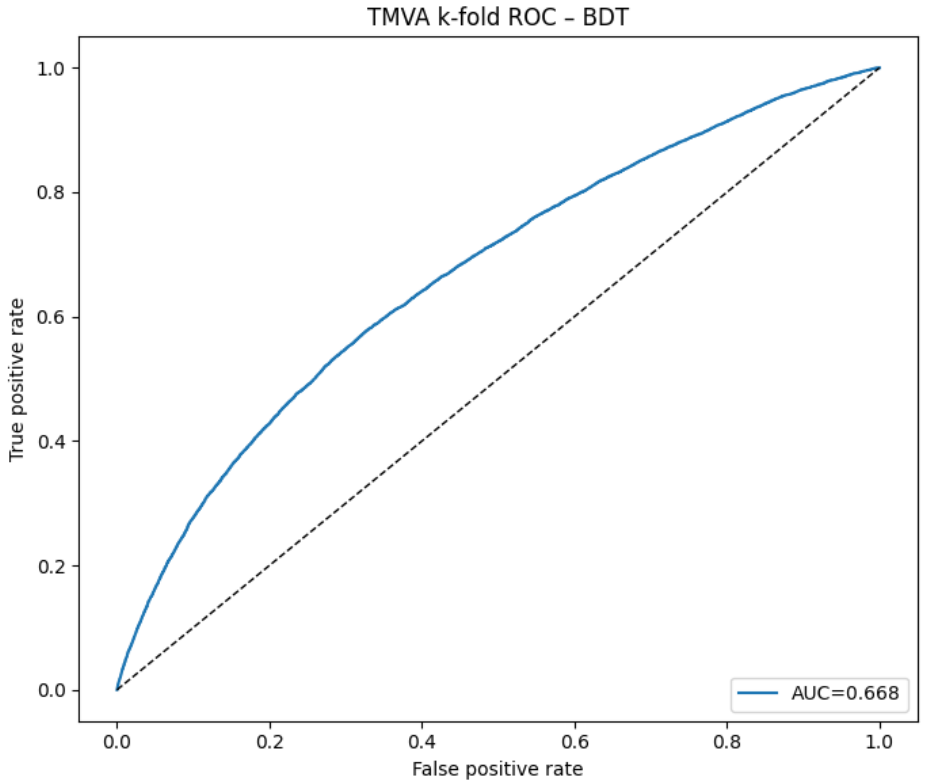
Results of Performance of ML Algorithms using K-fold on TMVA

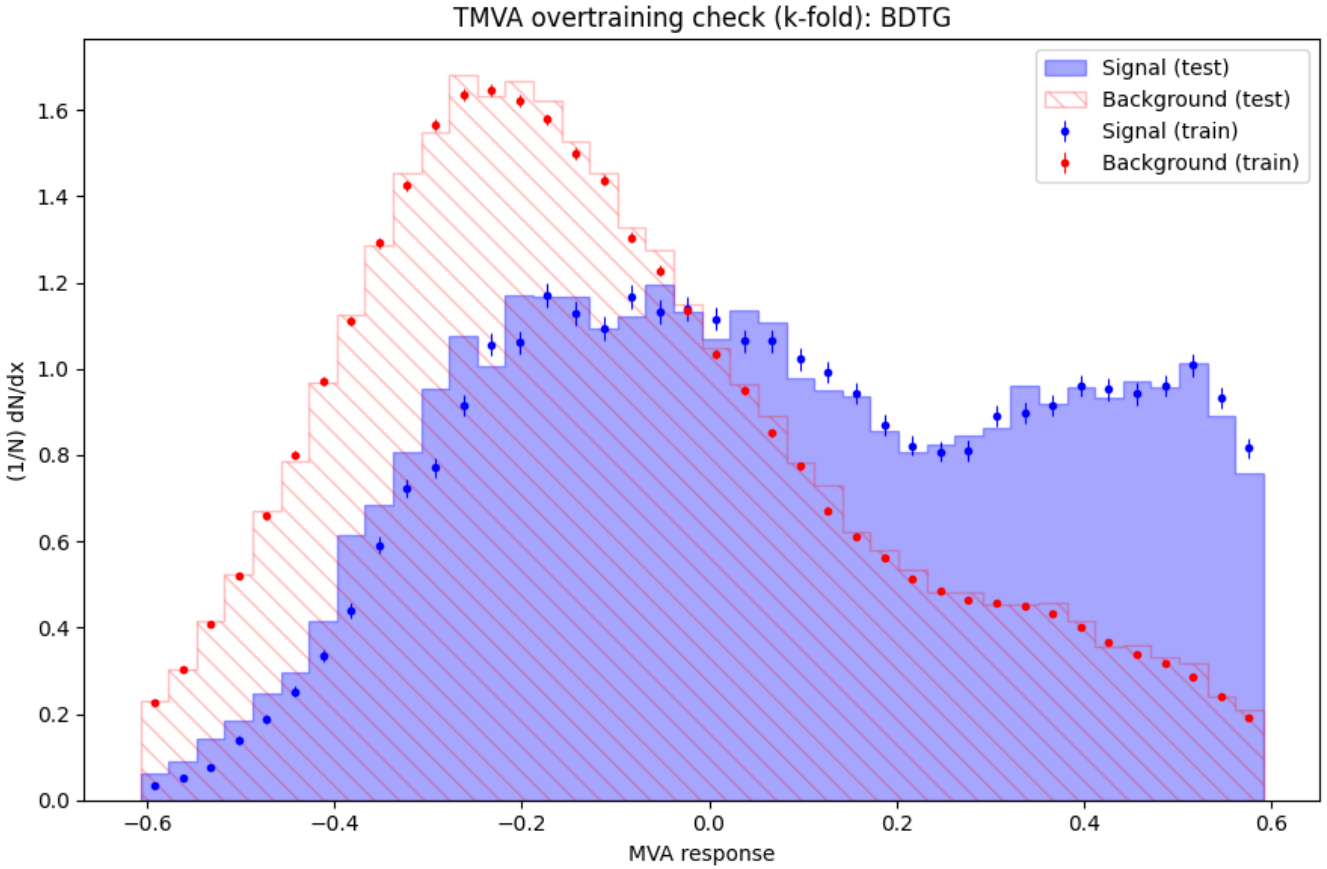
10^{th} February 2026

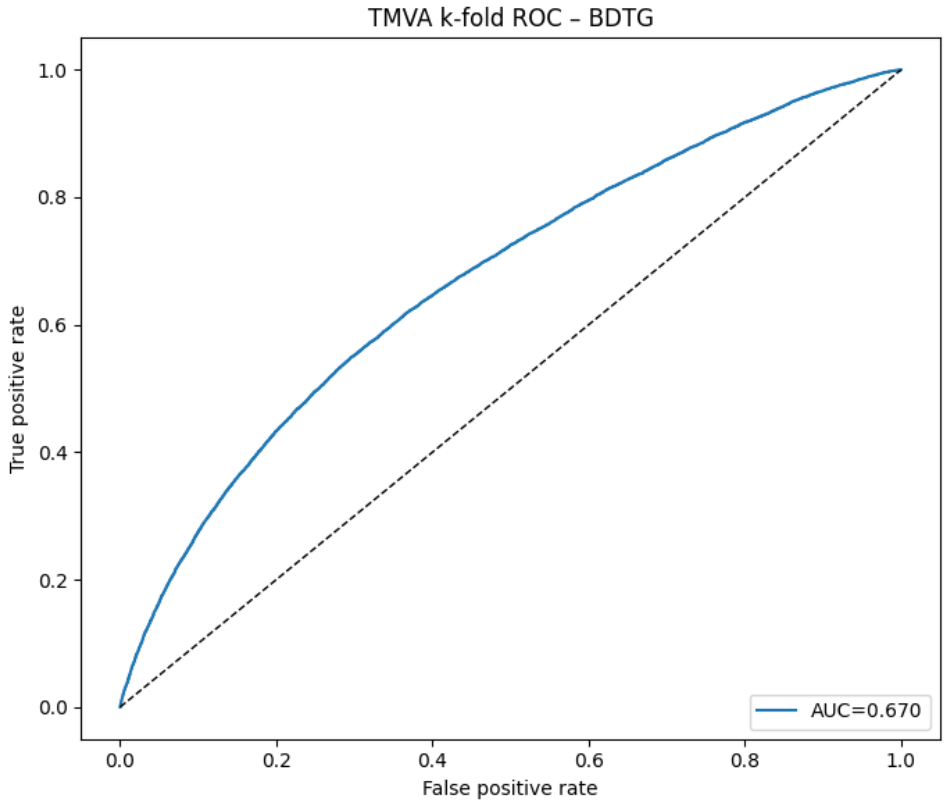
TMVA (k-fold) Results on New Data

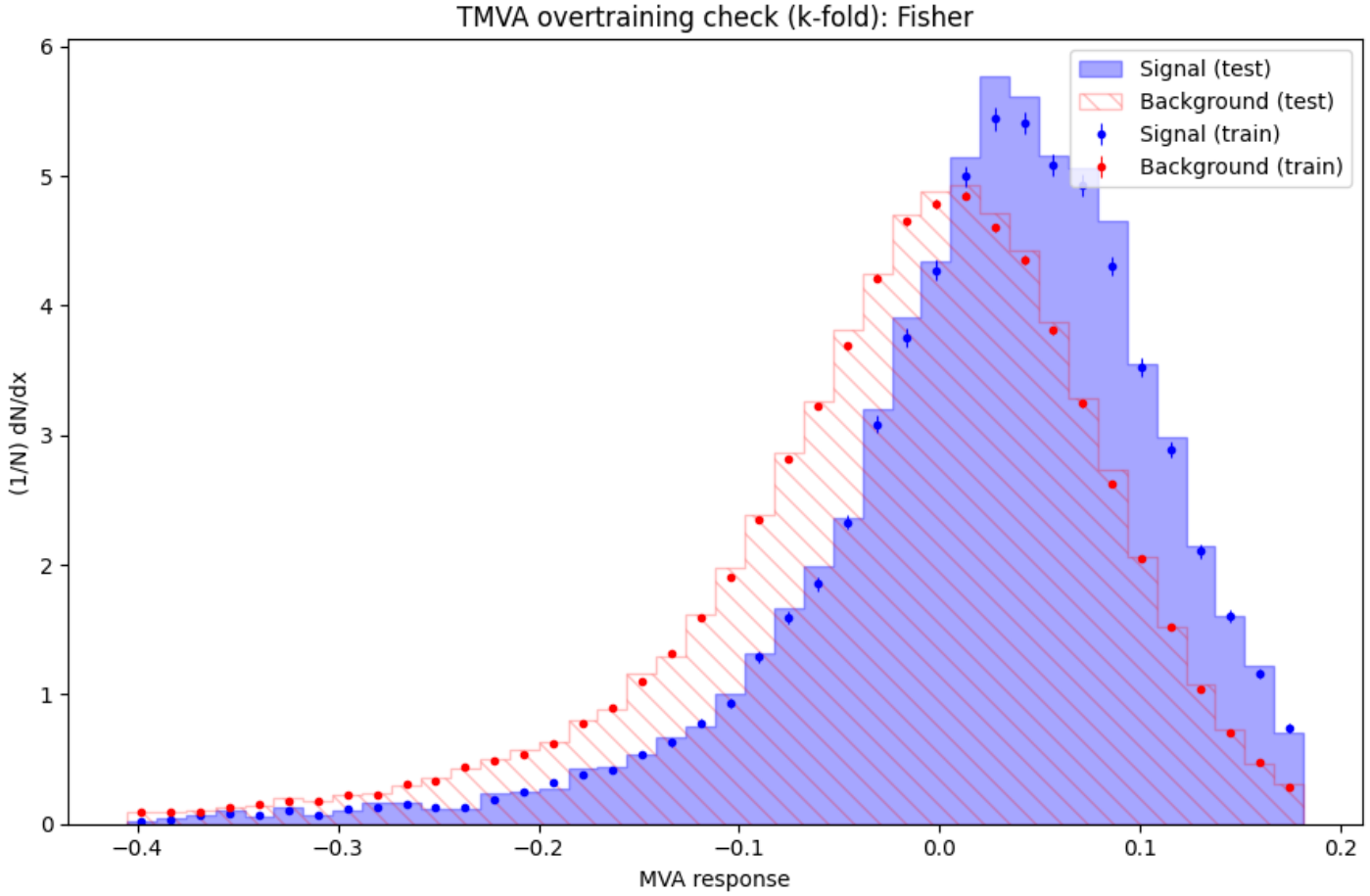
Algorithm (TMVA)	kfold	n_trials	best_mean_auc
BDT	5	20	0.668182
BDTG	5	20	0.670094
Fisher	5	20	0.637319
kNN	5	20	0.651456
Likelihood	5	20	0.650749
MLP	5	20	0.668192

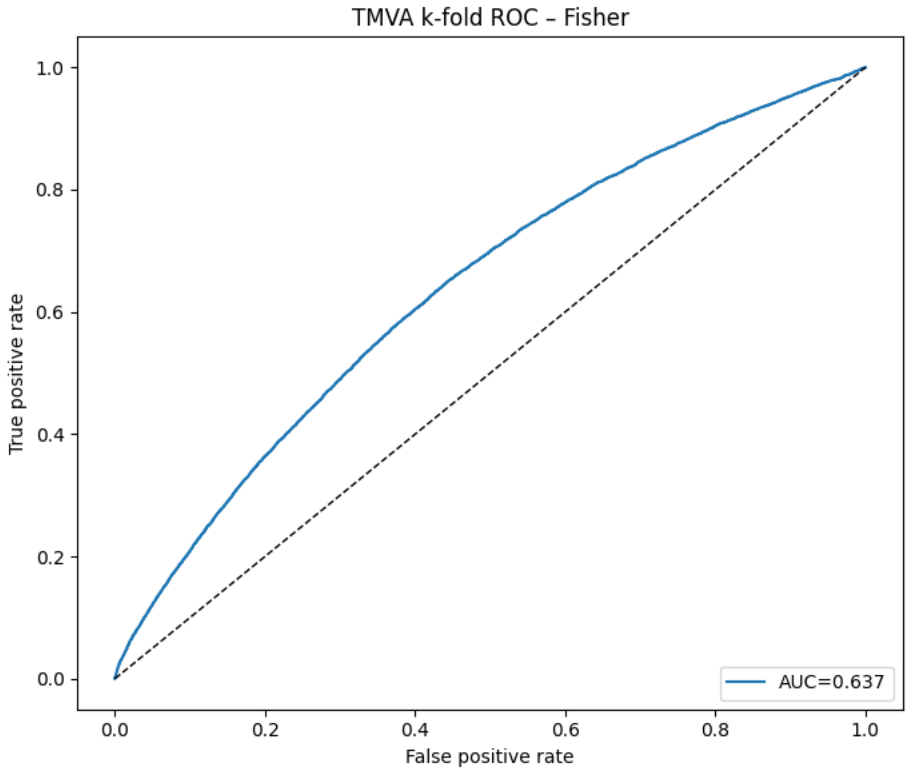

TMVA overtraining check (k-fold): BDT
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3

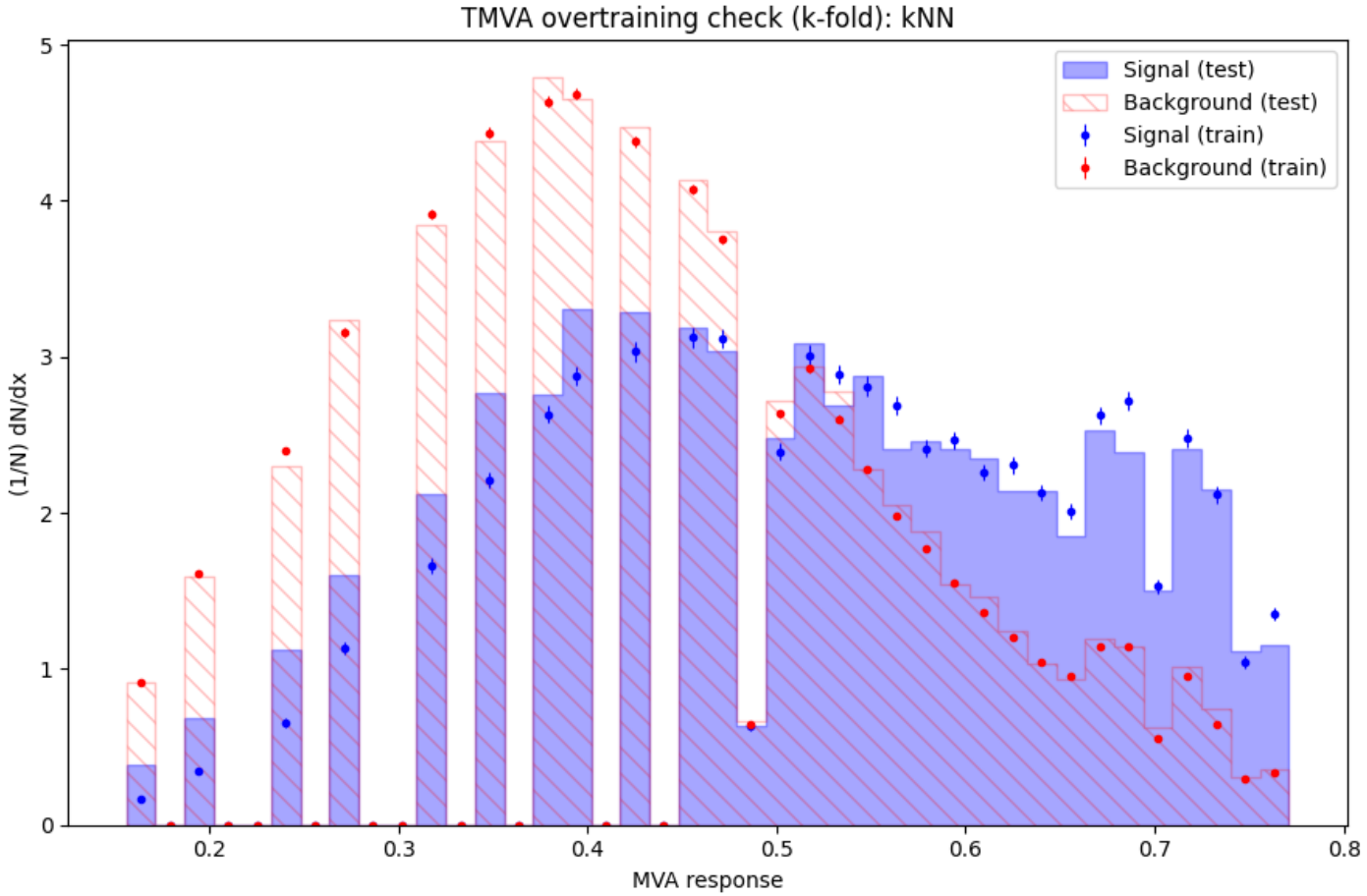

TMVA k-fold ROC – BDT
True positive rate
False positive rate
AUC=0.668
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

