Improved automated CASH optimization with tree parzen estimators for class imbalance problems

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Supplementary Material for Improved Automated CASH Optimization with Tree Parzen Estimators for Class Imbalance Problems

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I. EXPERIMENTAL SETUP: PARAMETER SETTING

In this section, we present detailed information of the hyperparameters used in the classification algorithms[1] and resampling algorithms[2] that we used in our experiment. The entire Python code project can be found at https://github.com/ECOLE-ITN/CASH4IMBALANCE.

TABLE S-1
HYPERPARAMETERS OF CLASSIFICATION ALGORITHMS

Alg.	Params.	Range
Support Vector Machines	max_iter	10000
	cache_size	700 (Megabyte)
	probability	[True, False]
	C	$[0.5^5, 100]$
	kernel	[linear, rbf, poly, sigmoid]
	gamma	[auto, value, scale]
	gamma_value	[3.1e-05,8]
	coef0	[-1.0, 1.0]
	degree	[2, 5]
	shrinking	[True, False]
	tol	[1e-05, 1e-01]
Random Forest	n_estimators	[1, 150]
	criterion	[gini, entropy]
	max_features	[1, sqrt, log2, None]
	min_samples_split	[2, 20]
	min_samples_leaf	[1, 20]
	class_weight	[balanced, balanced_subsample, None]
	bootstrap	[True, False]
K-Nearest Neighbors	n_neighbors	[1, 51]
	weights	[uniform, distance]
	algorithm	[auto, ball_tree, kd_tree, brute]
	p	[0, 20]
	metric	· p = 0 → metric = chebyshev
		· p = 1 → metric = manhattan
		· p = 2 → metric = euclidean
		· p > 2 → metric = minkowski
Decision Tree	criterion	[gini, entropy]
	max_depth	[2,20]
	max_features	[1, sqrt, log2, None]
	min_samples_split	[2, 20]
	min_samples_leaf	[1, 20]
Logistic Regression	C	[1, 150]
	criterion	$[0.5^5, 100]$
	tol	[1e-05, 1e-01]
	l1_ratio	[1e-09, 1]
	(penalty, solver)	[(l1, liblinear), (l1, saga), (l2, lbfgs), (l2, newton-cg), (l2, liblinear), (l2, sag), (l2, saga), (elasticnet, saga), (none, newton-cg), (none, lbfgs), (none, sag), (none, saga)]

[1]All classification algorithms are implemented in the Python package **scikit-learn**(version 0.23.2) [1].

[2]All resampling algorithms are implemented in the Python package **imbalanced-learn**(version 0.7.0) [2]

TABLE S-2
HYPERPARAMETERS OF RESAMPLING TECHNIQUES (PART I)

Group.	Params.	Range
Under resampling	**CondensedNearestNeighbour**	
	sampling_strategy	*default*
	n_neighbors	[1, 50]
	n_seeds_S	[1, 50]
	EditedNearestNeighbours	
	sampling_strategy	*default*
	n_neighbors	[1, 20]
	kind_sel	[all, mode]
	RepeatedEditedNearestNeighbours	
	sampling_strategy	*default*
	n_neighbors	[1, 20]
	kind_sel	[all, mode]
	AllKNN	
	sampling_strategy	*default*
	n_neighbors	[1, 20]
	kind_sel	[all, mode]
	allow_minority	[True, False]
	InstanceHardnessThreshold	
	sampling_strategy	*default*
	estimator	none, decision-tree, adaboost knn, linear-svm, gradient-boosting
	cv	[2, 10]
	OneSidedSelection	
	sampling_strategy	*default*
	n_neighbors	[1, 20]
	n_seeds_S	[1, 20]
	RandomUnderSampler	
	sampling_strategy	*default*
	replacement	[True, False]
	TomekLinks	
	sampling_strategy	*default*
	NearMiss	
	sampling_strategy	*default*
	version	[1,3]
	n_neighbors	[1, 20]
	n_neighbors_ver3	[1, 20]
	NeighbourhoodCleaningRule	
	sampling_strategy	*default*
	n_neighbors	[1, 20]
	threshold_cleaning	[0.0, 1.0]
	ClusterCentroids	
	sampling_strategy	*default*
	estimator	[KMeans, MiniBatchKMeans]
	voting	[hard, soft]
Combine resampling	**SMOTENN**	
	sampling_strategy	*default*
	SMOTETomek	
	sampling_strategy	*default*

In addition to the hyperparameters listed in Table S-1, Table S-2, and Table S-3, we use 10 random seeds i.e., 9, 18, 27, 29, 36, 39, 59, 79, 90, 109 for any algorithm which requires a random seed parameter.

HYPERPARAMETERS OF RESAMPLING TECHNIQUES (PART II)

Group.	Params.	Range
	SMOTE	
	k_neighbors	[1, 10]
	sampling_strategy	*default*
	BorderlineSMOTE	
	sampling_strategy	*default*
	k_neighbors	[1, 10]
	m_neighbors	[1, 10]
	kind	[borderline1, borderline2]
	SMOTENC	
	sampling_strategy	*default*
	categorical_features	True
	k_neighbors	[1, 10]
	SVMSMOTE	
	sampling_strategy	*default*
Over resampling	k_neighbors	[1, 10]
	m_neighbors	[1, 10]
	out_step	[0.0, 1.0]
	KMeansSMOTE	
	sampling_strategy	*default*
	k_neighbors	[1, 10]
	cluster_balance_threshold	[1e-2, 1]
	ADASYN	
	sampling_strategy	*default*
	n_neighbors	[1, 10]
	RandomOverSampler	
	sampling_strategy	*default*

II. DATASETS

In this section, we present 44 examined datasets taken from the KEEL repository [3] in Table 4. For each dataset, we include the *Imbalance Ratio* (IR), which is the ratio of the number of majority class instances to that of minority class instances.

III. EXPERIMENTAL RESULTS - ADDITIONAL PLOTS

The distribution of GM over 10 repetitions for 44 datasets is visualized in Fig. S- 1. Each box plot represents 10 repetitions, the horizontal-inner line shows the median, the ends of the whisker show the lowest and the highest observed values (here, the whisker's scale is taken as 1.5). The ends of the color-box show the first and the third quartiles respectively, the dots in color represent outliers, and black-dots shows the observed values.

IV. ADDITIONAL PLOTS ON THE DATASET "ABALONE9-18"

This section provides 10 figures of 10 repeated executions using TPE and Random search on datataset "abalone9-18". The figure of each execution shown below is similar to Fig.2 in the main paper, at which each contains two plots. The above one is for TPE and the below is for Random. Full results of 44 datasets can be found in https://github.com/ECOLE-ITN/CASH4IMBALANCE.

TABLE S-4
THE NUMBER OF POSITIVE, NEGATIVE CLASSES, ATTRIBUTES (#ATT) AND THE IMBALANCE RATIO (IR) OF THE KEEL DATASETS, ORDERED BY INCREASING IR VALUE.

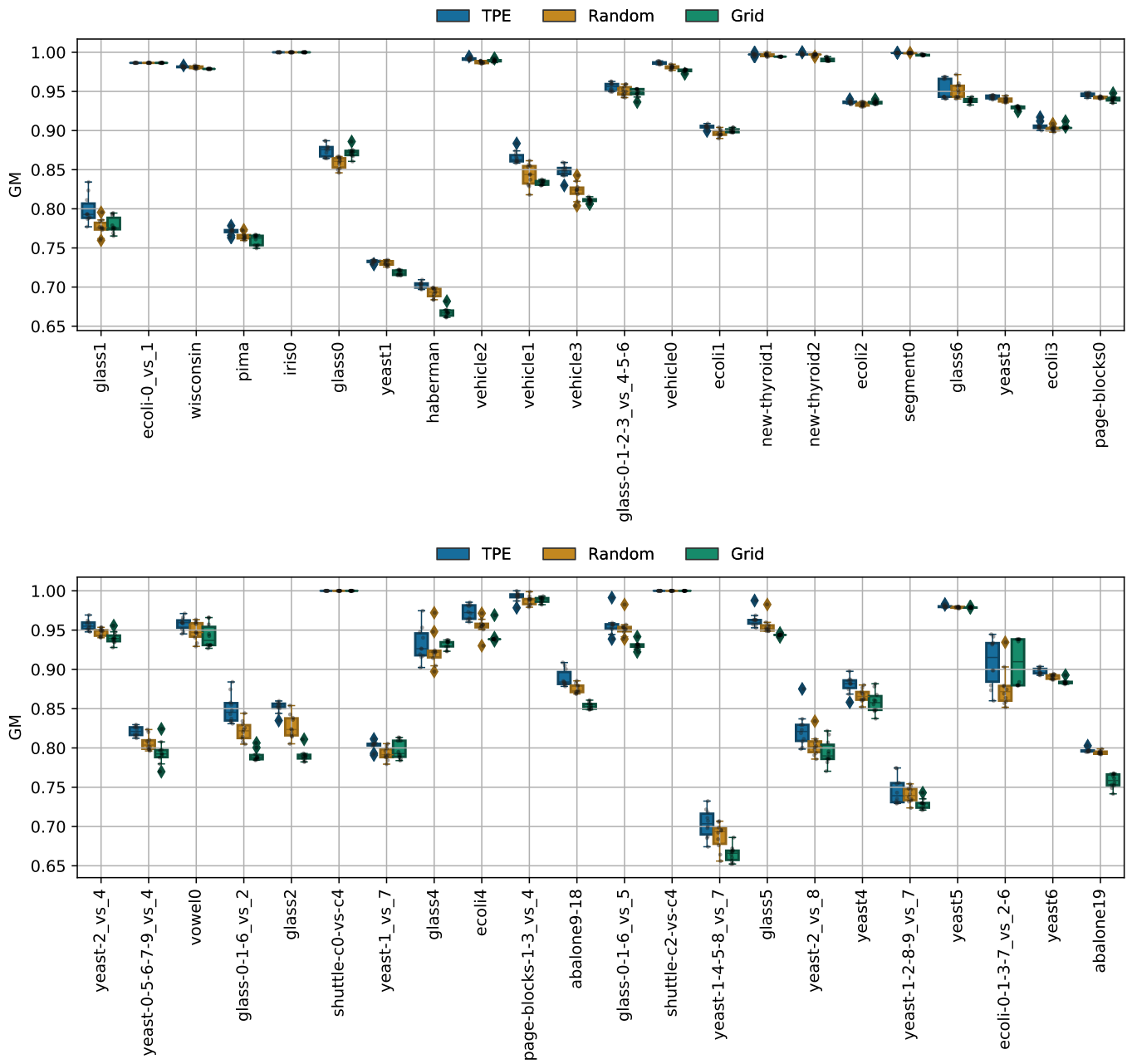| Data Sets	# Negative	# Positive	#Att	IR
glass1	138	76	9	1.82
ecoli-0_vs_1	77	143	7	1.86
wisconsin	444	239	9	1.86
pima	500	268	8	1.87
iris0	100	50	4	2
glass0	144	70	9	2.06
yeast1	1055	429	8	2.46
haberman	225	81	3	2.78
vehicle2	628	218	18	2.88
vehicle1	629	217	18	2.9
vehicle3	634	212	18	2.99
glass-0-1-2-3_vs_4-5-6	163	51	9	3.2
vehicle0	647	199	18	3.25
ecoli1	259	77	7	3.36
new-thyroid1	180	35	5	5.14
new-thyroid2	180	35	5	5.14
ecoli2	284	52	7	5.46
segment0	1979	329	19	6.02
glass6	185	29	9	6.38
yeast3	1321	163	8	8.1
ecoli3	301	35	7	8.6
page-blocks0	4913	559	10	8.79
yeast-2_vs_4	463	51	8	9.08
yeast-0-5-6-7-9_vs_4	477	51	8	9.35
vowel0	898	90	13	9.98
glass-0-1-6_vs_2	175	17	9	10.29
glass2	197	17	9	11.59
shuttle-c0-vs-c4	1706	123	9	13.87
yeast-1_vs_7	429	30	7	14.3
glass4	201	13	9	15.46
ecoli4	316	20	7	15.8
page-blocks-1-3_vs_4	444	28	10	15.86
abalone9-18	689	42	8	16.4
glass-0-1-6_vs_5	175	9	9	19.44
shuttle-c2-vs-c4	123	6	9	20.5
yeast-1-4-5-8_vs_7	663	30	8	22.1
glass5	205	9	9	22.78
yeast-2_vs_8	462	20	8	23.1
yeast4	1433	51	8	28.1
yeast-1-2-8-9_vs_7	917	30	8	30.57
yeast5	1440	44	8	32.73
ecoli-0-1-3-7_vs_2-6	274	7	7	39.14
yeast6	1449	35	8	41.4
abalone19	4142	32	8	129.44

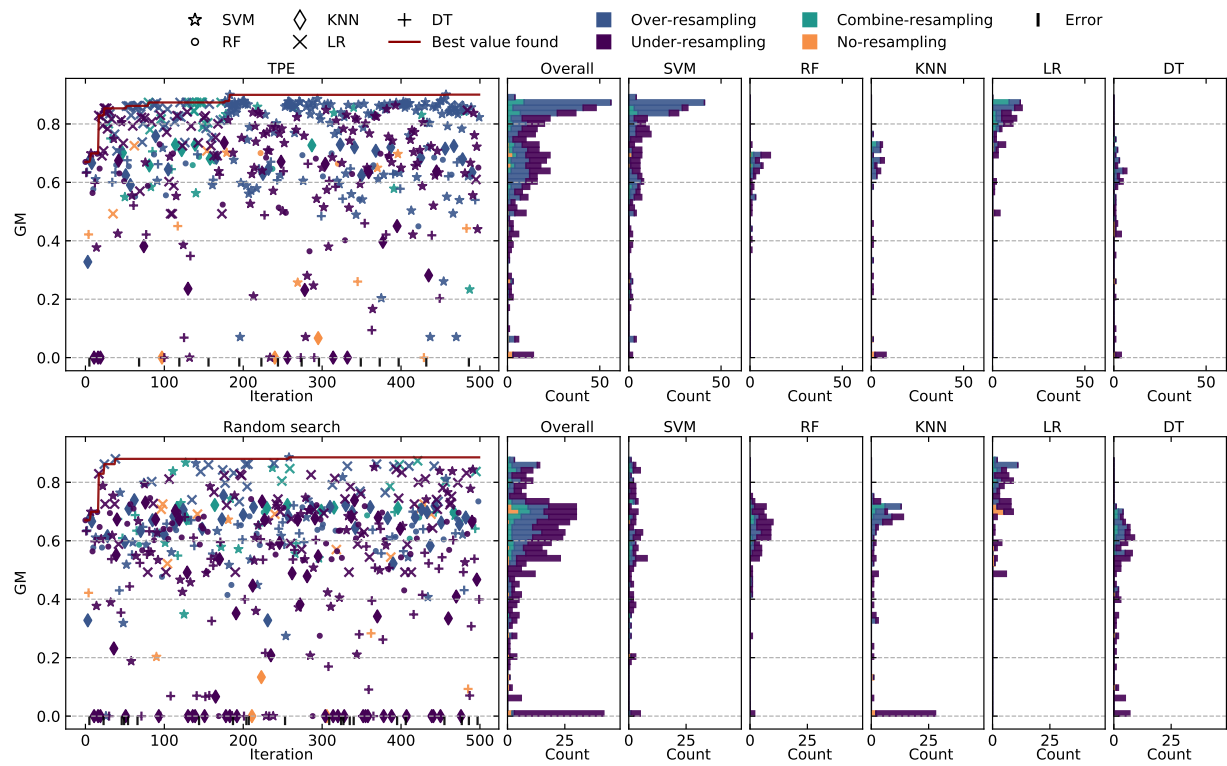Fig. S-1. Box plots showing the distribution of GM for 44 datasets.