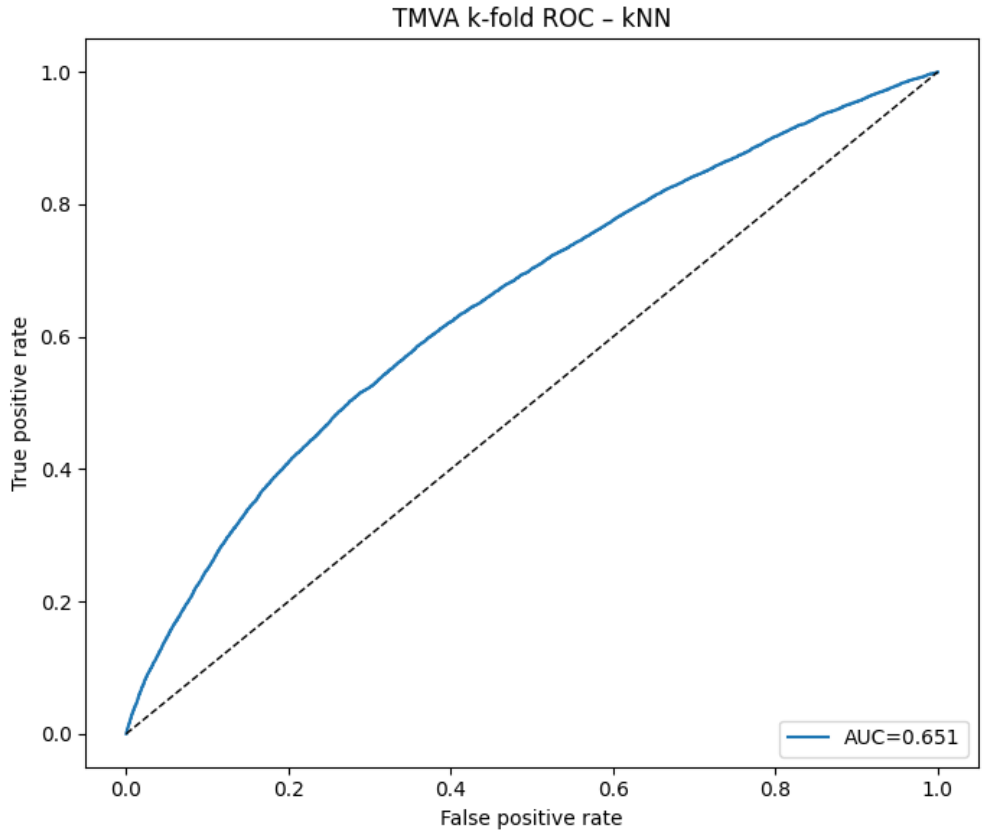

TMVA overtraining check (k-fold): BDTG
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6

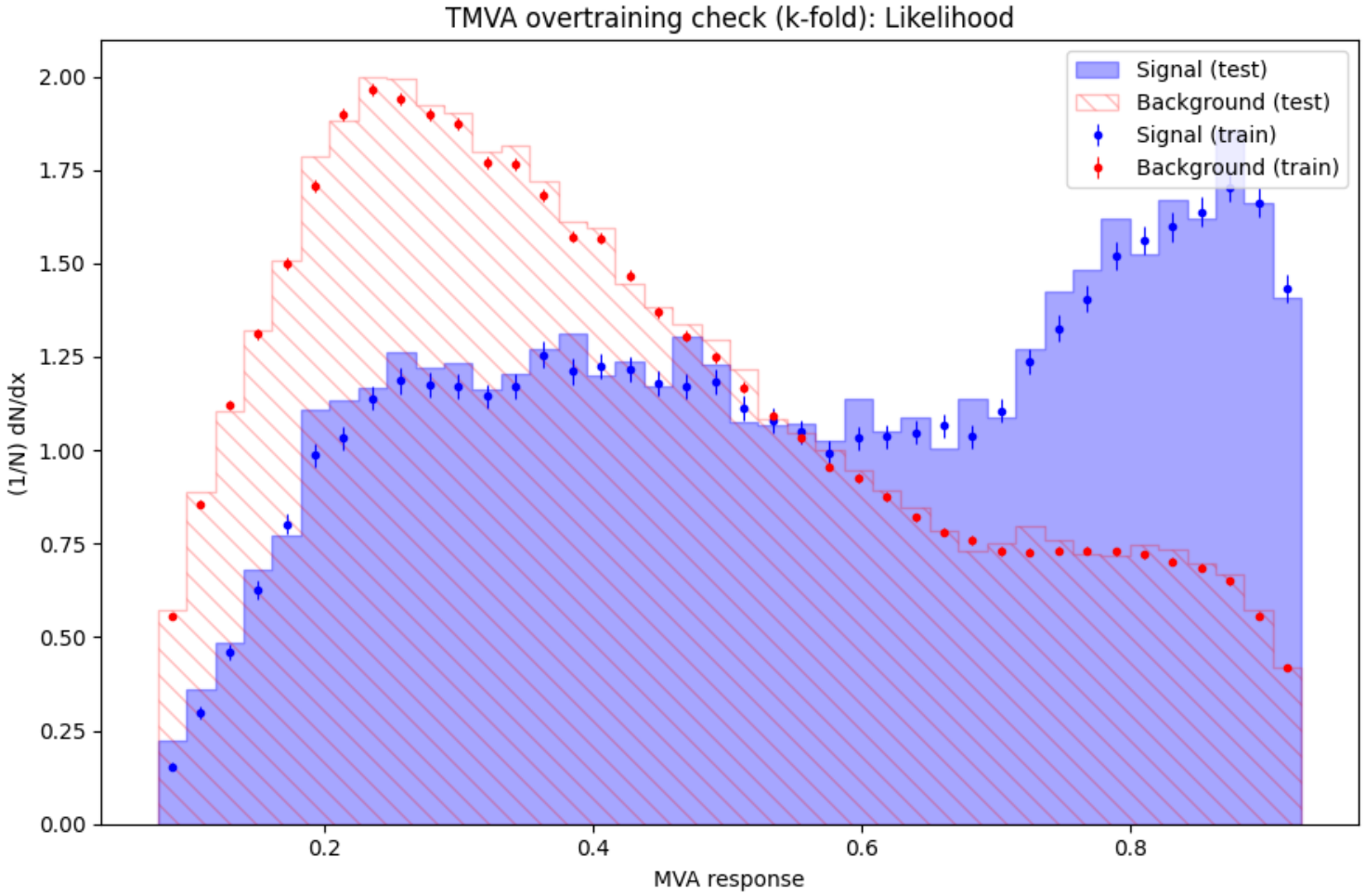

TMVA k-fold ROC – BDTG
True positive rate
False positive rate
AUC=0.670
0.0
0.2
0.4
0.6
0.8
1.0

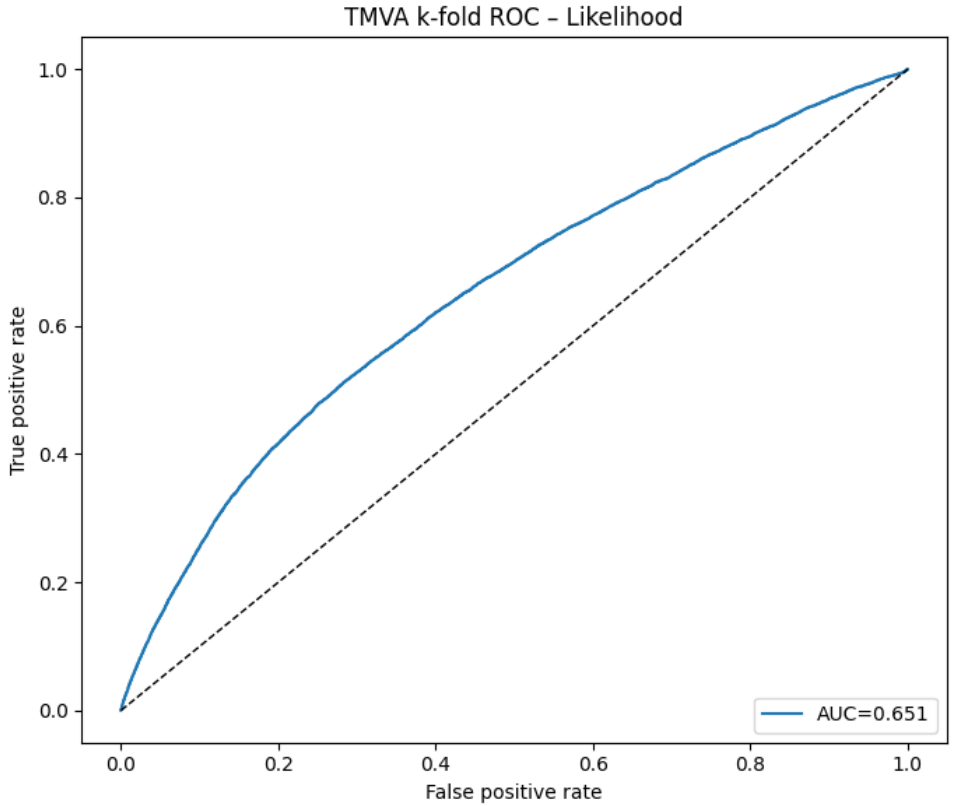

TMVA overtraining check (k-fold): Fisher
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0
1
2
3
4
5
6
−0.4
−0.3
−0.2
−0.1
0.0
0.1
0.2

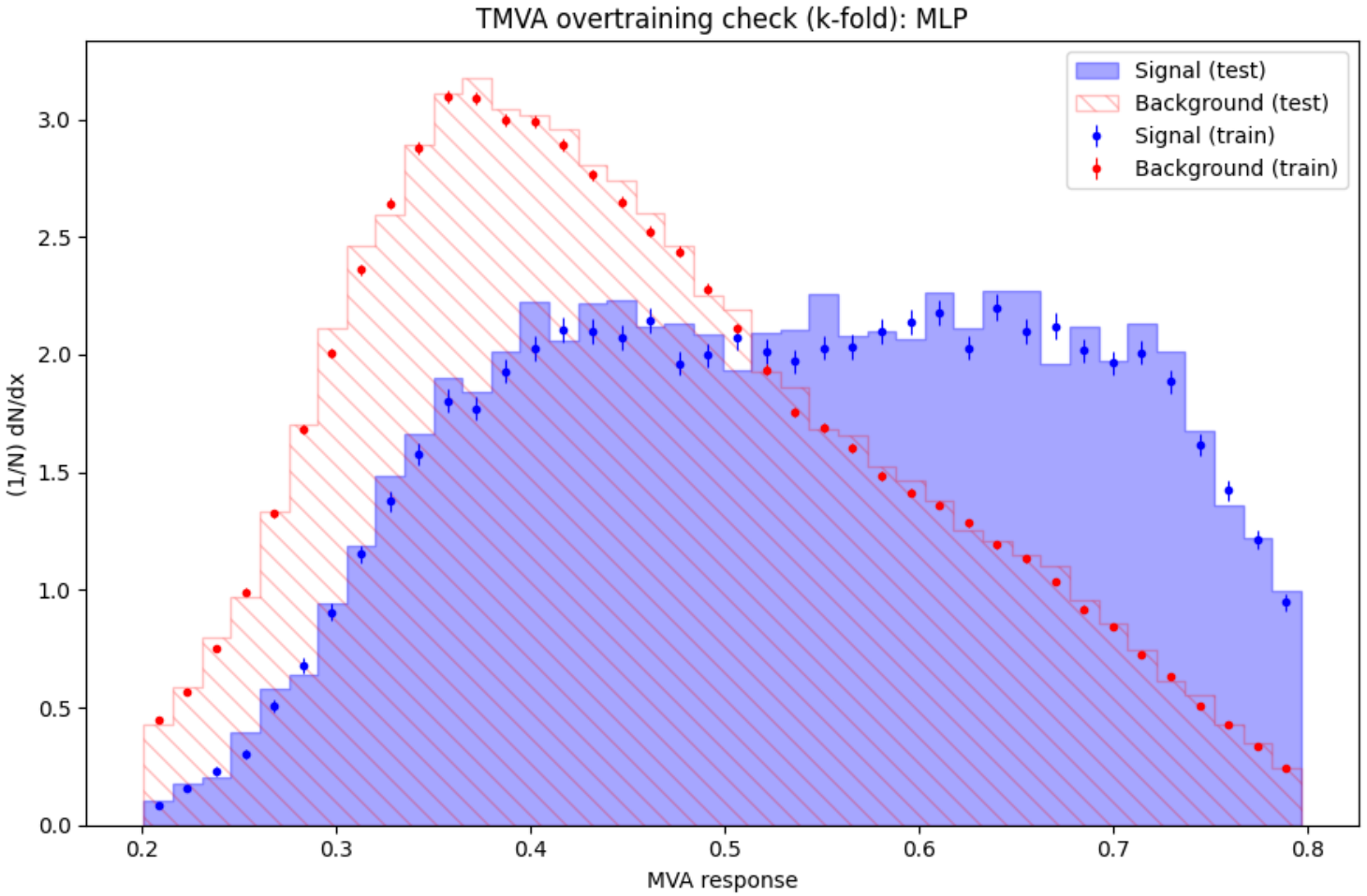

TMVA k-fold ROC – Fisher
True positive rate
False positive rate
AUC=0.637
0.0
0.2
0.4
0.6
0.8
1.0

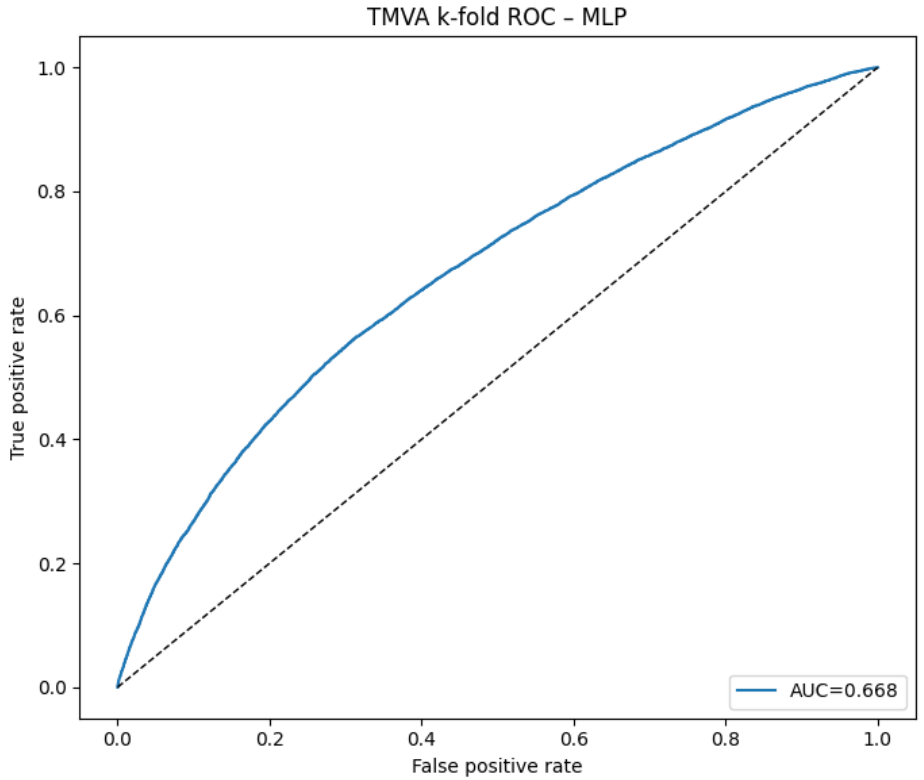

TMVA overtraining check (k-fold): kNN
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0
1
2
3
4
5
0.2
0.3
0.4
0.5
0.6
0.7
0.8


TMVA k-fold ROC – kNN
True positive rate
False positive rate
AUC=0.651
0.0
0.2
0.4
0.6
0.8
1.0


TMVA overtraining check (k-fold): Likelihood
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
0.2
0.4
0.6
0.8