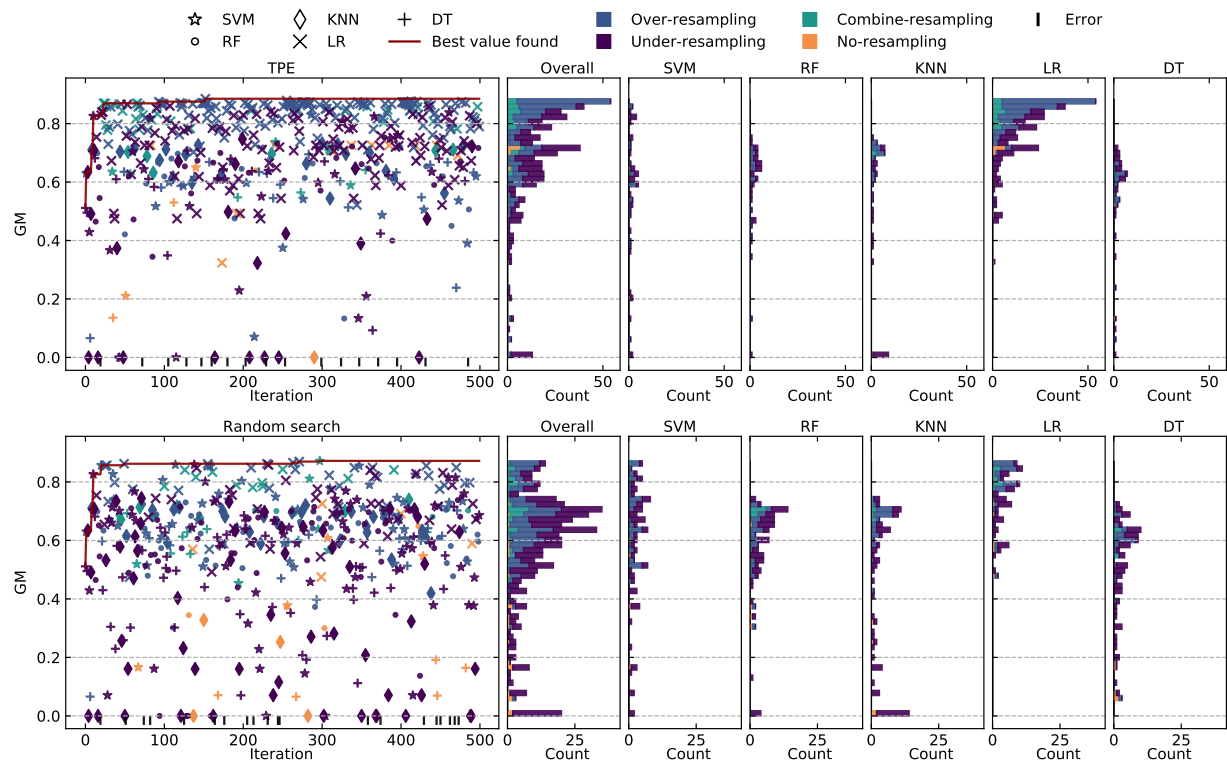Fig. S-2. Dataset: abalone9-18 − run: 1

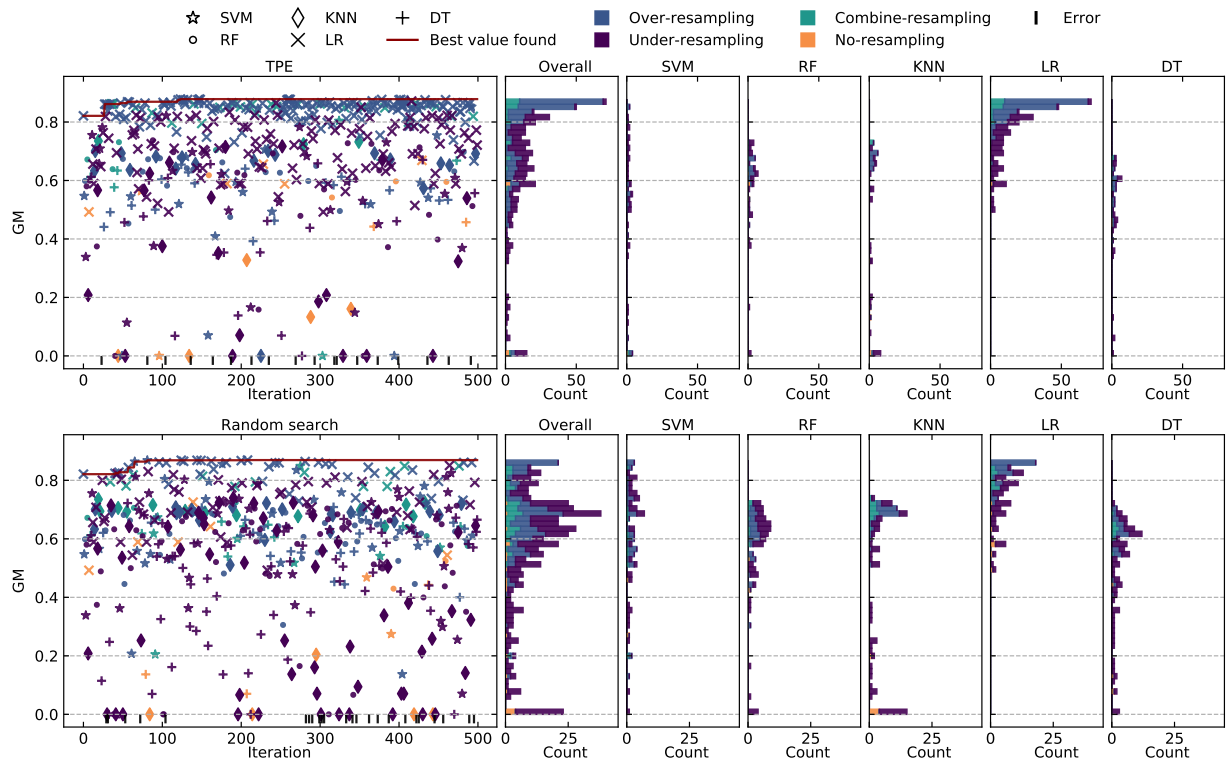Fig. S-3. Dataset: abalone9-18 − run: 2

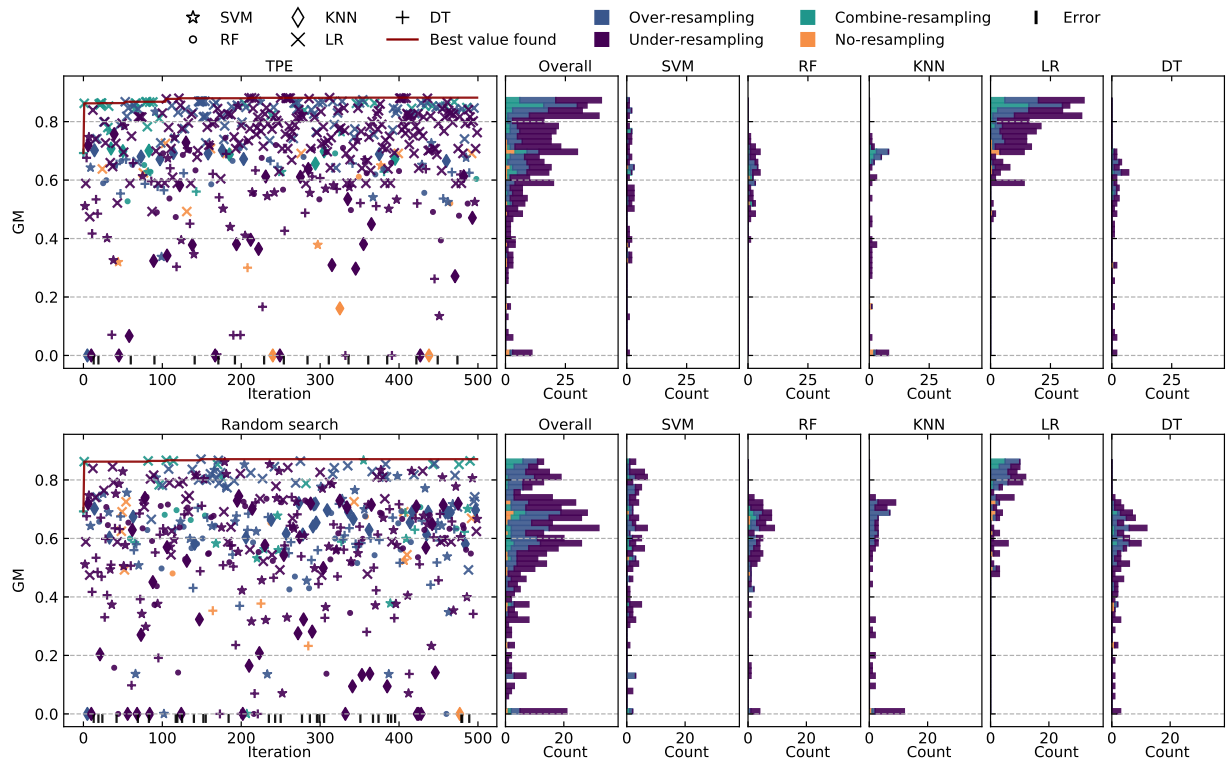Fig. S-4. Dataset: abalone9-18 − run: 3
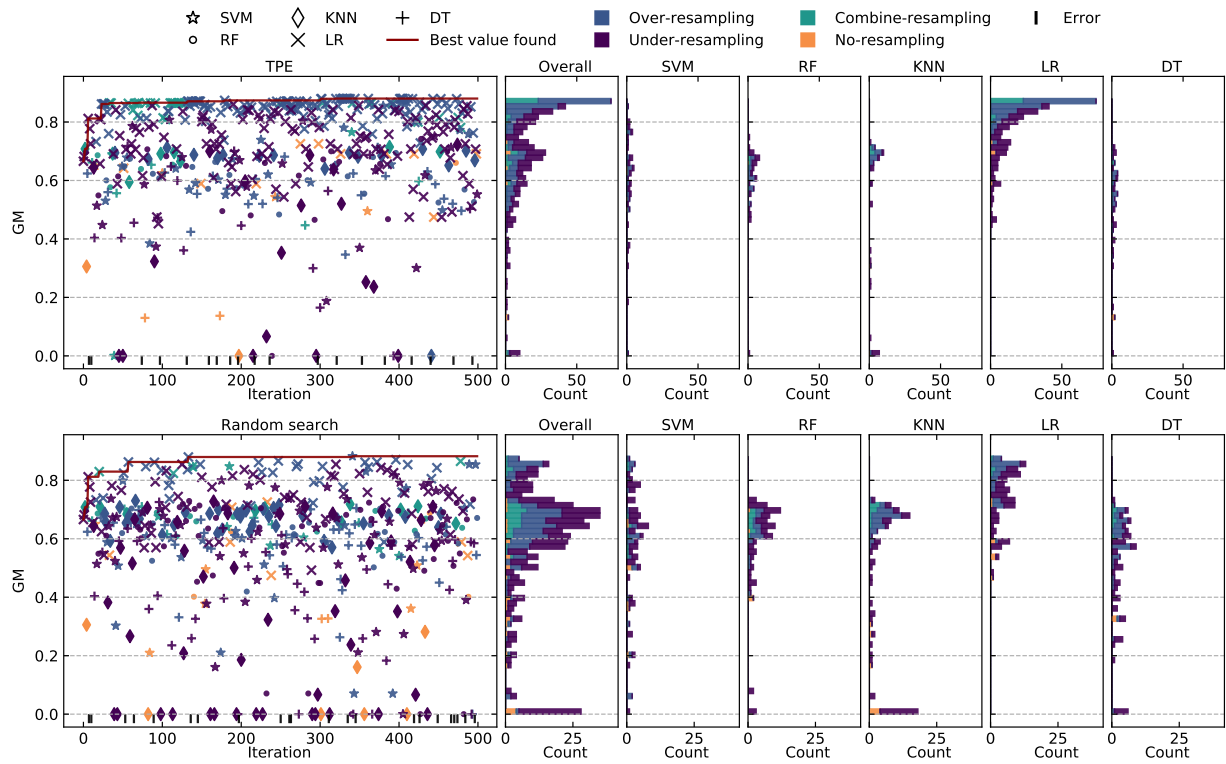

Fig. S-5. Dataset: abalone9-18 − run: 4

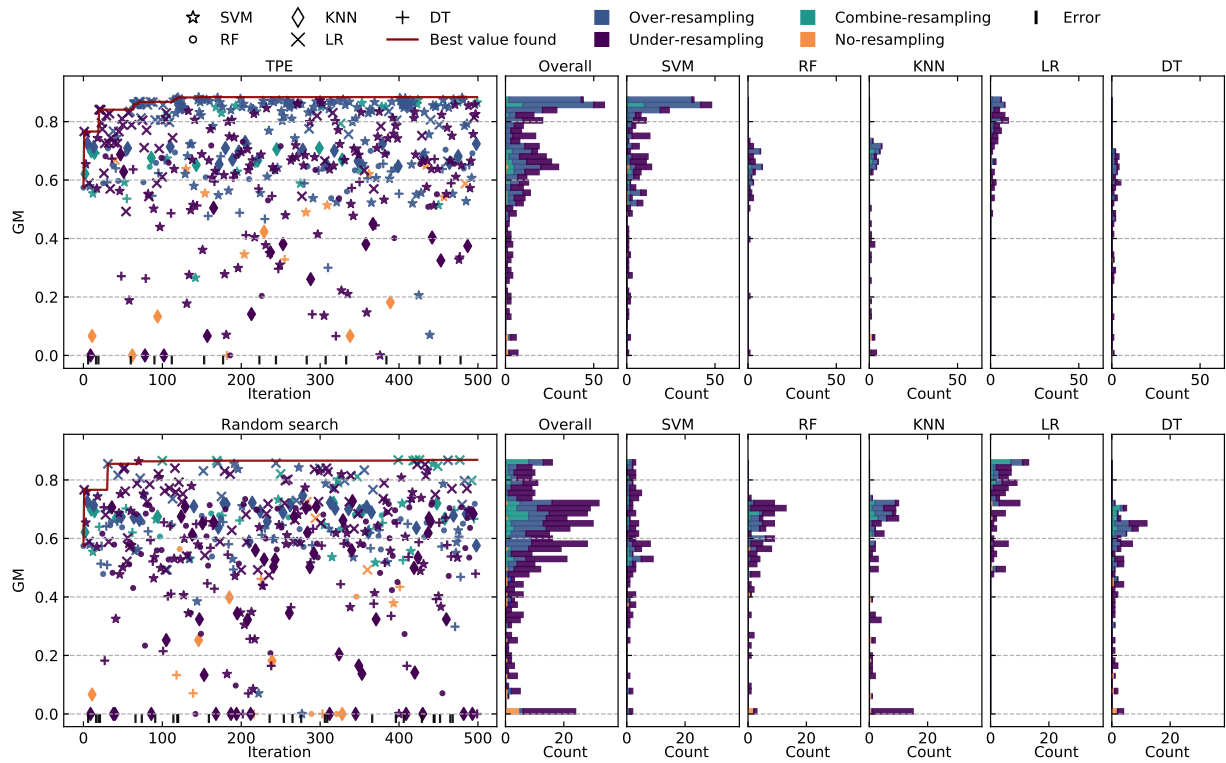Fig. S-6. Dataset: abalone9-18 − run: 5
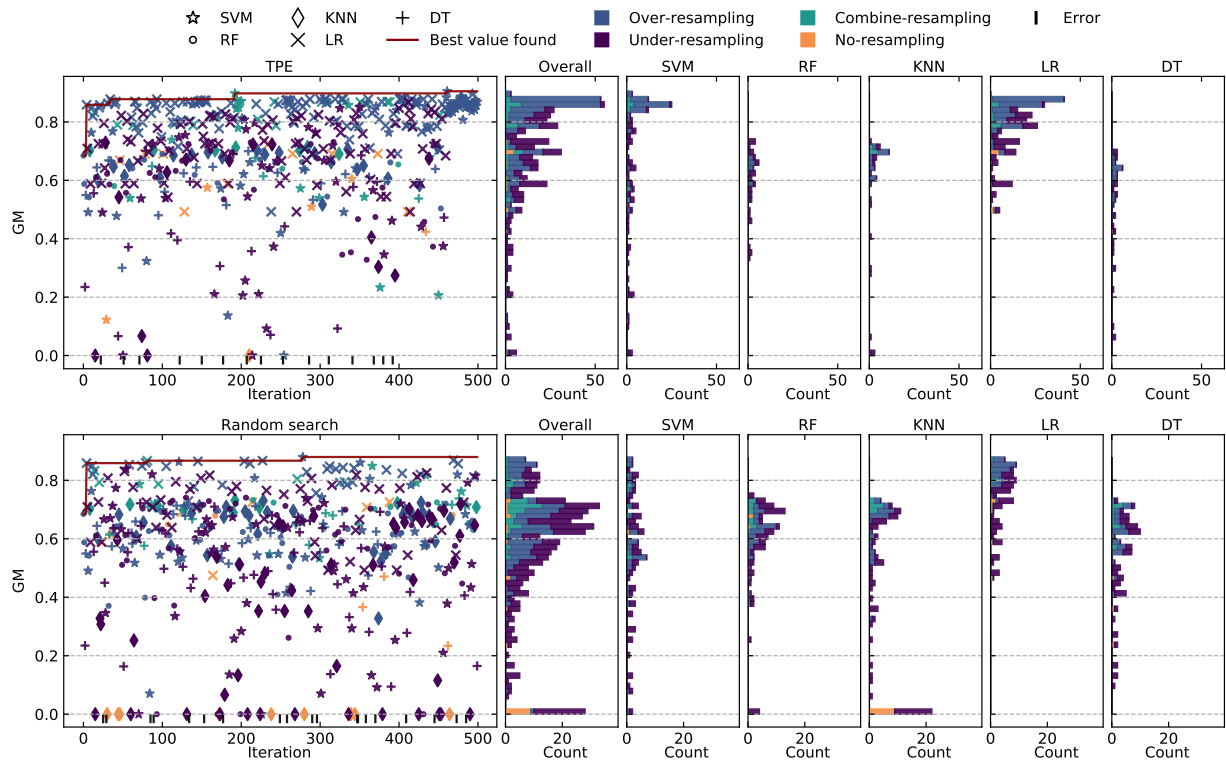