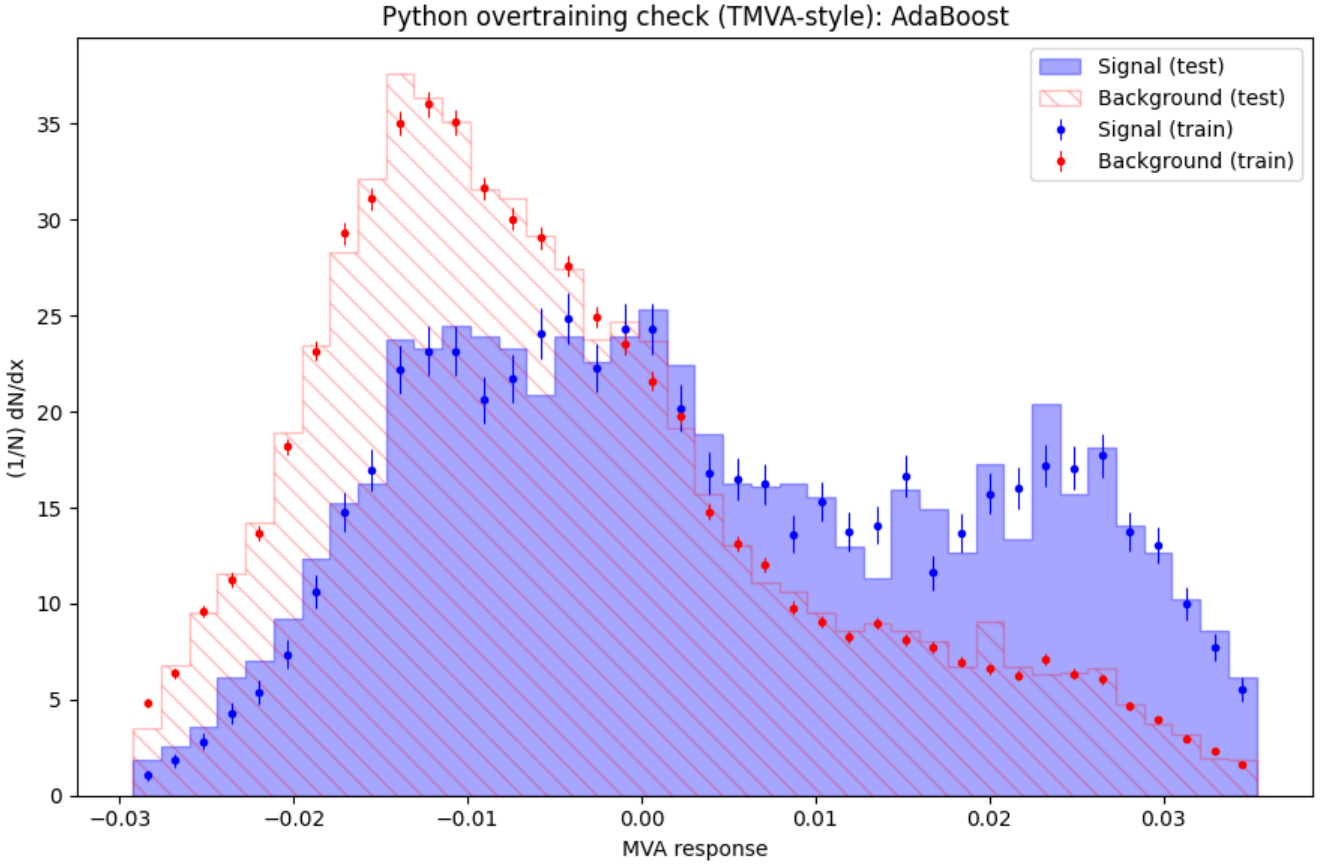

TMVA k-fold ROC – Likelihood
True positive rate
False positive rate
AUC=0.651
0.0
0.2
0.4
0.6
0.8
1.0

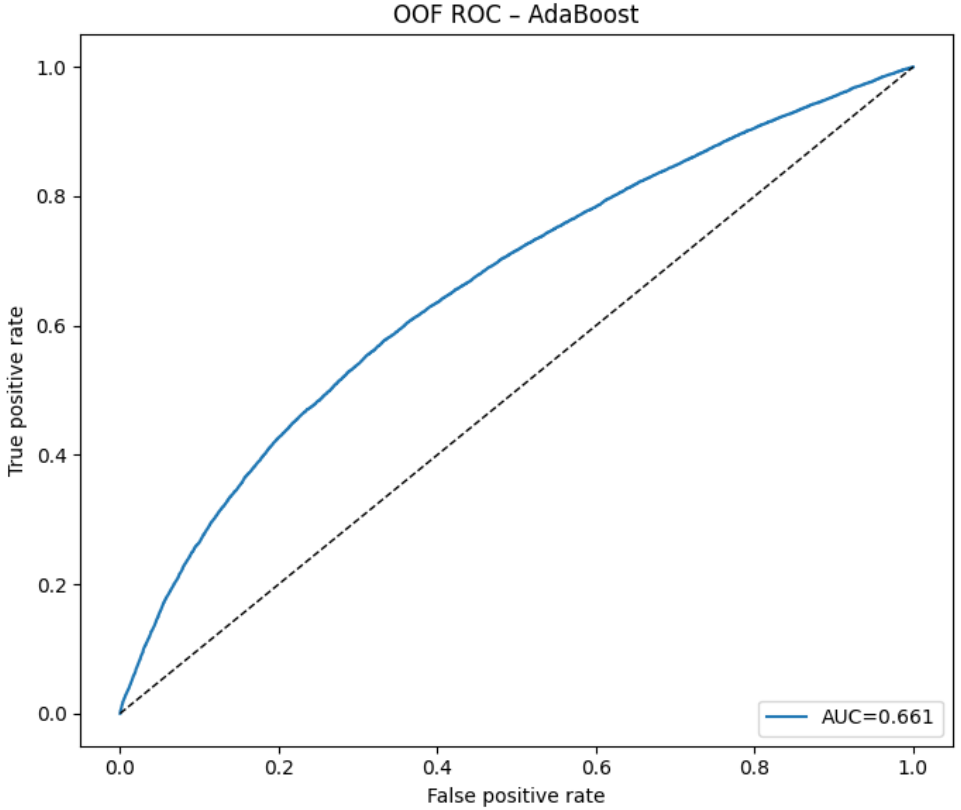

TMVA overtraining check (k-fold): MLP
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0.2
0.3
0.4
0.5
0.6
0.7
0.8

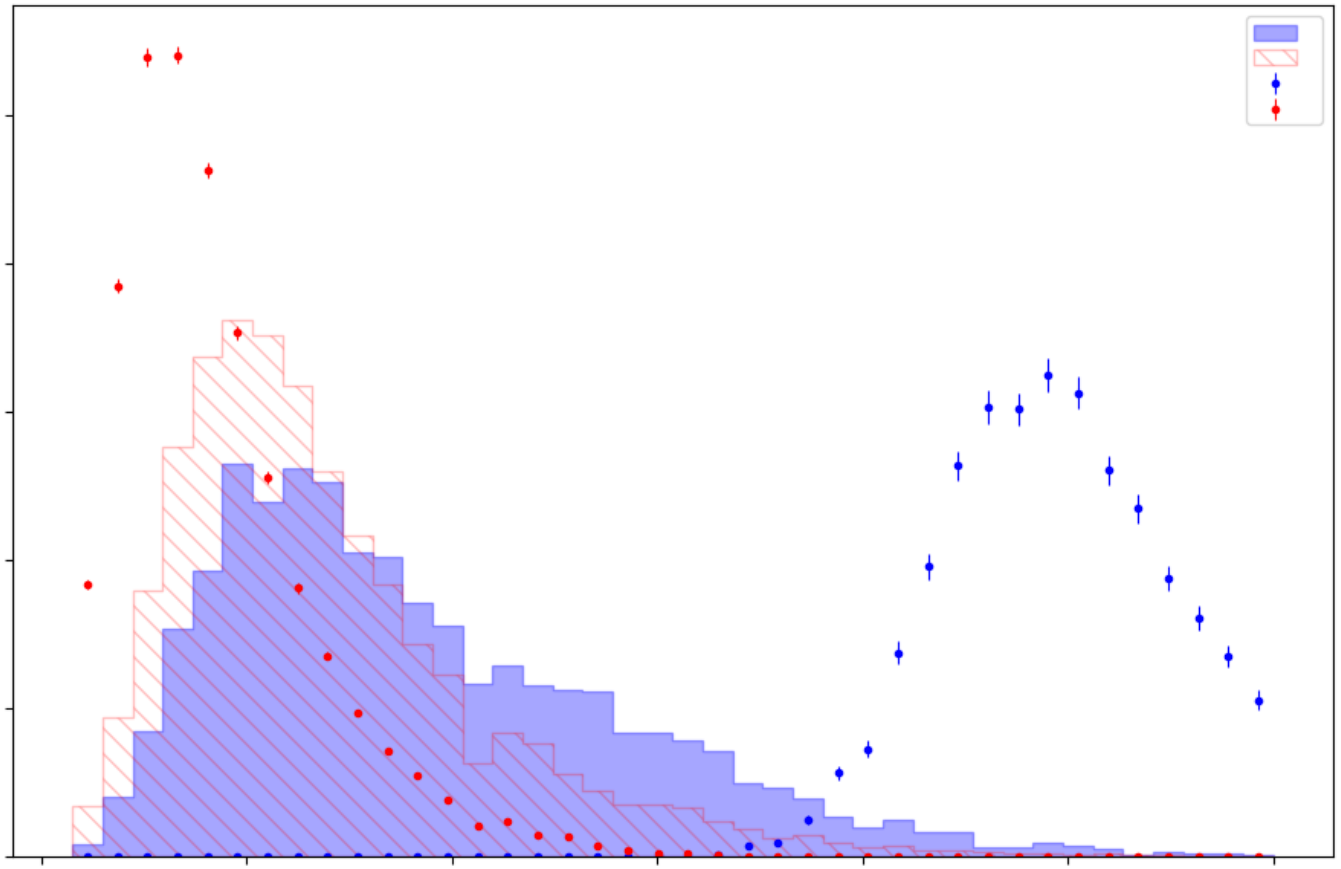

TMVA k-fold ROC – MLP
True positive rate
False positive rate
AUC=0.668
0.0
0.2
0.4
0.6
0.8
1.0

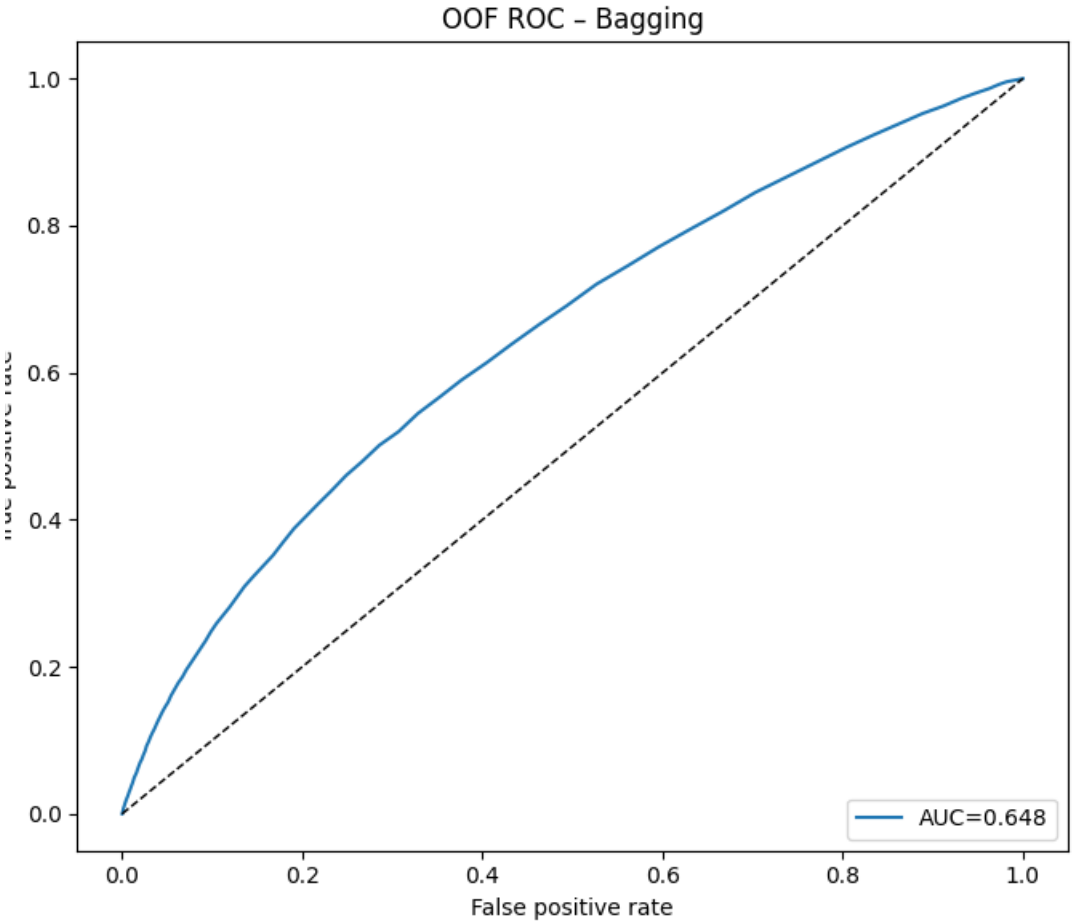
Results of Performance of ML Algorithms using K-fold on Python 4th Trial More algorithms added 10th February 2026

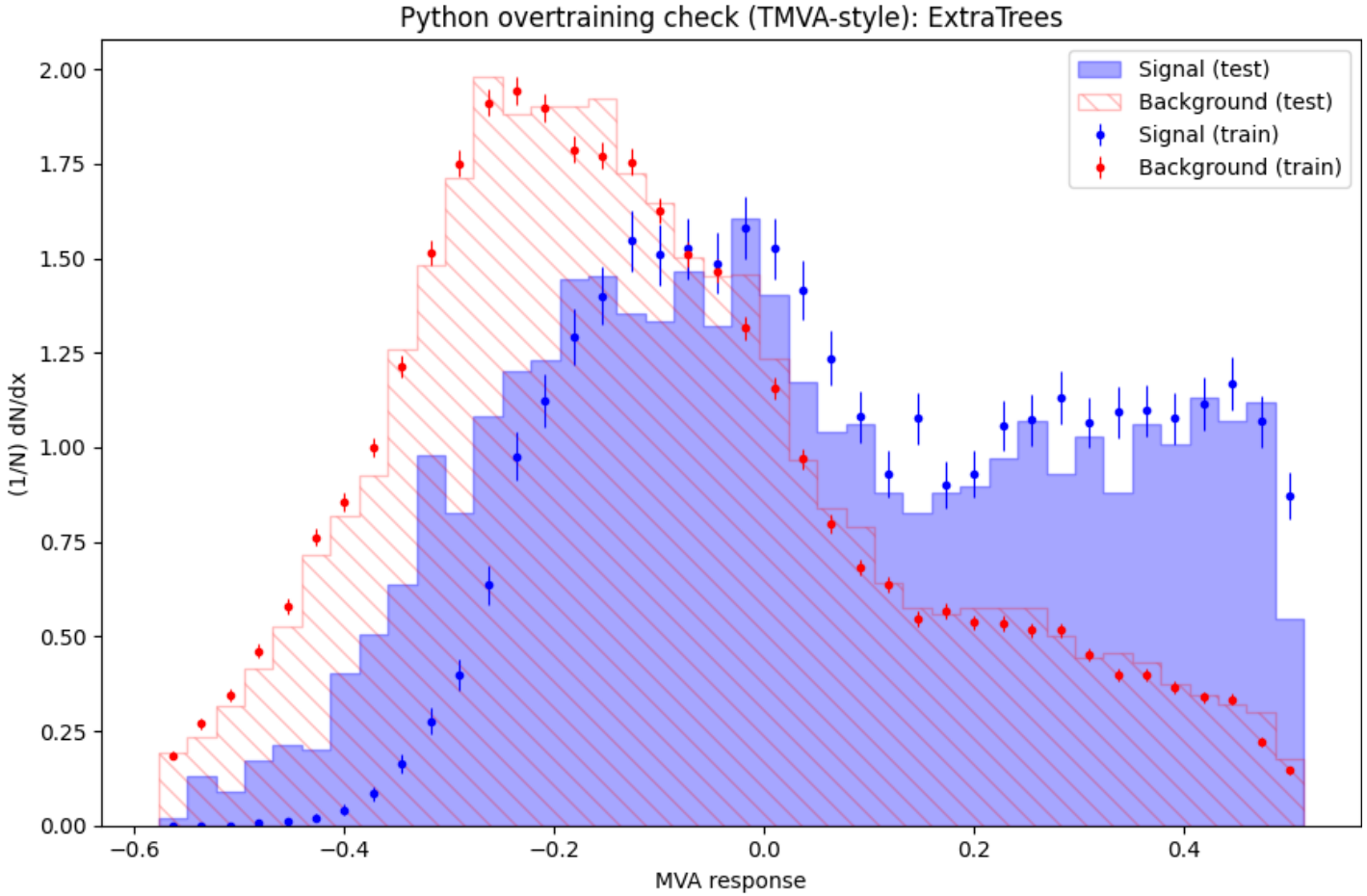
Algorithm (Python)	outer_k	inner_k	n_iter	mean_fold_auc	std_fold_auc	overall_oof_auc	mean_fold_wacc	std_fold_wacc	overall_oof_wacc
AdaBoost	5	3	25	0.663612	0.006768	0.660667	0.62078	0.004724	0.62078
Bagging	5	3	25	0.647918	0.007531	0.647809	0.502429	0.000625	0.502429
ExtraTrees	5	3	25	0.667711	0.006485	0.667169	0.622879	0.005654	0.622879
GaussianNB	5	3	25	0.636746	0.008755	0.636637	0.59563	0.004879	0.59563
GradientBoosting	5	3	25	0.670242	0.007283	0.670033	0.625561	0.006146	0.62556
HistGradientBoosting	5	3	25	0.668588	0.006794	0.668074	0.624038	0.005583	0.624038
KNN	5	3	25	0.649829	0.006528	0.649802	0.500247	0.000234	0.500247
LDA	5	3	25	0.633161	0.009455	0.632984	0.500227	4.95E-05	0.500227
LinearSVC	5	3	25	0.638989	0.00895	0.638861	0.602301	0.008101	0.6023
LogisticRegression	5	3	25	0.641267	0.008797	0.641124	0.604398	0.007429	0.604398
MLP	5	3	25	0.66697	0.007911	0.666548	0.50295	0.00077	0.50295
QDA	5	3	25	0.645348	0.007435	0.645249	0.51138	0.002164	0.511379
RandomForest	5	3	25	0.667747	0.006265	0.667129	0.620657	0.006323	0.620657
SGDClassifier	5	3	25	0.652858	0.006399	0.652702	0.570652	0.004155	0.570652
SVC	5	3	12	0.668126	0.006504	0.667912	0.62335	0.00485	0.62335