Fig. S-7. Dataset: abalone9-18 − run: 6

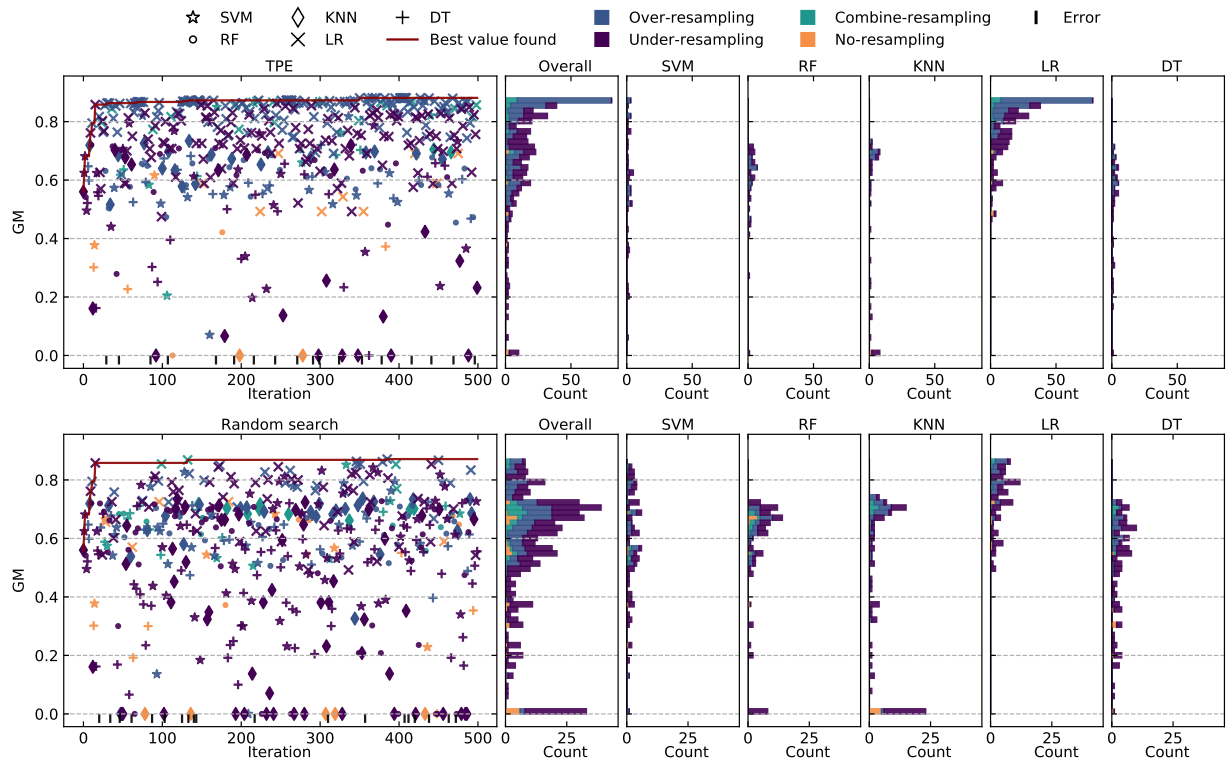Fig. S-8. Dataset: abalone9-18 − run: 7

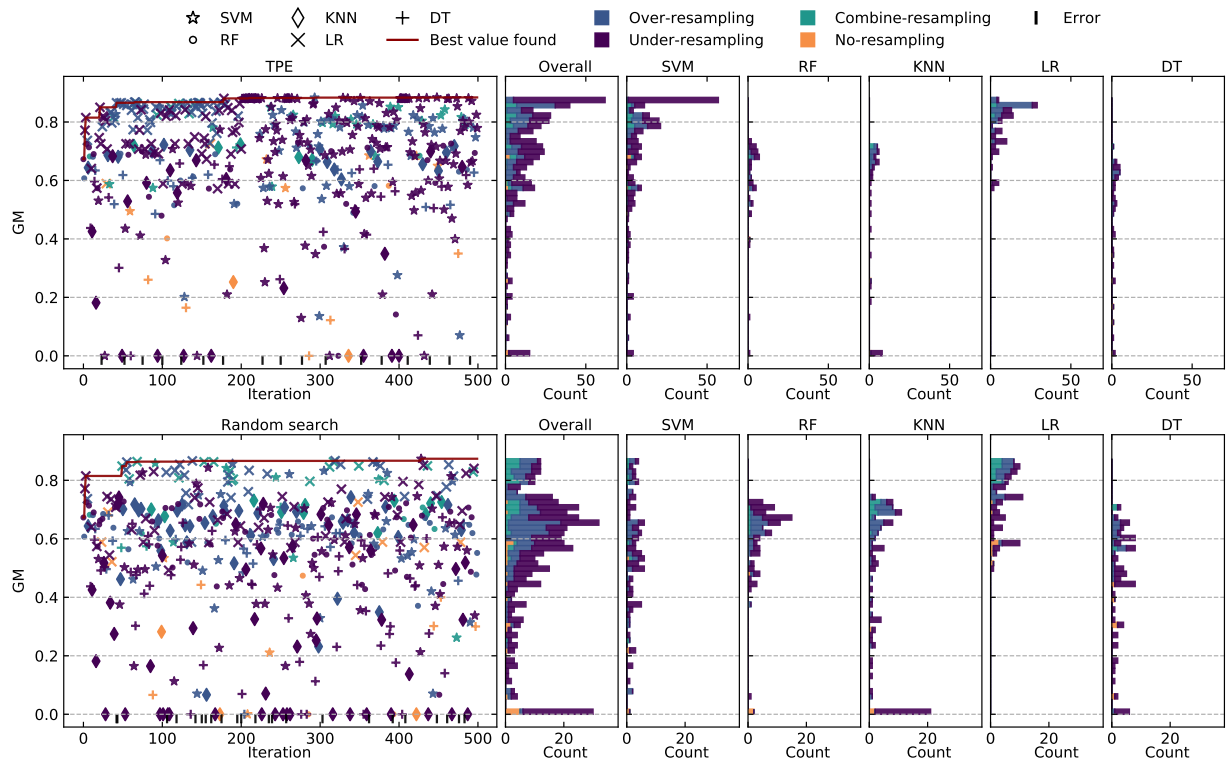
Fig. S-9. Dataset: abalone9-18 − run: 8
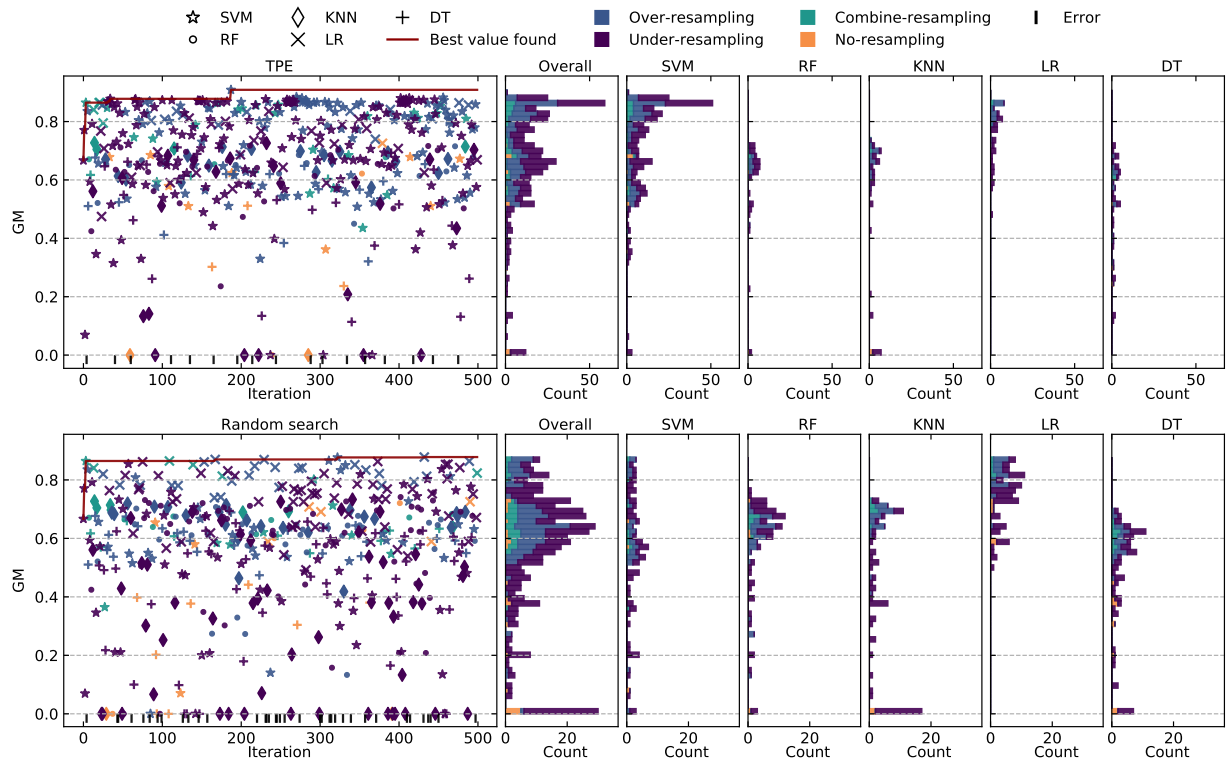
Fig. S-10. Dataset: abalone9-18 − run: 9

Fig. S-11. Dataset: abalone9-18 − run: 10

V. Detailed results

This section presents the best configurations found from the three approaches (TPE, Random search, and Grid-Def) for 44 datasets, ordered by increasing IR value of the corresponding dataset. Each dataset's results present in a table, which includes the best-found configurations of 3 approaches over ten runs; thus, a table has $3 \times 10 = 30$ rows. Note that, we choose the first found configuration in the case of more than one configuration at the highest GM.