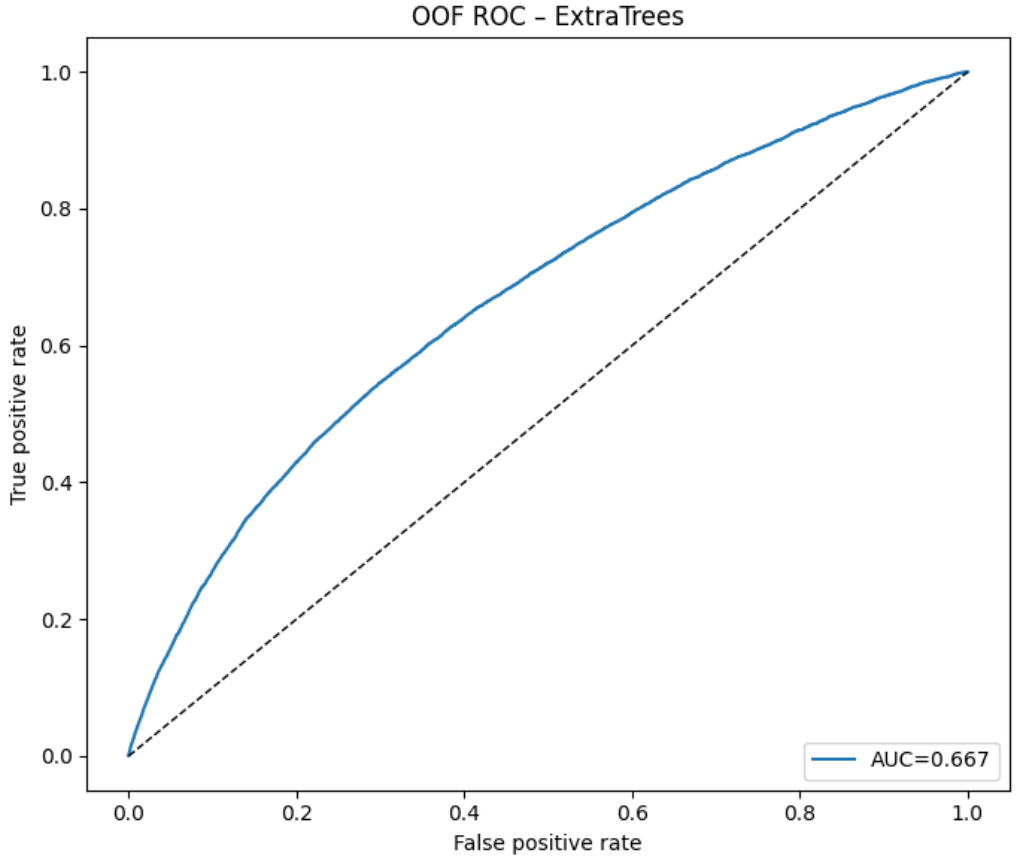

Python overtraining check (TMVA-style): AdaBoost
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0
5
10
15
20
25
30
35
−0.03
−0.02
−0.01
0.00
0.01
0.02
0.03

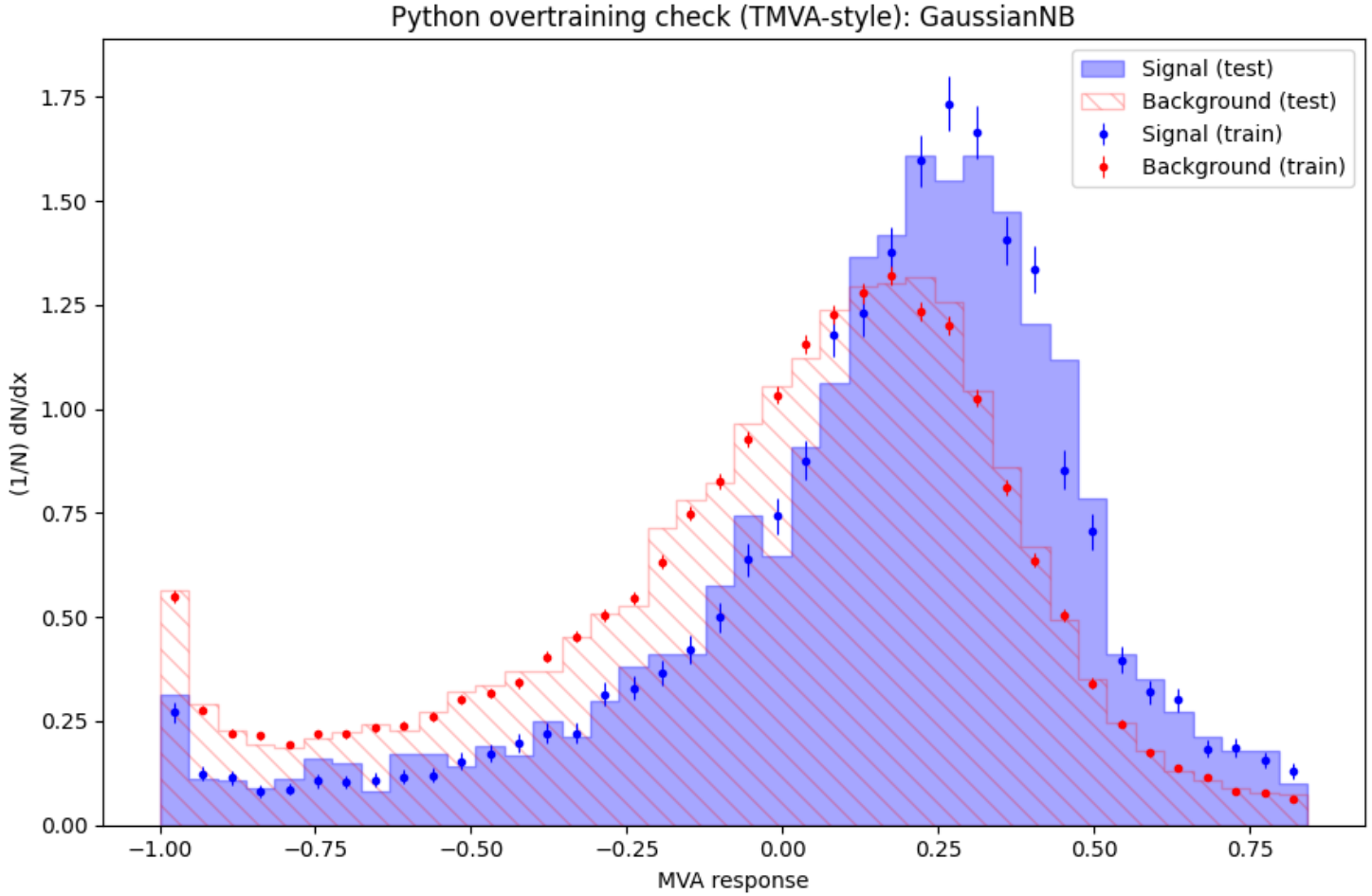

OOF ROC – AdaBoost
True positive rate
False positive rate
AUC=0.661
0.0
0.2
0.4
0.6
0.8
1.0

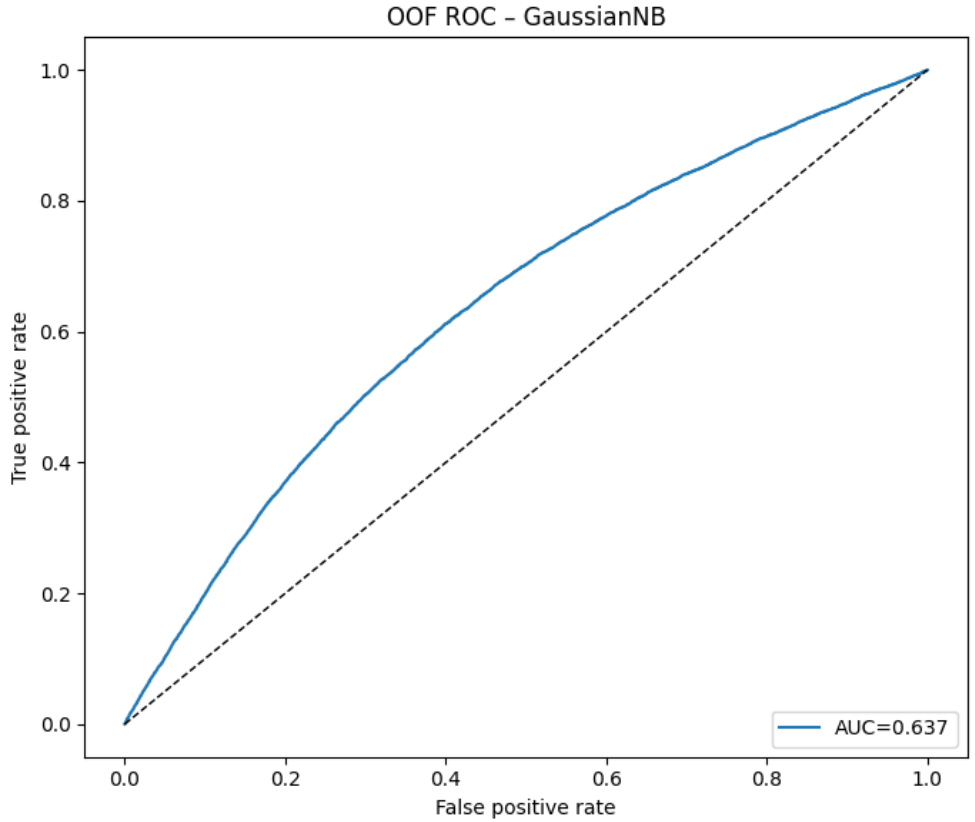


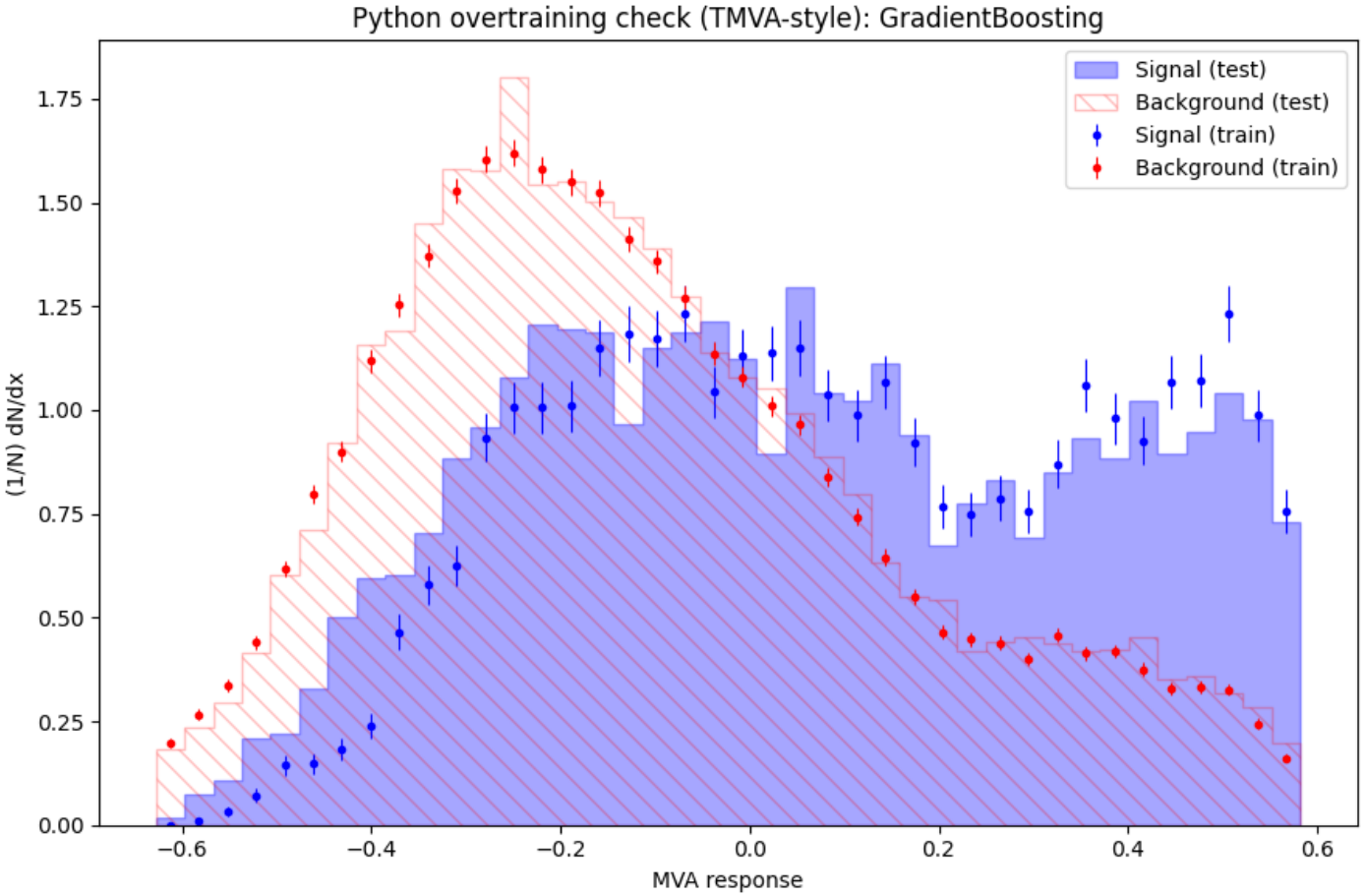

OOF ROC – Bagging
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
False positive rate
AUC=0.648

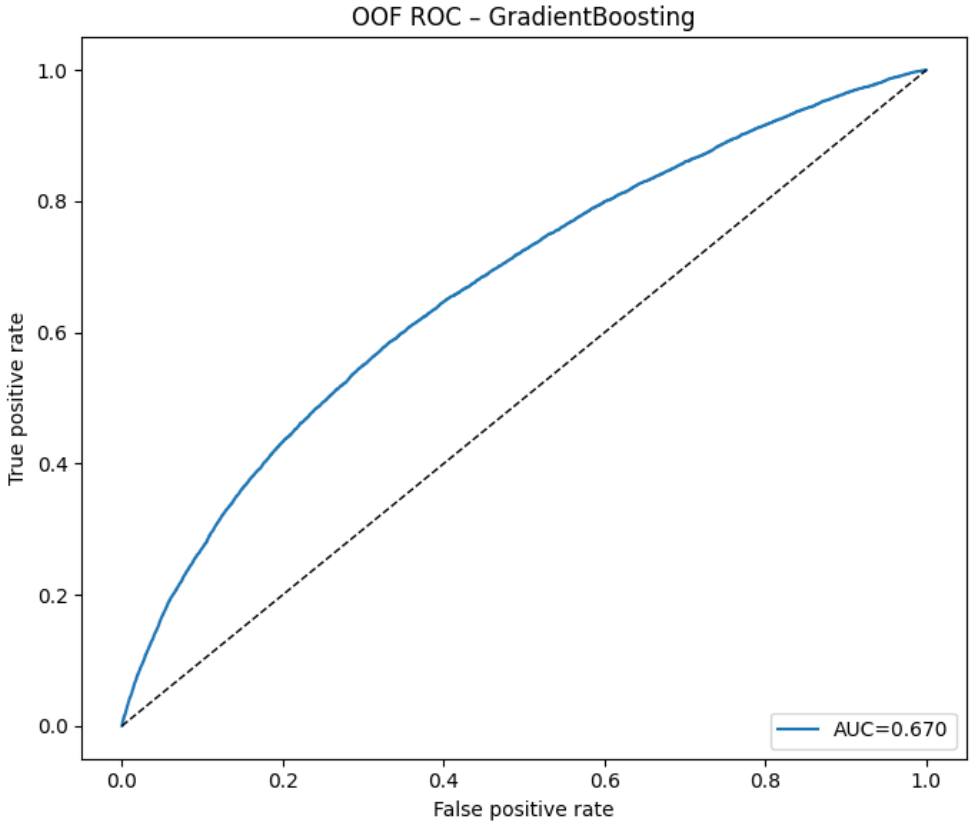

Python overtraining check (TMVA-style): ExtraTrees
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
−0.6
−0.4
−0.2
0.0
0.2
0.4

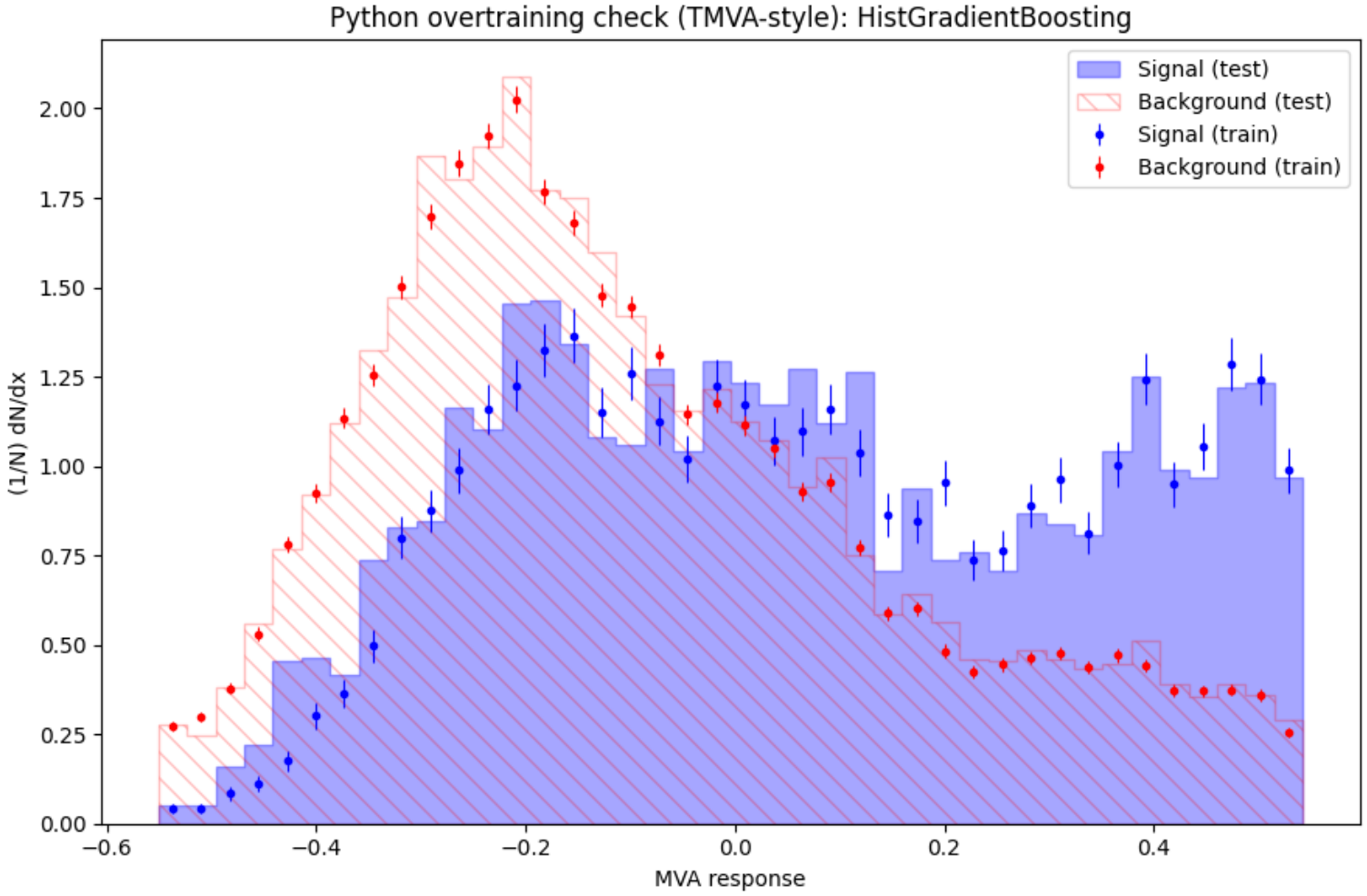

OOF ROC – ExtraTrees
True positive rate
False positive rate
AUC=0.667
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

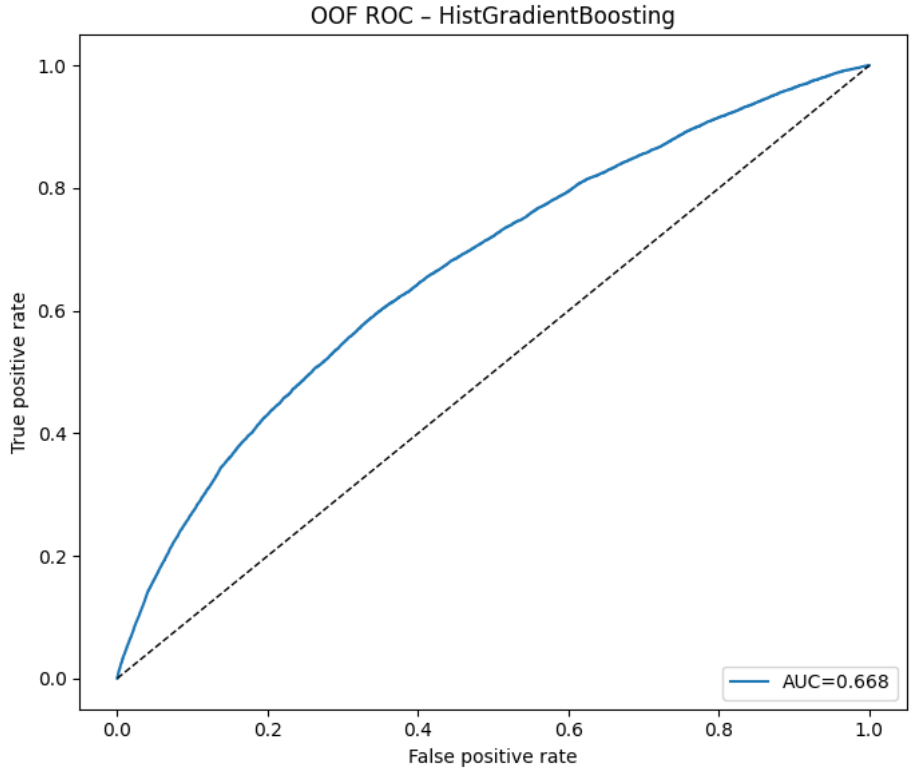

Python overtraining check (TMVA-style): GaussianNB
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75

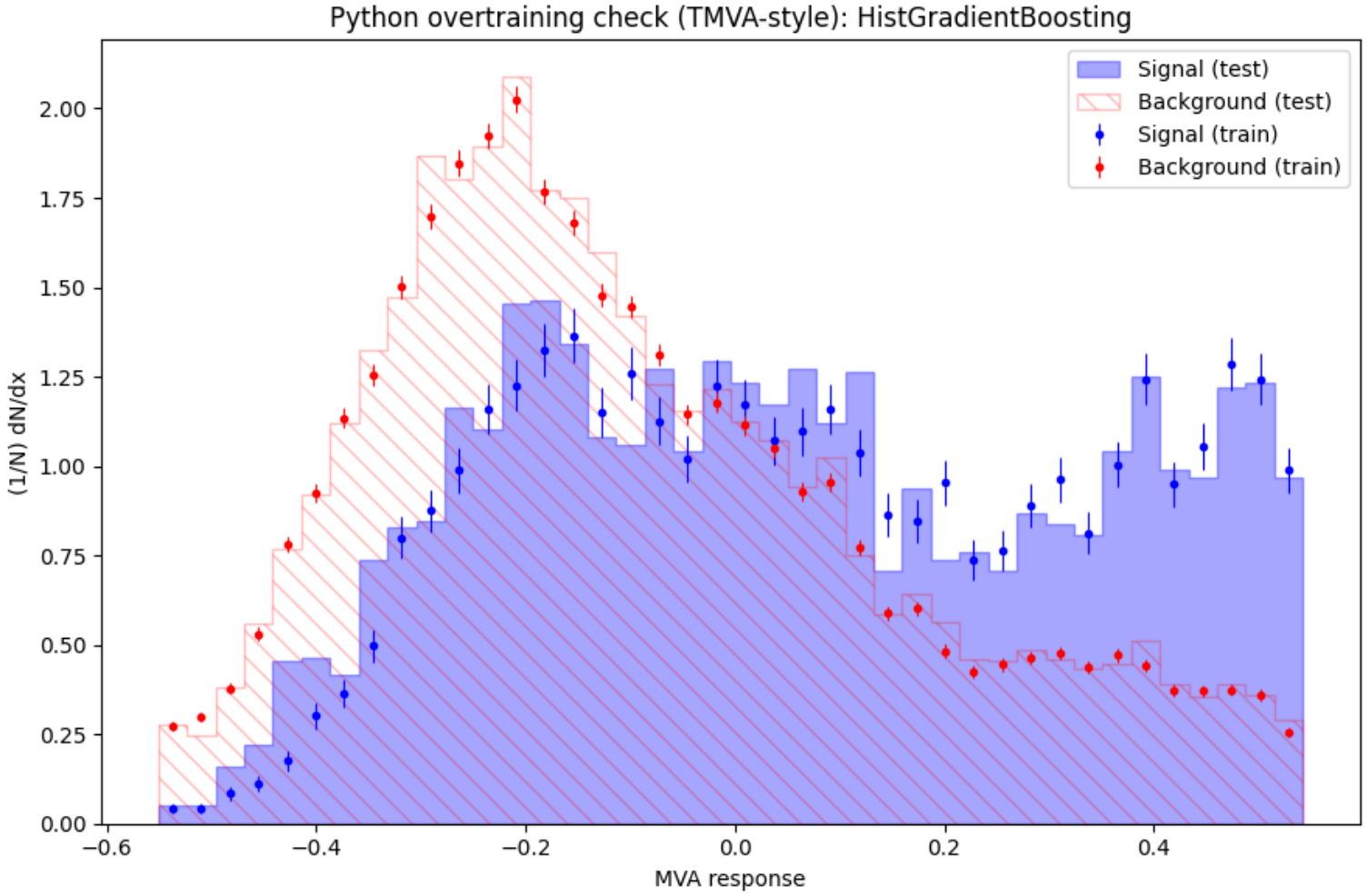

OOF ROC – GaussianNB
True positive rate
False positive rate
AUC=0.637
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

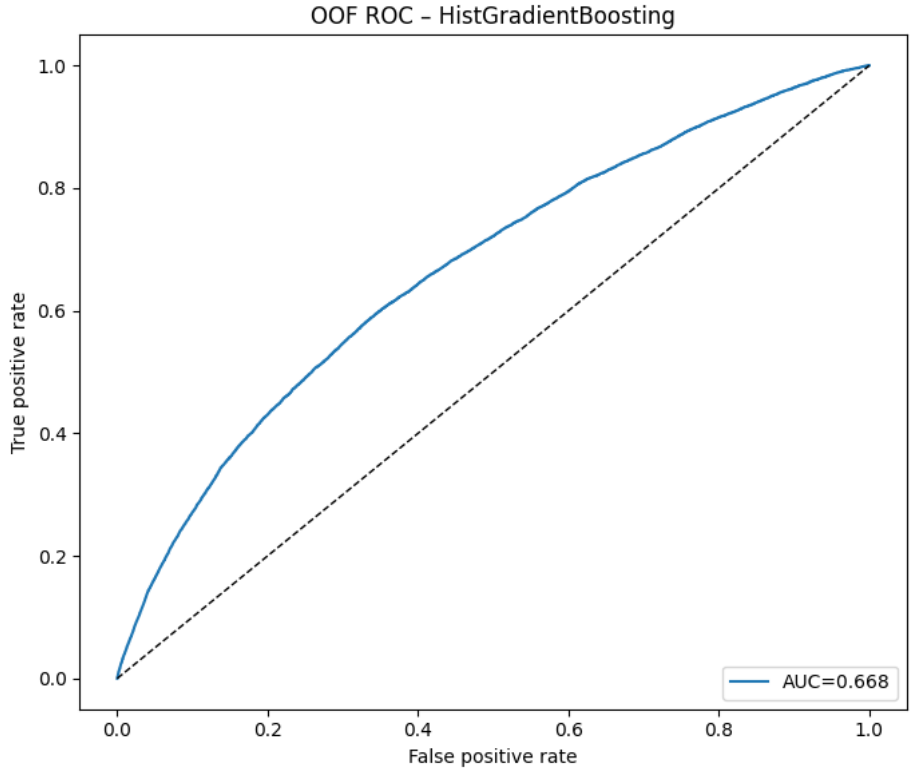

Python overtraining check (TMVA-style): GradientBoosting
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6

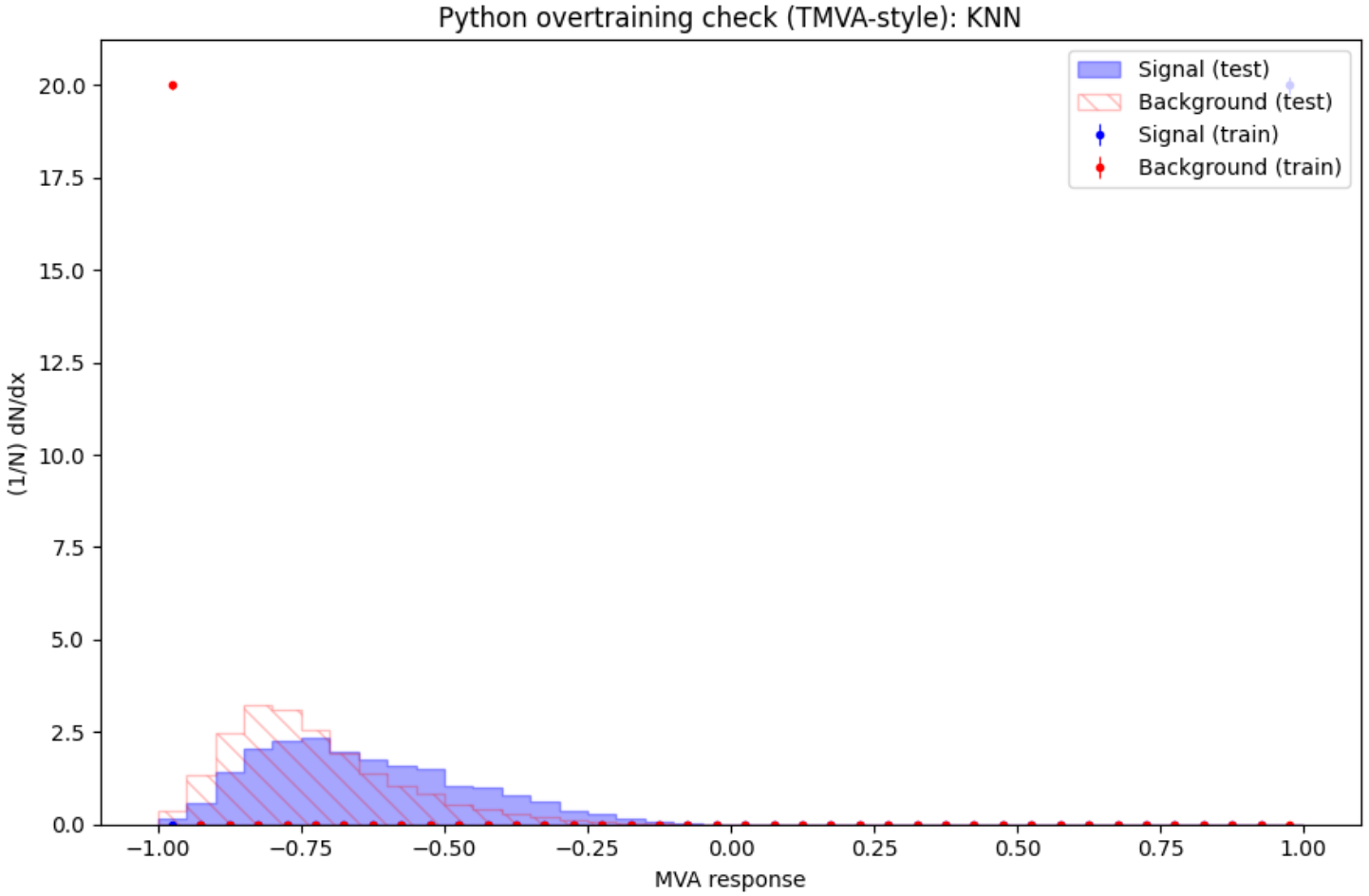

OOF ROC – GradientBoosting
True positive rate
False positive rate
AUC=0.670
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

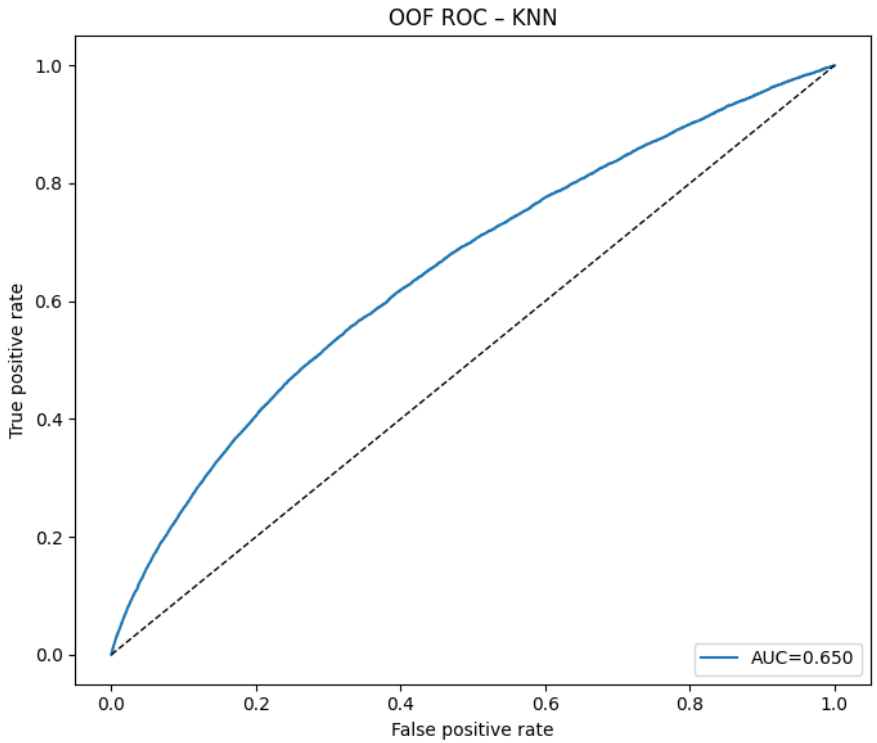

Python overtraining check (TMVA-style): HistGradientBoosting
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
−0.6
−0.4
−0.2
0.0
0.2
0.4