TABLE S-5
"GLASS1"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	OneSidedSelection	Under resampling	0.7753
Grid	18	RF	ADASYN	Over resampling	0.7946
Grid	27	RF	SMOTENC	Over resampling	0.7688
Grid	29	RF	KMeansSMOTE	Over resampling	0.7653
Grid	36	RF	RandomUnderSampler	Under resampling	0.7788
Grid	39	RF	SVMSMOTE	Over resampling	0.7918
Grid	59	RF	SMOTETomek	Combine resampling	0.7754
Grid	79	RF	BorderlineSMOTE	Over resampling	0.776
Grid	90	RF	RandomOverSampler	Over resampling	0.7935
Grid	109	RF	SMOTETomek	Combine resampling	0.7733
Random	9	RF	SMOTE	Over resampling	0.7749
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 2, min_samples_split: 8, n_estimators: 145, name: RF, random_state: 9}, sub: {k_neighbors: 5, random_state: 9, smo_grp: OVER, type: SMOTE}}					
Random	18	RF	RandomOverSampler	Over resampling	0.7751
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 1, min_samples_split: 10, n_estimators: 130, name: RF, random_state: 18}, sub: {random_state: 18, smo_grp: OVER, type: RandomOverSampler}}					
Random	27	RF	SMOTE	Over resampling	0.762
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 3, n_estimators: 107, name: RF, random_state: 27}, sub: {k_neighbors: 8, random_state: 27, smo_grp: OVER, type: SMOTE}}					
Random	29	RF	SMOTE	Over resampling	0.7598
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 6, min_samples_split: 18, n_estimators: 70, name: RF, random_state: 29}, sub: {k_neighbors: 9, random_state: 29, smo_grp: OVER, type: SMOTE}}					
Random	36	DT	SMOTENC	Over resampling	0.7766
{classifier: {criterion: gini, max_depth: 9, max_features: None, min_samples_leaf: 5, min_samples_split: 7, name: DTC, random_state: 36}, sub: {categorical_features: True, k_neighbors: 6, random_state: 36, smo_grp: OVER, type: SMOTENC}}					
Random	39	RF	ADASYN	Over resampling	0.784
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 4, min_samples_split: 9, n_estimators: 120, name: RF, random_state: 39}, sub: {n_neighbors: 7, random_state: 39, smo_grp: OVER, type: ADASYN}}					
Random	59	RF	SMOTENC	Over resampling	0.7858
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 2, n_estimators: 80, name: RF, random_state: 59}, sub: {categorical_features: True, k_neighbors: 1, random_state: 59, smo_grp: OVER, type: SMOTENC}}					

continued on the next column

TABLE S-5
"GLASS1" – CONTINUED FROM PREVIOUS COLUMN

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	79	RF	SVMSMOTE	Over resampling	0.773
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 14, n_estimators: 71, name: RF, random_state: 79}, sub: {k_neighbors: 9, m_neighbors: 3, out_step: 0.6751398455432444, random_state: 79, smo_grp: OVER, type: SVMSMOTE}}					
Random	90	RF	SMOTE	Over resampling	0.7764
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 3, min_samples_split: 3, n_estimators: 74, name: RF, random_state: 90}, sub: {k_neighbors: 8, random_state: 90, smo_grp: OVER, type: SMOTE}}					
Random	109	RF	CondensedNearest Neighbour	Under resampling	0.7955
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 2, min_samples_split: 8, n_estimators: 105, name: RF, random_state: 109}, sub: {n_neighbors: 19, n_seeds_S: 41, random_state: 109, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	9	RF	ADASYN	Over resampling	0.7933
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 2, min_samples_split: 4, n_estimators: 88, name: RF, random_state: 9}, sub: {n_neighbors: 2, random_state: 9, smo_grp: OVER, type: ADASYN}}					
TPE	18	RF	SMOTETomek	Combine resampling	0.7892
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 6, n_estimators: 81, name: RF, random_state: 18}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	27	RF	CondensedNearest Neighbour	Under resampling	0.8342
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 7, n_estimators: 43, name: RF, random_state: 27}, sub: {n_neighbors: 49, n_seeds_S: 10, random_state: 27, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	29	RF	CondensedNearest Neighbour	Under resampling	0.8235
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 7, min_samples_split: 1, n_estimators: 67, name: RF, random_state: 29}, sub: {n_neighbors: 29, n_seeds_S: 14, random_state: 29, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	36	KNN	SMOTENC	Over resampling	0.777
{classifier: {algorithm: ball_tree, n_neighbors: 13, name: KNN, p: 1, random_state: 36, weights: distance}, sub: {categorical_features: True, k_neighbors: 4, random_state: 36, smo_grp: OVER, type: SMOTENC}}					
TPE	39	RF	SMOTENC	Over resampling	0.7928
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 11, n_estimators: 97, name: RF, random_state: 39}, sub: {categorical_features: True, k_neighbors: 7, random_state: 39, smo_grp: OVER, type: SMOTENC}}					
TPE	59	RF	CondensedNearest Neighbour	Under resampling	0.787
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 4, min_samples_split: 4, n_estimators: 149, name: RF, random_state: 59}, sub: {n_neighbors: 24, n_seeds_S: 8, random_state: 59, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	79	RF	BorderlineSMOTE	Over resampling	0.7928
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 1, min_samples_split: 4, n_estimators: 33, name: RF, random_state: 79}, sub: {k_neighbors: 6, kind: borderline-2, m_neighbors: 5, random_state: 79, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	90	RF	SMOTENC	Over resampling	0.8113
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 1, min_samples_split: 2, n_estimators: 70, name: RF, random_state: 90}, sub: {categorical_features: True, k_neighbors: 1, random_state: 90, smo_grp: OVER, type: SMOTENC}}					
TPE	109	RF	SMOTETomek	Combine resampling	0.7882
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 4, min_samples_split: 10, n_estimators: 89, name: RF, random_state: 109}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTETomek}}					

TABLE S-6
"ECOLI-0_VS_1"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	No resampling	No resampling	0.9864
Grid	18	RF	No resampling	No resampling	0.9864
Grid	27	RF	No resampling	No resampling	0.9864
Grid	29	RF	No resampling	No resampling	0.9864
Grid	36	RF	OneSidedSelection	Under resampling	0.9864
Grid	39	RF	No resampling	No resampling	0.9864
Grid	59	RF	KMeansSMOTE	Over resampling	0.9864
Grid	79	RF	CondensedNearest Neighbour	Under resampling	0.9864
Grid	90	RF	SMOTEENN	Combine resampling	0.9864
Grid	109	RF	EditedNearest Neighbours	Under resampling	0.9864
Random	9	DT	SMOTEENN	Combine resampling	0.9864
{classifier: {criterion: entropy, max_depth: 13, max_features: None, min_samples_leaf: 18, min_samples_split: 5, name: DTC, random_state: 9}, sub: {random_state: 9, smo_grp: COMBINE, type: SMOTEENN}}					
Random	18	DT	EditedNearest Neighbours	Under resampling	0.9864
{classifier: {criterion: entropy, max_depth: 5, max_features: None, min_samples_leaf: 14, min_samples_split: 7, name: DTC, random_state: 18}, sub: {kind_sel: all, n_neighbors: 7, smo_grp: UNDER, type: EditedNearestNeighbours}}					
Random	27	RF	SMOTETomek	Combine resampling	0.9864
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 7, n_estimators: 89, name: RF, random_state: 27}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTETomek}}					
Random	29	RF	KMeansSMOTE	Over resampling	0.9864
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 11, min_samples_split: 18, n_estimators: 73, name: RF, random_state: 29}, sub: {cluster_balance_threshold: 0.18580927348761878, k_neighbors: 4, random_state: 29, smo_grp: OVER, type: KMeansSMOTE}}					
Random	36	RF	AllKNN	Under resampling	0.9864
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 1, min_samples_split: 13, n_estimators: 133, name: RF, random_state: 36}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 3, smo_grp: UNDER, type: AllKNN}}					
Random	39	RF	RandomOverSampler	Over resampling	0.9864
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 2, min_samples_split: 12, n_estimators: 97, name: RF, random_state: 39}, sub: {random_state: 39, smo_grp: OVER, type: RandomOverSampler}}					
Random	59	DT	AllKNN	Under resampling	0.9864
{classifier: {criterion: entropy, max_depth: 11, max_features: None, min_samples_leaf: 10, min_samples_split: 4, name: DTC, random_state: 59}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 6, smo_grp: UNDER, type: AllKNN}}					
Random	79	RF	RandomUnderSampler	Under resampling	0.9864
{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: None, min_samples_leaf: 14, min_samples_split: 12, n_estimators: 136, name: RF, random_state: 79}, sub: {random_state: 79, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	AllKNN	Under resampling	0.9864
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 16, min_samples_split: 13, n_estimators: 40, name: RF, random_state: 90}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 2, smo_grp: UNDER, type: AllKNN}}					
Random	109	RF	SMOTEENN	Combine resampling	0.9864
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 17, n_estimators: 80, name: RF, random_state: 109}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	9	RF	ClusterCentroids	Under resampling	0.9864
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 5, min_samples_split: 7, n_estimators: 149, name: RF, random_state: 9}, sub: {estimator: MiniBatchKMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	18	DT	EditedNearest Neighbours	Under resampling	0.9864
{classifier: {criterion: entropy, max_depth: 5, max_features: None, min_samples_leaf: 14, min_samples_split: 7, name: DTC, random_state: 18}, sub: {kind_sel: all, n_neighbors: 7, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	27	RF	SMOTETomek	Combine resampling	0.9864
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 7, n_estimators: 89, name: RF, random_state: 27}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	29	RF	KMeansSMOTE	Over resampling	0.9864
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 11, min_samples_split: 18, n_estimators: 73, name: RF, random_state: 29}, sub: {cluster_balance_threshold: 0.18580927348761878, k_neighbors: 4, random_state: 29, smo_grp: OVER, type: KMeansSMOTE}}					
TPE	36	RF	AllKNN	Under resampling	0.9864
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 1, min_samples_split: 13, n_estimators: 133, name: RF, random_state: 36}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 3, smo_grp: UNDER, type: AllKNN}}					
TPE	39	RF	RandomUnderSampler	Under resampling	0.9864
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 15, n_estimators: 126, name: RF, random_state: 39}, sub: {random_state: 39, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	59	DT	AllKNN	Under resampling	0.9864
{classifier: {criterion: entropy, max_depth: 11, max_features: None, min_samples_leaf: 10, min_samples_split: 4, name: DTC, random_state: 59}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 6, smo_grp: UNDER, type: AllKNN}}					
TPE	79	RF	RandomUnderSampler	Under resampling	0.9864
{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: None, min_samples_leaf: 14, min_samples_split: 12, n_estimators: 136, name: RF, random_state: 79}, sub: {random_state: 79, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	90	RF	AllKNN	Under resampling	0.9864
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 16, min_samples_split: 13, n_estimators: 40, name: RF, random_state: 90}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 2, smo_grp: UNDER, type: AllKNN}}					
TPE	109	RF	SMOTEENN	Combine resampling	0.9864
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 17, n_estimators: 80, name: RF, random_state: 109}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	18	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	27	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	29	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	36	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	39	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	59	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	79	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	90	LR	Instance HardnessThreshold	Under resampling	0.9788
Grid	109	LR	Instance HardnessThreshold	Under resampling	0.9788
Random	9	SVM	Neighbourhood CleaningRule	Under resampling	0.9821