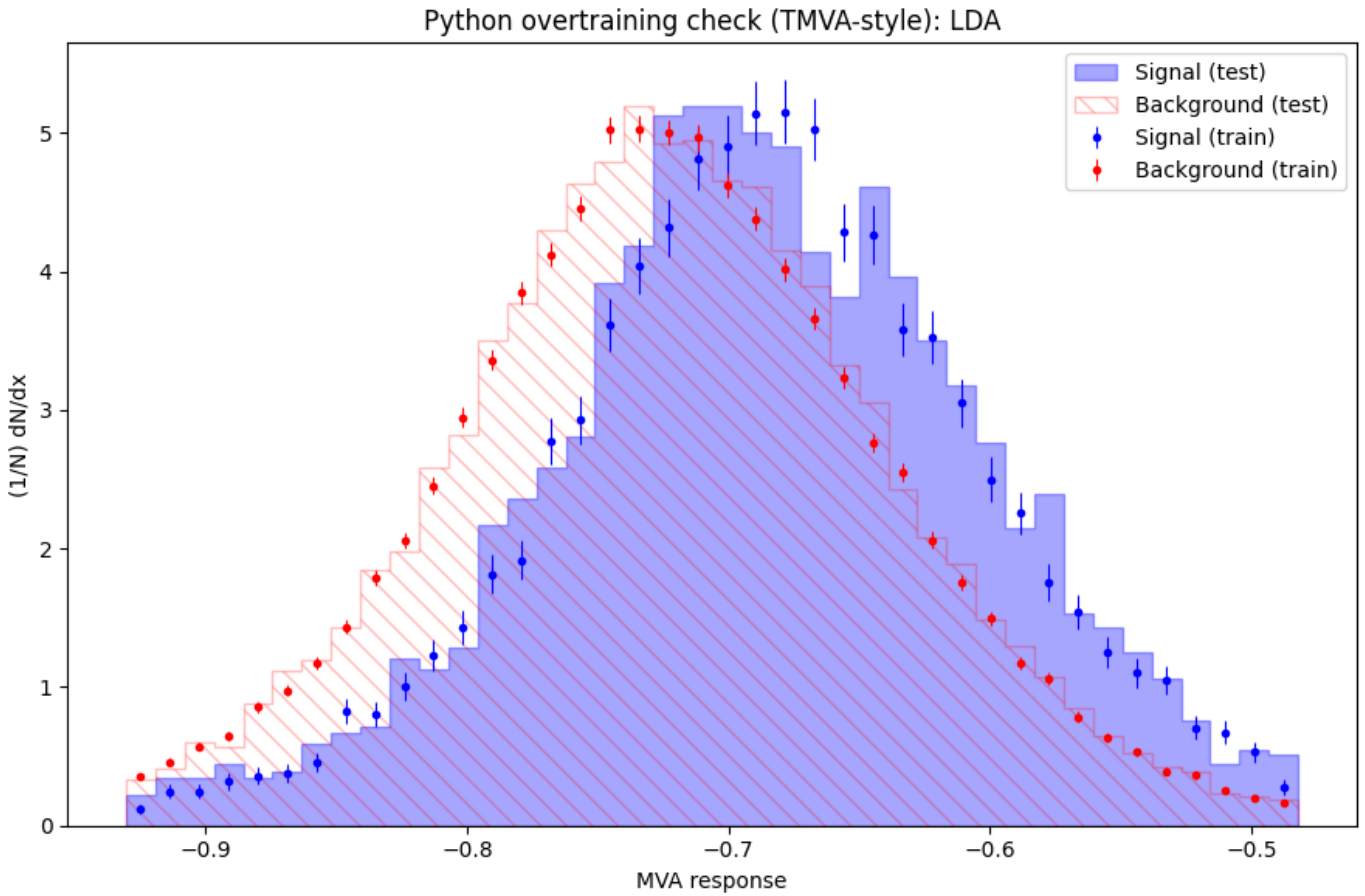

OOF ROC – HistGradientBoosting
True positive rate
False positive rate
AUC=0.668
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

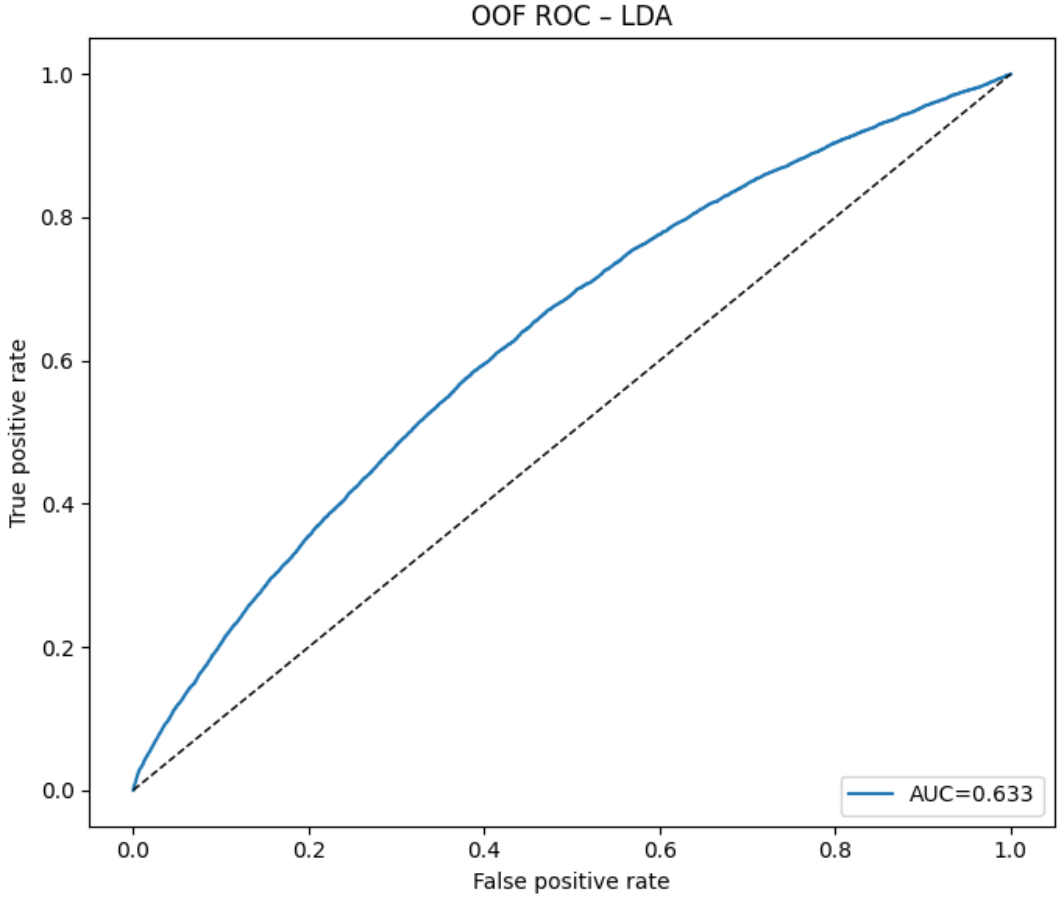

Python overtraining check (TMVA-style): HistGradientBoosting
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
−0.6
−0.4
−0.2
0.0
0.2
0.4

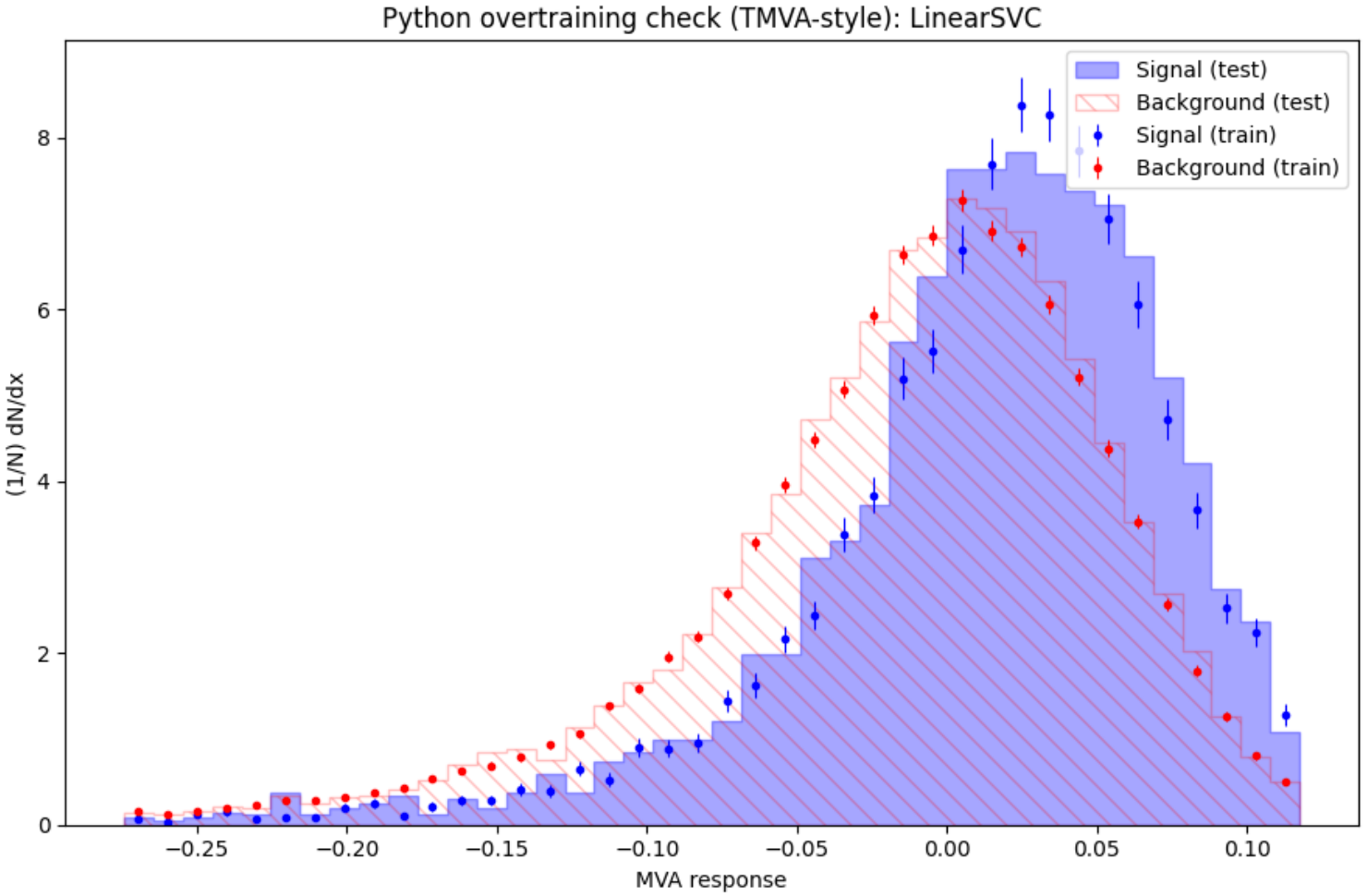

OOF ROC – HistGradientBoosting
True positive rate
False positive rate
AUC=0.668
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

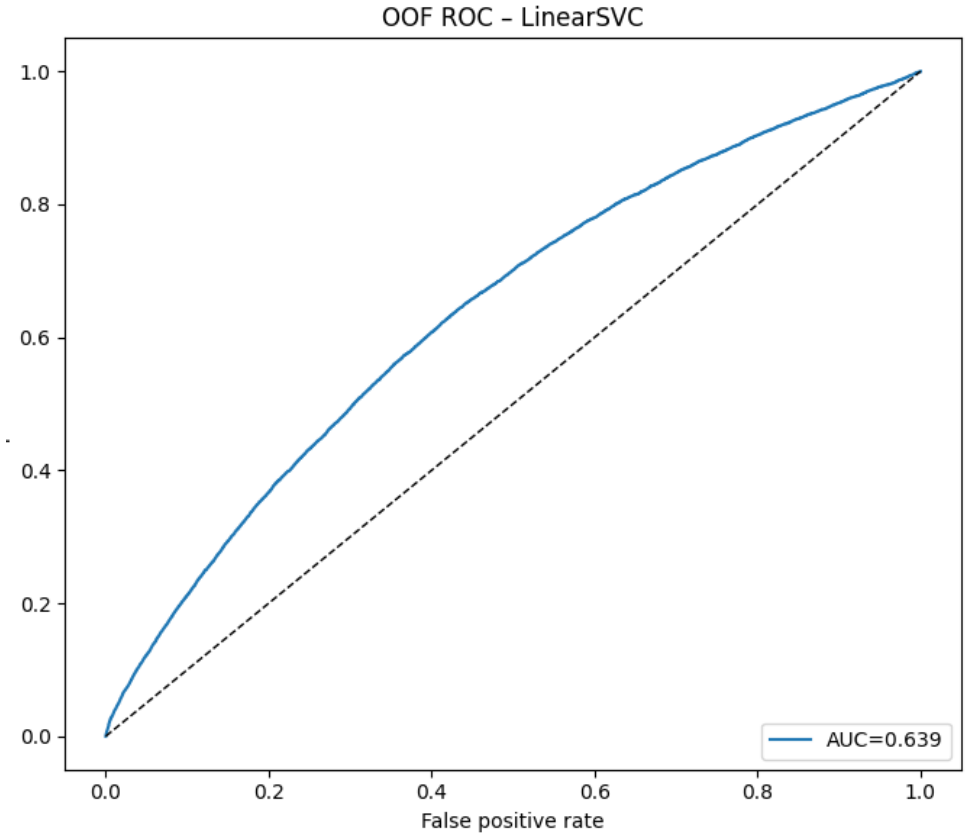

Python overtraining check (TMVA-style): KNN
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00

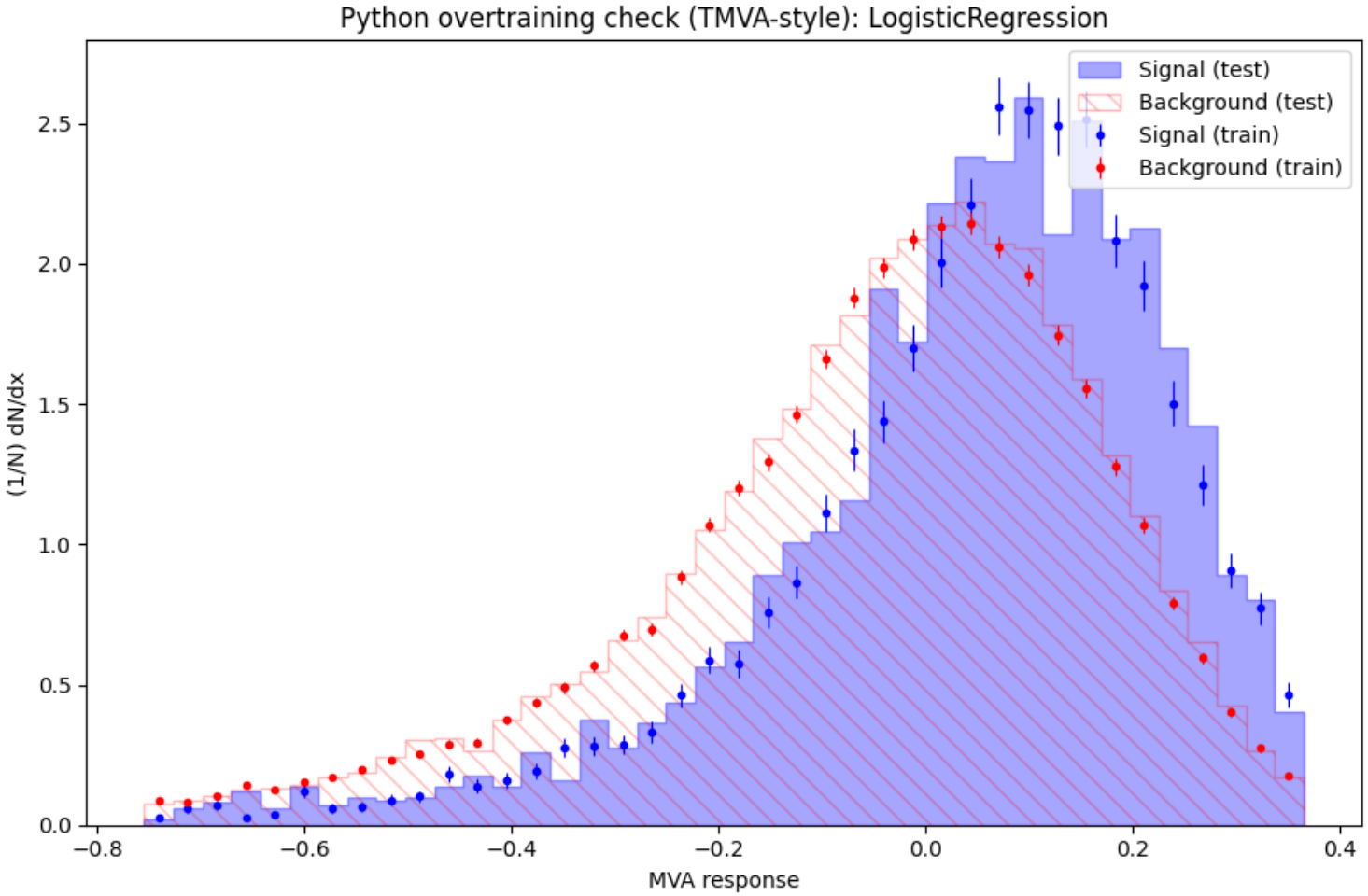

OOF ROC – KNN
True positive rate
False positive rate
AUC=0.650
0.0
0.2
0.4
0.6
0.8
1.0

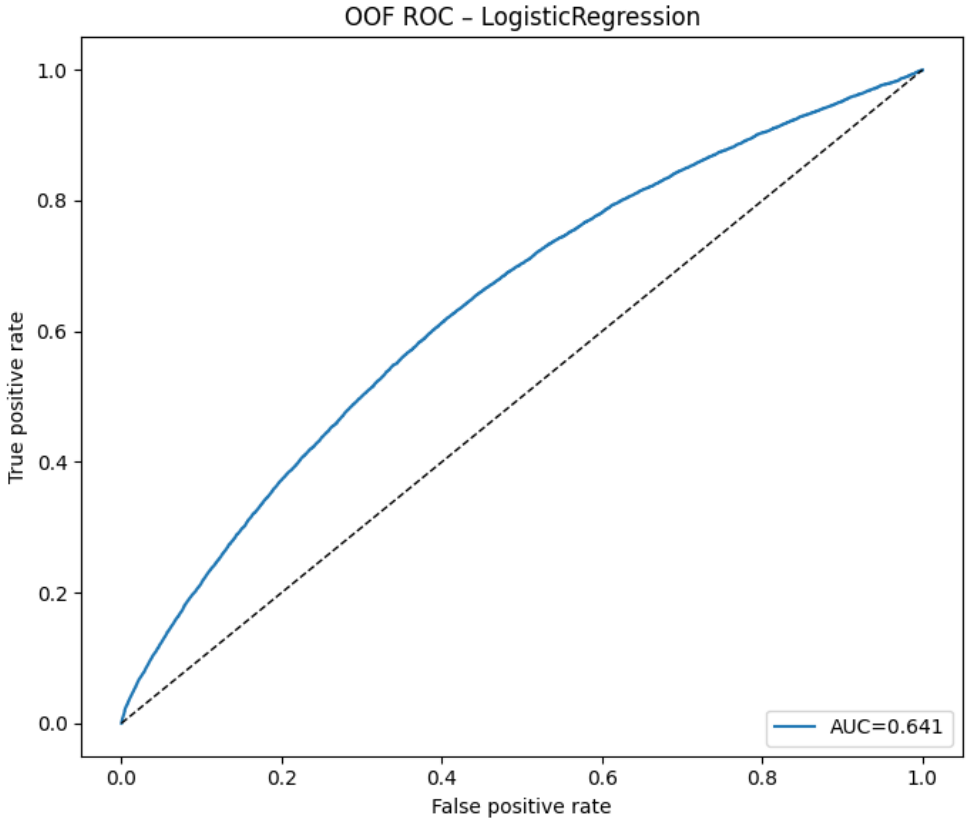

Python overtraining check (TMVA-style): LDA
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0
1
2
3
4
5
−0.9
−0.8
−0.7
−0.6
−0.5

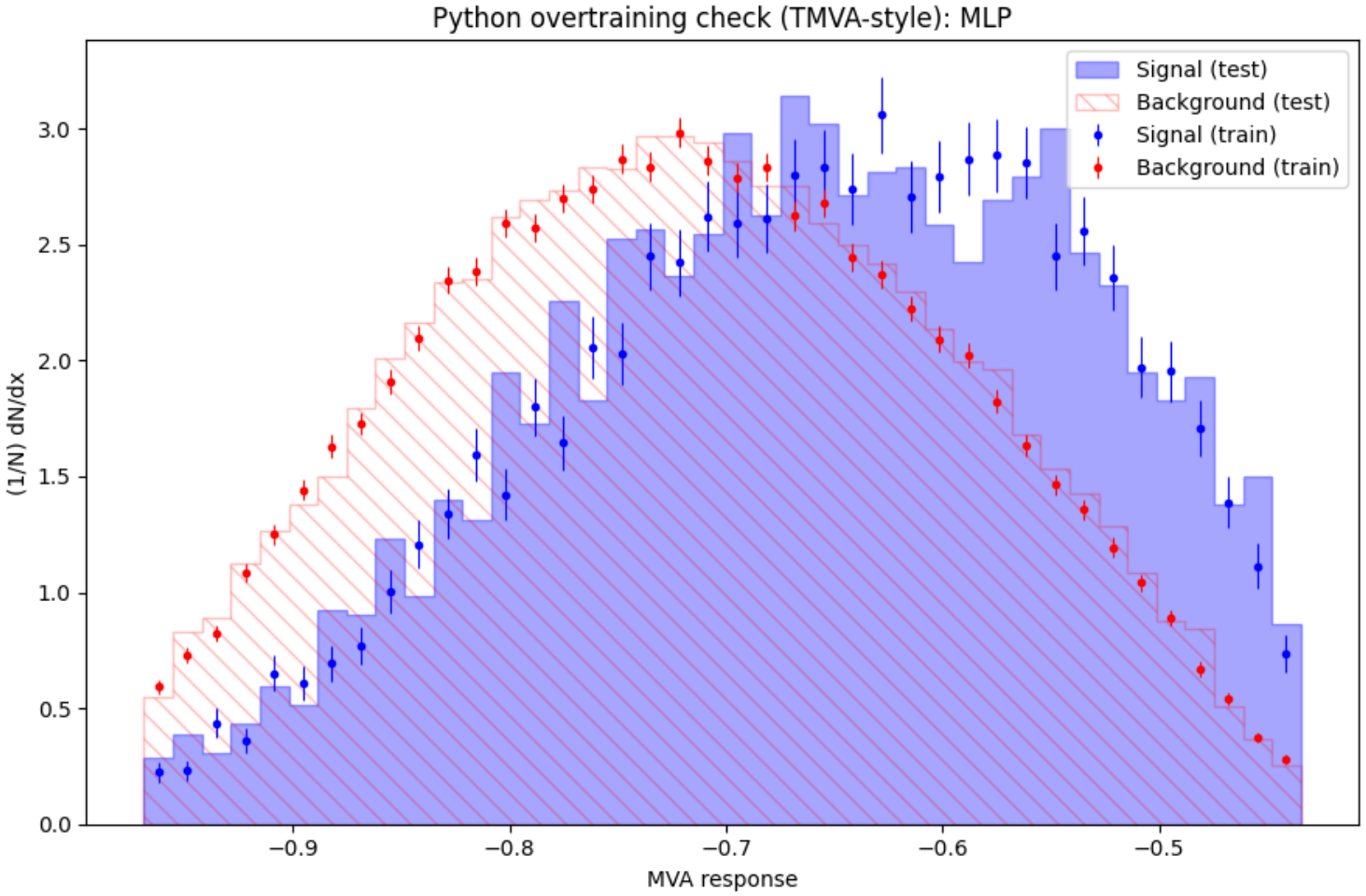

OOF ROC – LDA
True positive rate
False positive rate
AUC=0.633
0.0
0.2
0.4
0.6
0.8
1.0

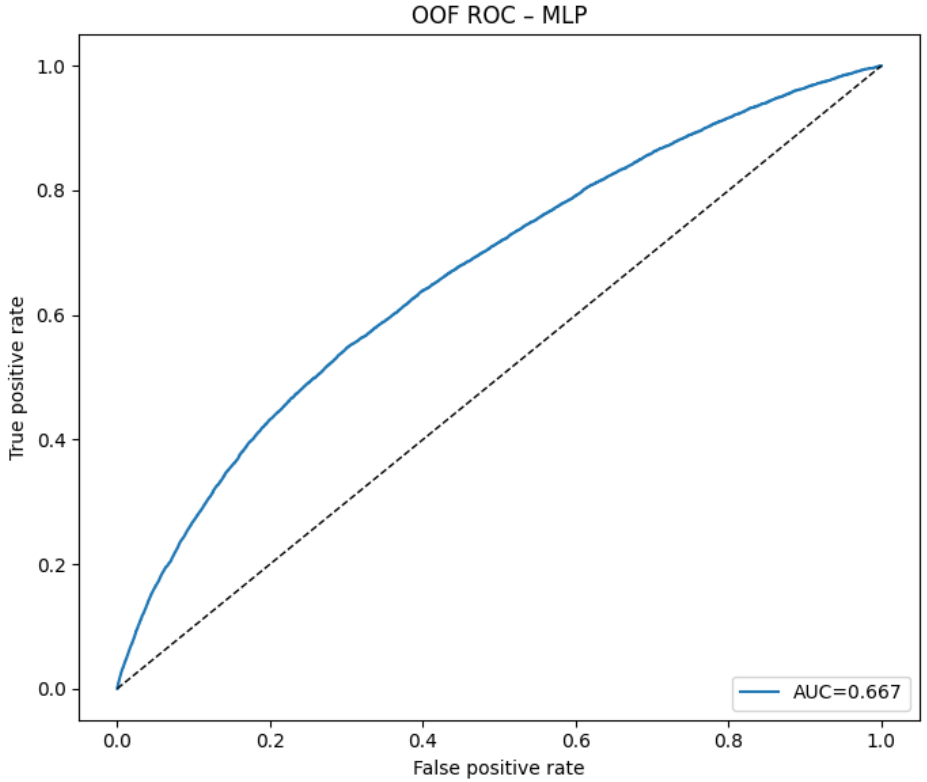

Python overtraining check (TMVA-style): LinearSVC
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0
2
4
6
8
−0.25
−0.20
−0.15
−0.10
−0.05
0.00
0.05
0.10

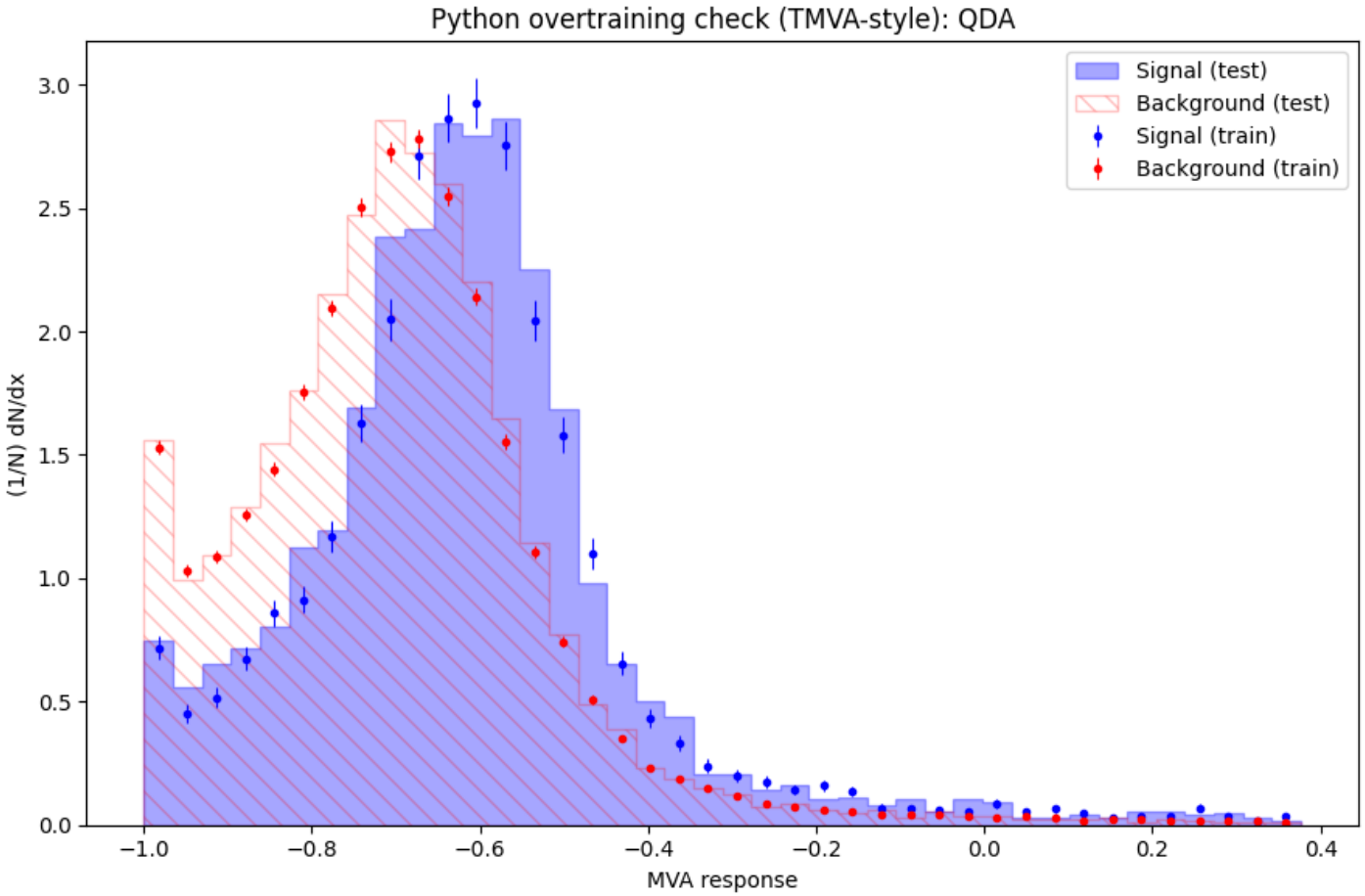

OOF ROC – LinearSVC
AUC=0.639
False positive rate
0.0
0.2
0.4
0.6
0.8
1.0

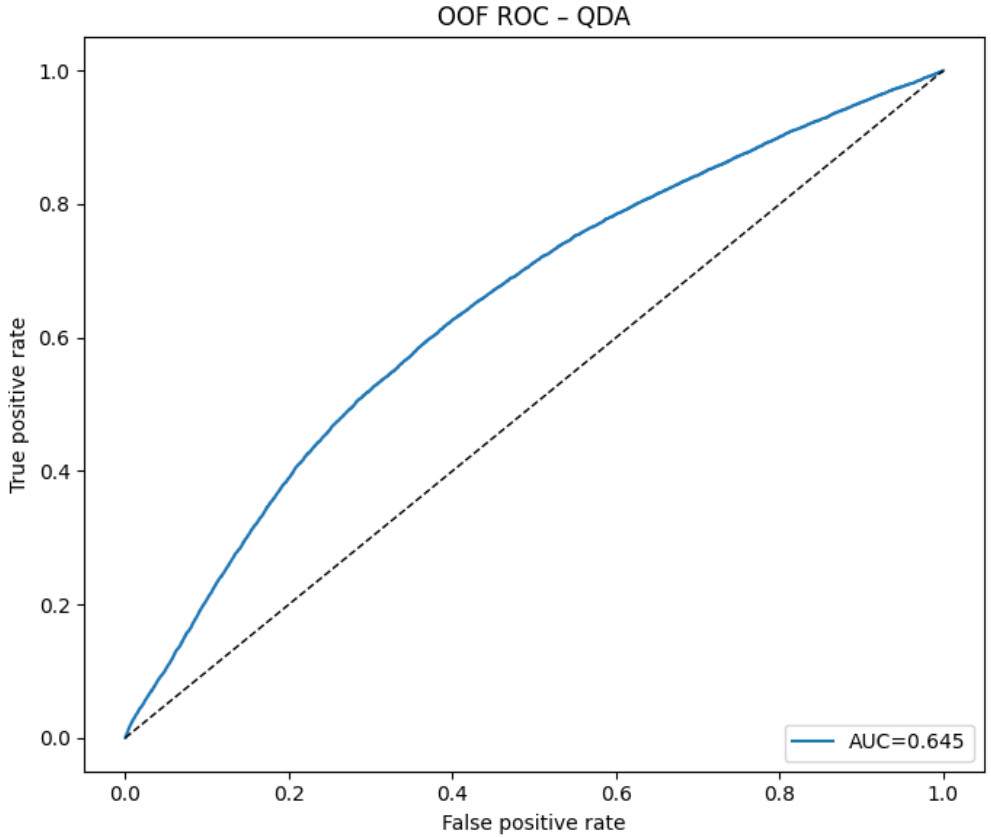

Python overtraining check (TMVA-style): LogisticRegression
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
2.5
2.0
1.5
1.0
0.5
0.0
−0.8
−0.6
−0.4
−0.2
0.0
0.2
0.4

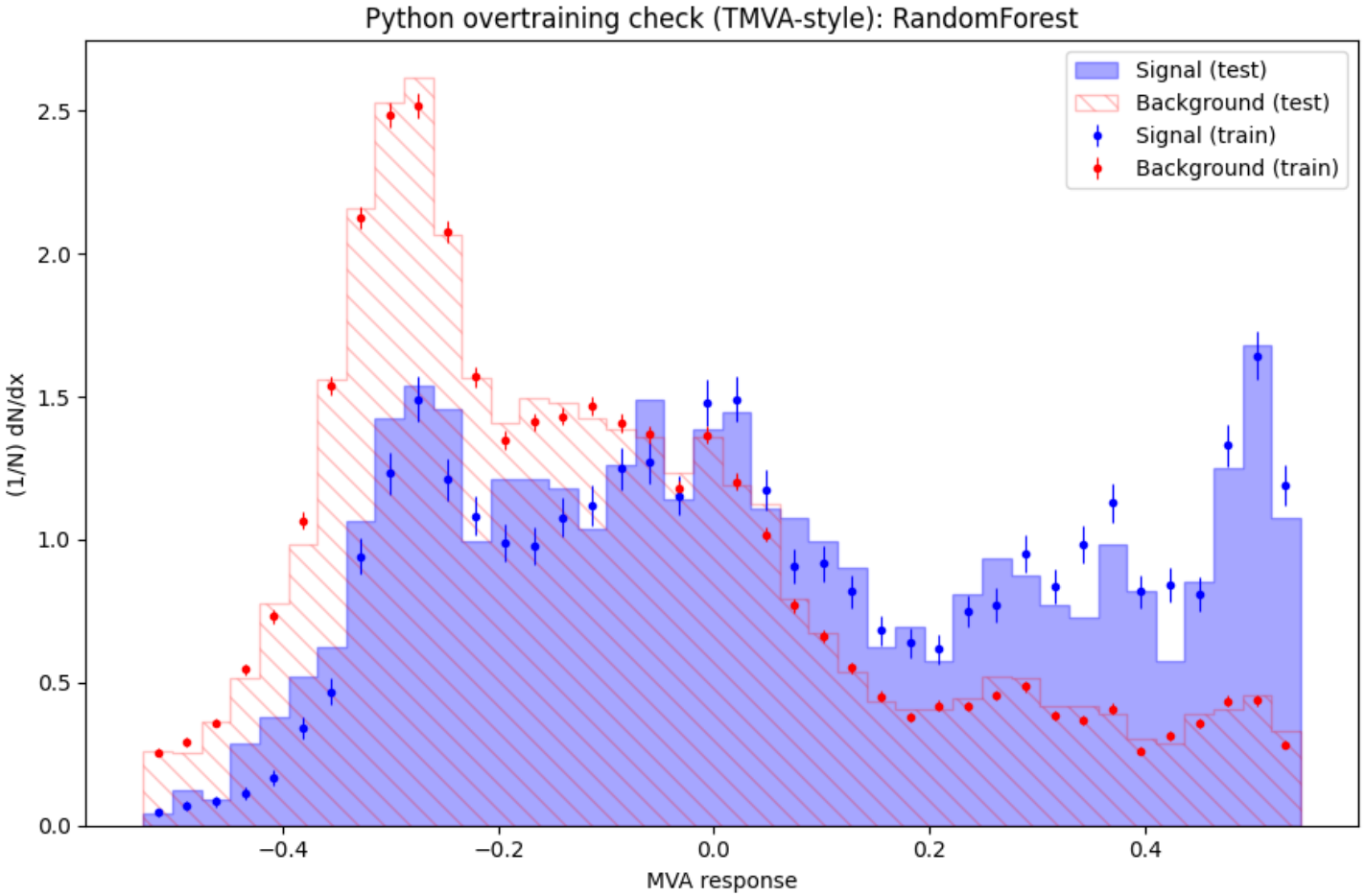

OOF ROC – LogisticRegression
True positive rate
False positive rate
AUC=0.641
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