{classifier: {C: 67.70882698732748, coef0: 0.6249617016676856, degree: 2, gamma: auto, gamma_value: 5.050808803917089, kernel: sigmoid, name: SVM, probability: True, random_state: 9, shrinking: False, tol: 0.09075216714367539}, sub: {n_neighbors: 6, smo_grp: UNDER, threshold_cleaning: 0.5490784152825638, type: NeighbourhoodCleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	18	RF	SVMSMOTE	Over resampling	0.9811

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 9, min_samples_split: 14, n_estimators: 97, name: RF, random_state: 18}, sub: {k_neighbors: 8, m_neighbors: 6, out_step: 0.6241990373116405, random_state: 18, smo_grp: OVER, type: SVMSMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	27	RF	AllKNN	Under resampling	0.9799

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 10, min_samples_split: 15, n_estimators: 69, name: RF, random_state: 27}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 2, smo_grp: UNDER, type: AllKNN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	29	RF	ADASYN	Over resampling	0.9788

{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: 1, min_samples_leaf: 11, min_samples_split: 11, n_estimators: 144, name: RF, random_state: 29}, sub: {n_neighbors: 7, random_state: 29, smo_grp: OVER, type: ADASYN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	36	RF	TomekLinks	Under resampling	0.9832

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 6, min_samples_split: 11, n_estimators: 129, name: RF, random_state: 36}, sub: {smo_grp: UNDER, type: TomekLinks}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	39	SVM	Neighbourhood CleaningRule	Under resampling	0.9809

{classifier: {C: 8.574929401348019, coef0: -0.6074709498310942, degree: 3, gamma: auto, gamma_value: 5.077700380063702, kernel: poly, name: SVM, probability: False, random_state: 39, shrinking: False, tol: 0.05187824047026576}, sub: {n_neighbors: 9, smo_grp: UNDER, threshold_cleaning: 0.40607236970731564, type: NeighbourhoodCleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	59	LR	OneSidedSelection	Under resampling	0.9809

{classifier: {C: 85.11621701617383, l1_ratio: 0.31568347696736626, name: LR, penalty_solver: l2+saga, random_state: 59, tol: 0.0216677283393548}, sub: {n_neighbors: 14, n_seeds_S: 18, random_state: 59, smo_grp: UNDER, type: OneSidedSelection}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	79	RF	RepeatedEdited NearestNeighbours	Under resampling	0.982

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 1, min_samples_split: 7, n_estimators: 83, name: RF, random_state: 79}, sub: {kind_sel: all, n_neighbors: 15, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	LR	AllKNN	Under resampling	0.9786

{classifier: {C: 49.19801228867176, l1_ratio: 0.9512887078407267, name: LR, penalty_solver: l2+newton-cg, random_state: 90, tol: 0.08566923231602934}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 11, smo_grp: UNDER, type: AllKNN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	109	LR	EditedNearest Neighbours	Under resampling	0.9798

{classifier: {C: 64.55794221848194, l1_ratio: 0.19713469997160402, name: LR, penalty_solver: l2+sag, random_state: 109, tol: 0.007552840603006304}, sub: {kind_sel: all, n_neighbors: 9, smo_grp: UNDER, type: EditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	9	RF	Neighbourhood CleaningRule	Under resampling	0.982

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 10, n_estimators: 84, name: RF, random_state: 9}, sub: {n_neighbors: 8, smo_grp: UNDER, threshold_cleaning: 0.5136149645244137, type: NeighbourhoodCleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	18	RF	RandomUnderSampler	Under resampling	0.9811

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 11, min_samples_split: 7, n_estimators: 135, name: RF, random_state: 18}, sub: {random_state: 18, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	27	RF	SMOTEENN	Combine resampling	0.9822

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 11, min_samples_split: 8, n_estimators: 48, name: RF, random_state: 27}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTEENN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	29	RF	No resampling	No resampling	0.9811

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 14, min_samples_split: 14, n_estimators: 25, name: RF, random_state: 29}, sub: {smo_grp: NO, type: NO}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	36	RF	TomekLinks	Under resampling	0.9832

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 8, min_samples_split: 3, n_estimators: 64, name: RF, random_state: 36}, sub: {smo_grp: UNDER, type: TomekLinks}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	39	LR	RepeatedEdited NearestNeighbours	Under resampling	0.9809

{classifier: {C: 26.08150656179407, l1_ratio: 0.561726727630242, name: LR, penalty_solver: none+saga, random_state: 39, tol: 0.003368975603944193}, sub: {kind_sel: all, n_neighbors: 15, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	59	RF	RandomOverSampler	Over resampling	0.9811

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 9, min_samples_split: 16, n_estimators: 106, name: RF, random_state: 59}, sub: {random_state: 59, smo_grp: OVER, type: RandomOverSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	79	LR	OneSidedSelection	Under resampling	0.9809

{classifier: {C: 47.48062434934689, l1_ratio: 0.5515845887457744, name: LR, penalty_solver: elasticnet+saga, random_state: 79, tol: 0.08529145762637622}, sub: {n_neighbors: 13, n_seeds_S: 16, random_state: 79, smo_grp: UNDER, type: OneSidedSelection}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	90	RF	TomekLinks	Under resampling	0.9811

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 5, min_samples_split: 6, n_estimators: 42, name: RF, random_state: 90}, sub: {smo_grp: UNDER, type: TomekLinks}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	109	LR	AllKNN	Under resampling	0.9809

{classifier: {C: 99.44086357149492, l1_ratio: 0.5424056895927956, name: LR, penalty_solver: elasticnet+saga, random_state: 109, tol: 0.0001299252748858666}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 19, smo_grp: UNDER, type: AllKNN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	LR	SVMSMOTE	Over resampling	0.7609
Grid	18	RF	SMOTEENN	Combine resampling	0.7645
Grid	27	RF	RandomUnderSampler	Under resampling	0.7671
Grid	29	RF	SMOTEENN	Combine resampling	0.7655
Grid	36	RF	SMOTEENN	Combine resampling	0.7655
Grid	39	RF	EditedNearest Neighbours	Under resampling	0.7534
Grid	59	RF	RandomUnderSampler	Under resampling	0.7526
Grid	79	RF	SMOTEENN	Combine resampling	0.7539
Grid	90	RF	SMOTEENN	Combine resampling	0.7657
Grid	109	LR	NearMiss	Under resampling	0.7495
Random	9	RF	TomekLinks	Under resampling	0.766
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 16, min_samples_split: 18, n_estimators: 48, name: RF, random_state: 9}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	18	RF	ADASYN	Over resampling	0.7635
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 8, min_samples_split: 5, n_estimators: 94, name: RF, random_state: 18}, sub: {n_neighbors: 9, random_state: 18, smo_grp: OVER, type: ADASYN}}					
Random	27	RF	BorderlineSMOTE	Over resampling	0.7715
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 13, min_samples_split: 10, n_estimators: 50, name: RF, random_state: 27}, sub: {k_neighbors: 3, kind: borderline-1, m_neighbors: 2, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	29	RF	BorderlineSMOTE	Over resampling	0.7666
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 15, min_samples_split: 14, n_estimators: 127, name: RF, random_state: 29}, sub: {k_neighbors: 8, kind: borderline-2, m_neighbors: 2, random_state: 29, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	36	RF	RandomUnderSampler	Under resampling	0.7732
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 8, min_samples_split: 2, n_estimators: 73, name: RF, random_state: 36}, sub: {random_state: 36, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}					
Random	39	RF	OneSidedSelection	Under resampling	0.762
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 10, min_samples_split: 17, n_estimators: 139, name: RF, random_state: 39}, sub: {n_neighbors: 8, n_seeds_S: 8, random_state: 39, smo_grp: UNDER, type: OneSidedSelection}}					
Random	59	RF	SMOTENC	Over resampling	0.7625
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 8, min_samples_split: 18, n_estimators: 108, name: RF, random_state: 59}, sub: {categorical_features: True, k_neighbors: 1, random_state: 59, smo_grp: OVER, type: SMOTENC}}					
Random	79	RF	SMOTETomek	Combine resampling	0.7595
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 18, min_samples_split: 6, n_estimators: 132, name: RF, random_state: 79}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}					