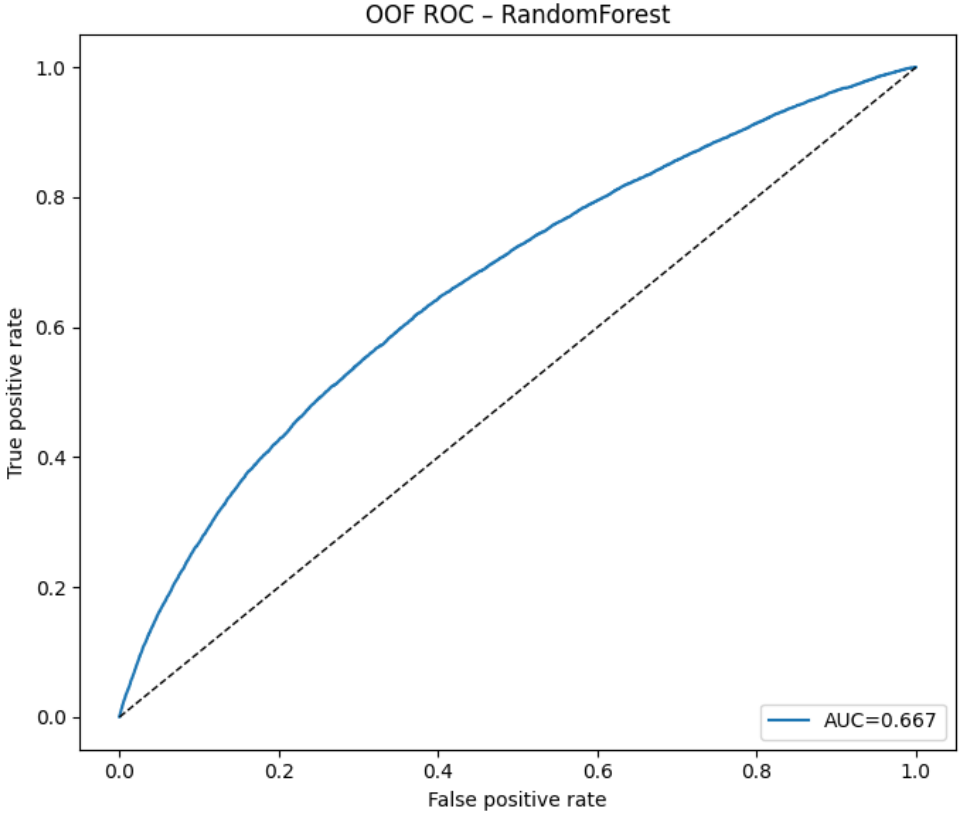

Python overtraining check (TMVA-style): MLP
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.9
−0.8
−0.7
−0.6
−0.5

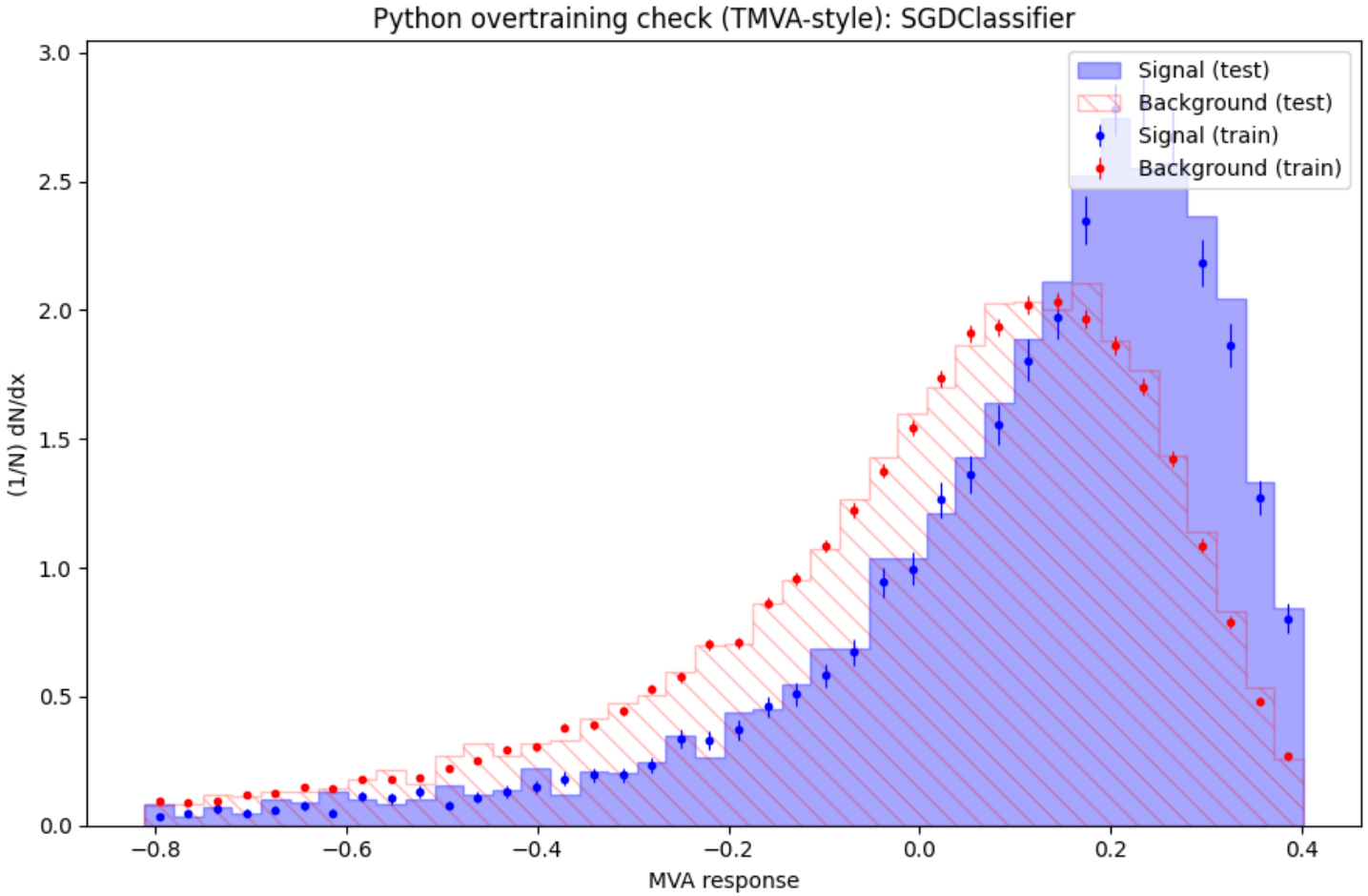

OOF ROC – MLP
True positive rate
False positive rate
AUC=0.667
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

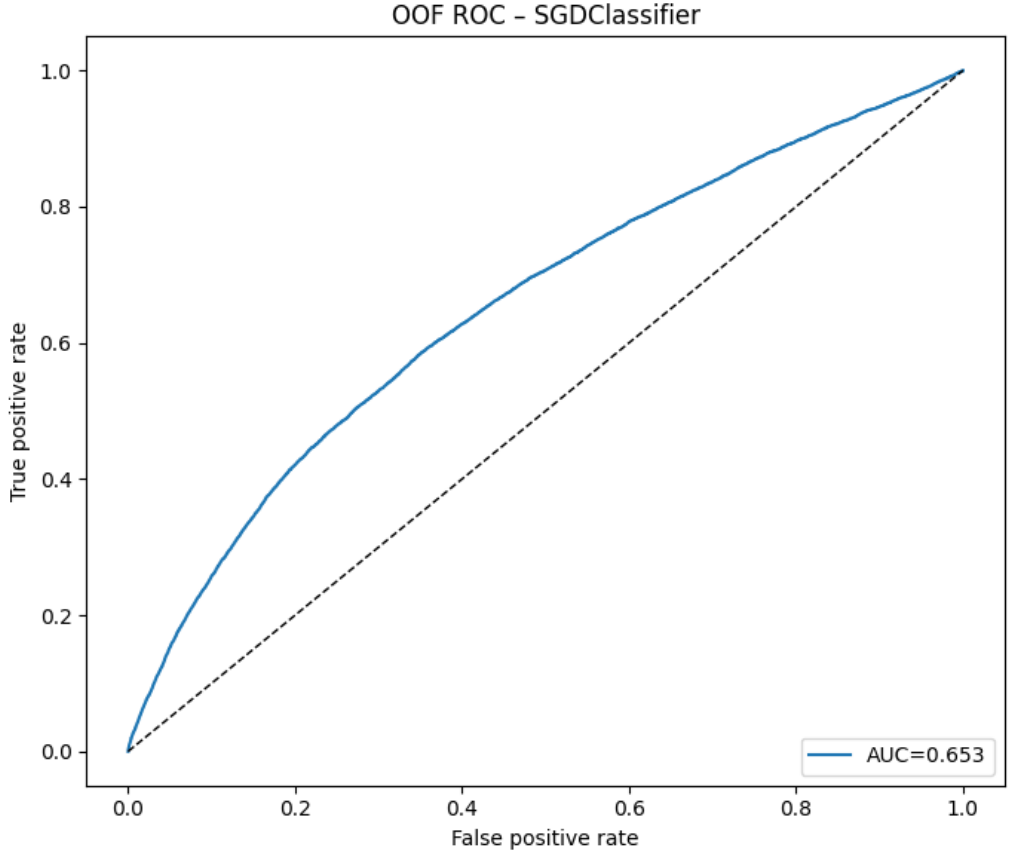

Python overtraining check (TMVA-style): QDA
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−1.0
−0.8
−0.6
−0.4
−0.2
0.0
0.2
0.4

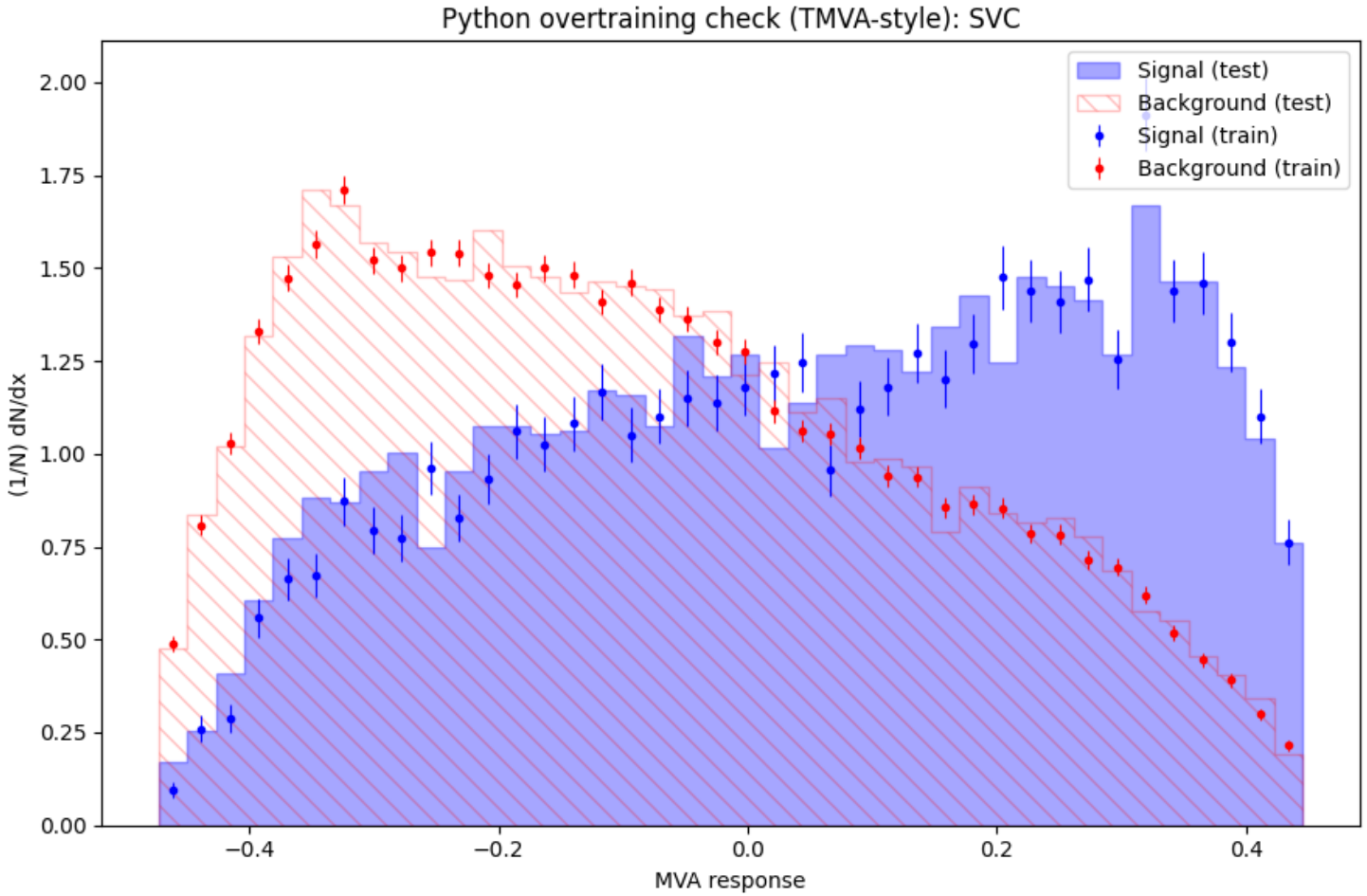

OOF ROC – QDA
True positive rate
False positive rate
AUC=0.645
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

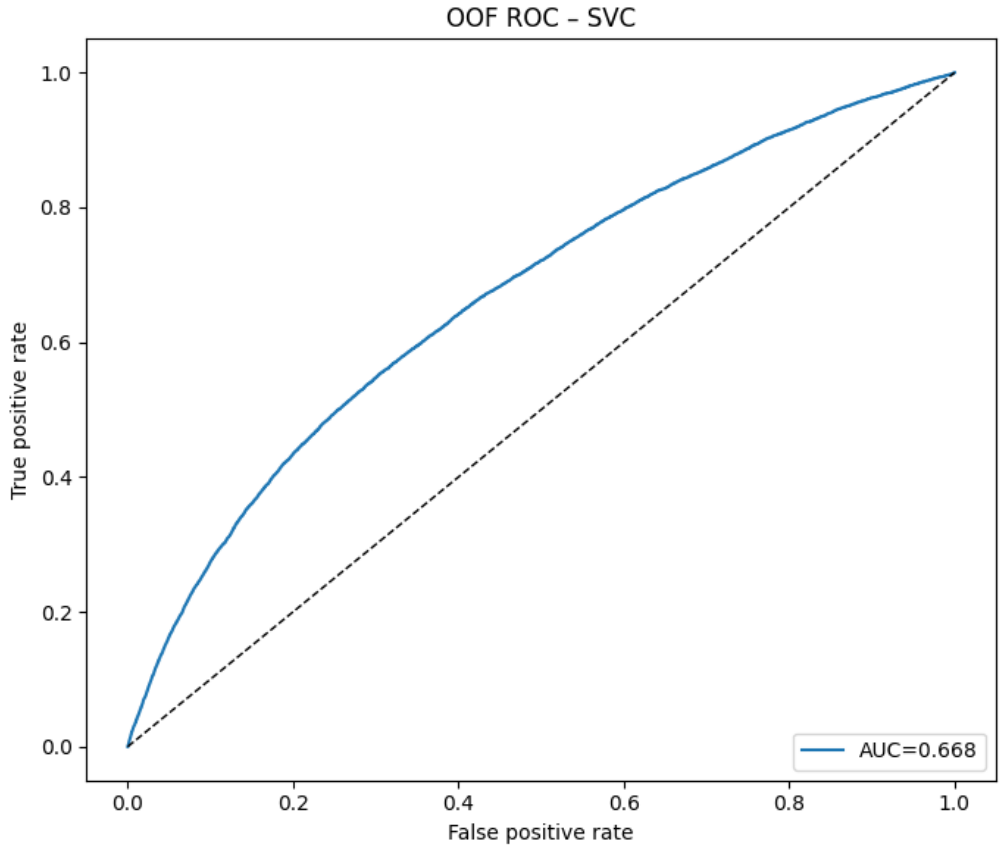

Python overtraining check (TMVA-style): RandomForest
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
0.0
0.5
1.0
1.5
2.0
2.5
−0.4
−0.2
0.0
0.2
0.4


OOF ROC – RandomForest
True positive rate
False positive rate
AUC=0.667
0.0
0.2
0.4
0.6
0.8
1.0


Python overtraining check (TMVA-style): SGDClassifier
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.8
−0.6
−0.4
−0.2
0.0
0.2
0.4


OOF ROC – SGDClassifier
True positive rate
False positive rate
AUC=0.653
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0


Python overtraining check (TMVA-style): SVC
Signal (test)
Background (test)
Signal (train)
Background (train)
(1/N) dN/dx
MVA response
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
−0.4
−0.2
0.0
0.2
0.4


OOF ROC – SVC
True positive rate
False positive rate
AUC=0.668
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

Comparison Table of all platforms with kfold=5

Model family (common name)	TMVA algorithm (if available)	TMVA best_mean_auc	R AUC (oof_weighted)	Python mean_fold_auc	Python overall_oof_auc	ΔAUC (R − Py overall)	ΔAUC (TMVA − Py overall)
Gradient Boosting (GBM)	**BDTG**	0.670094	**1.000000**	0.675134	0.674820	+0.325180	−0.004726
MLP	**MLP**	0.668192	0.661500	0.665761	0.664427	−0.002927	+0.003765
Random Forest (RF)	—	—	0.656103	0.672187	0.671608	−0.015505	—
Logistic Regression (GLM)	—	—	0.643484	0.639506	0.639507	+0.003977	—
Naive Bayes (NB)	—	—	0.640344	0.640700	0.639867	+0.000477	—
SVM (SVM/SVC)	—	—	0.590934	0.676572	0.676277	−0.085343	—

Best Performnace across each platform TMVA, Python and R with k-fold=5

Platform	Best algorithm	Best score (AUC)	Score type (as reported)
TMVA	BDTG	0.670094	best_mean_auc (k-fold)
Python	GradientBoosting	0.670033	overall_oof_auc (out-of-fold)
R	MLP	0.660152	auc_oof_weighted (out-of-fold, weighted)

1. Could not work on Caret package this week (Since there was no response from Eduard yet on installation. He said it is taking long time on his side too.)

2. And working on preparing script for transformers and see how it goes this week

National Research
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Томского
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университета

Thank you for your attention!!!