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Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	SMOTE	Over resampling	0.7648
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 15, min_samples_split: 12, n_estimators: 129, name: RF, random_state: 90}, sub: {k_neighbors: 1, random_state: 90, smo_grp: OVER, type: SMOTE}}					
Random	109	RF	CondensedNearest Neighbour	Under resampling	0.7615
{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: sqrt, min_samples_leaf: 19, min_samples_split: 7, n_estimators: 62, name: RF, random_state: 109}, sub: {n_neighbors: 31, n_seeds_S: 37, random_state: 109, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	9	RF	RandomUnderSampler	Under resampling	0.7728
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 19, n_estimators: 103, name: RF, random_state: 9}, sub: {random_state: 9, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	18	RF	ClusterCentroids	Under resampling	0.7713
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 16, n_estimators: 65, name: RF, random_state: 18}, sub: {estimator: MiniBatchKMeans, random_state: 18, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
TPE	27	RF	ClusterCentroids	Under resampling	0.7784
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 3, min_samples_split: 16, n_estimators: 64, name: RF, random_state: 27}, sub: {estimator: MiniBatchKMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
TPE	29	LR	CondensedNearest Neighbour	Under resampling	0.7631
{classifier: {C: 20.177061707221796, l1_ratio: 0.32745555980061773, name: LR, penalty_solver: l2+sag, random_state: 29, tol: 0.06995722014546979}, sub: {n_neighbors: 44, n_seeds_S: 15, random_state: 29, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	36	RF	SMOTETomek	Combine resampling	0.771
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 15, min_samples_split: 14, n_estimators: 85, name: RF, random_state: 36}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	39	RF	SMOTE	Over resampling	0.7699
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 17, min_samples_split: 4, n_estimators: 59, name: RF, random_state: 39}, sub: {k_neighbors: 6, random_state: 39, smo_grp: OVER, type: SMOTE}}					
TPE	59	RF	RandomOverSampler	Over resampling	0.7728
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 11, min_samples_split: 13, n_estimators: 107, name: RF, random_state: 59}, sub: {random_state: 59, smo_grp: OVER, type: RandomOverSampler}}					
TPE	79	RF	RandomUnderSampler	Under resampling	0.7726
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 7, min_samples_split: 4, n_estimators: 142, name: RF, random_state: 79}, sub: {random_state: 79, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	90	RF	SVMSMOTE	Over resampling	0.7729
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 18, min_samples_split: 6, n_estimators: 80, name: RF, random_state: 90}, sub: {k_neighbors: 9, m_neighbors: 8, out_step: 0.7127887308616409, random_state: 90, smo_grp: OVER, type: SVMSMOTE}}					
TPE	109	RF	SMOTE	Over resampling	0.7659
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 11, min_samples_split: 9, n_estimators: 144, name: RF, random_state: 109}, sub: {k_neighbors: 3, random_state: 109, smo_grp: OVER, type: SMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	No resampling	No resampling	1.0
Grid	18	SVM	No resampling	No resampling	1.0
Grid	27	SVM	No resampling	No resampling	1.0
Grid	29	SVM	No resampling	No resampling	1.0
Grid	36	SVM	No resampling	No resampling	1.0
Grid	39	SVM	No resampling	No resampling	1.0
Grid	59	SVM	No resampling	No resampling	1.0
Grid	79	SVM	No resampling	No resampling	1.0
Grid	90	SVM	No resampling	No resampling	1.0
Grid	109	SVM	No resampling	No resampling	1.0
Random	9	RF	ClusterCentroids	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 13, n_estimators: 82, name: RF, random_state: 9}, sub: {estimator: KMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	18	DT	EditedNearest Neighbours	Under resampling	1.0
{classifier: {criterion: entropy, max_depth: 5, max_features: None, min_samples_leaf: 14, min_samples_split: 7, name: DTC, random_state: 18}, sub: {kind_sel: all, n_neighbors: 7, smo_grp: UNDER, type: EditedNearestNeighbours}}					
Random	27	LR	BorderlineSMOTE	Over resampling	1.0
{classifier: {C: 9.529652080962741, l1_ratio: 0.8594259123848675, name: LR, penalty_solver: elasticnet+saga, random_state: 27, tol: 0.003906565798961128}, sub: {k_neighbors: 2, kind: borderline-2, m_neighbors: 4, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	29	DT	SMOTETomek	Combine resampling	1.0
{classifier: {criterion: gini, max_depth: 10, max_features: 1, min_samples_leaf: 7, min_samples_split: 15, name: DTC, random_state: 29}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTETomek}}					
Random	36	LR	RepeatedEdited NearestNeighbours	Under resampling	1.0
{classifier: {C: 25.290684716908764, l1_ratio: 0.7521550903778699, name: LR, penalty_solver: l2+sag, random_state: 36, tol: 0.08351112042635321}, sub: {kind_sel: all, n_neighbors: 16, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	39	RF	SMOTE	Over resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 15, n_estimators: 126, name: RF, random_state: 39}, sub: {k_neighbors: 4, random_state: 39, smo_grp: OVER, type: SMOTE}}					
Random	59	RF	SMOTENC	Over resampling	1.0
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 16, min_samples_split: 5, n_estimators: 149, name: RF, random_state: 59}, sub: {categorical_features: True, k_neighbors: 7, random_state: 59, smo_grp: OVER, type: SMOTENC}}					
Random	79	SVM	NearMiss	Under resampling	1.0
{classifier: {C: 145.43923105808813, coef0: -0.028436683097273097, degree: 3, gamma: value, gamma_value: 0.9006163514445386, kernel: poly, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.008889748156938979}, sub: {n_neighbors: 11, n_neighbors_ver3: 16, smo_grp: UNDER, type: NearMiss, version: 1}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	RepeatedEdited NearestNeighbours	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 9, n_estimators: 135, name: RF, random_state: 90}, sub: {kind_sel: mode, n_neighbors: 13, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	109	SVM	EditedNearest Neighbours	Under resampling	1.0
{classifier: {C: 35.19416944269927, coef0: 0.713103618700079, degree: 3, gamma: auto, gamma_value: 5.876518879328954, kernel: poly, name: SVM, probability: False, random_state: 109, shrinking: False, tol: 0.0581200876862984}, sub: {kind_sel: all, n_neighbors: 6, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	9	RF	ClusterCentroids	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 13, n_estimators: 82, name: RF, random_state: 9}, sub: {estimator: KMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	18	DT	EditedNearest Neighbours	Under resampling	1.0
{classifier: {criterion: entropy, max_depth: 5, max_features: None, min_samples_leaf: 14, min_samples_split: 7, name: DTC, random_state: 18}, sub: {kind_sel: all, n_neighbors: 7, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	27	LR	BorderlineSMOTE	Over resampling	1.0
{classifier: {C: 9.529652080962741, l1_ratio: 0.8594259123848675, name: LR, penalty_solver: elasticnet+saga, random_state: 27, tol: 0.003906565798961128}, sub: {k_neighbors: 2, kind: borderline-2, m_neighbors: 4, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	29	DT	SMOTETomek	Combine resampling	1.0
{classifier: {criterion: gini, max_depth: 10, max_features: 1, min_samples_leaf: 7, min_samples_split: 15, name: DTC, random_state: 29}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	36	LR	RepeatedEdited NearestNeighbours	Under resampling	1.0
{classifier: {C: 25.290684716908764, l1_ratio: 0.7521550903778699, name: LR, penalty_solver: l2+sag, random_state: 36, tol: 0.08351112042635321}, sub: {kind_sel: all, n_neighbors: 16, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	39	RF	SMOTE	Over resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 15, n_estimators: 126, name: RF, random_state: 39}, sub: {k_neighbors: 4, random_state: 39, smo_grp: OVER, type: SMOTE}}					
TPE	59	RF	SMOTENC	Over resampling	1.0
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 16, min_samples_split: 5, n_estimators: 149, name: RF, random_state: 59}, sub: {categorical_features: True, k_neighbors: 7, random_state: 59, smo_grp: OVER, type: SMOTENC}}					
TPE	79	SVM	NearMiss	Under resampling	1.0
{classifier: {C: 145.43923105808813, coef0: -0.028436683097273097, degree: 3, gamma: value, gamma_value: 0.9006163514445386, kernel: poly, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.008889748156938979}, sub: {n_neighbors: 11, n_neighbors_ver3: 16, smo_grp: UNDER, type: NearMiss, version: 1}}					
TPE	90	RF	RepeatedEdited NearestNeighbours	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 9, n_estimators: 135, name: RF, random_state: 90}, sub: {kind_sel: mode, n_neighbors: 13, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	109	SVM	EditedNearest Neighbours	Under resampling	1.0
{classifier: {C: 35.19416944269927, coef0: 0.713103618700079, degree: 3, gamma: auto, gamma_value: 5.876518879328954, kernel: poly, name: SVM, probability: False, random_state: 109, shrinking: False, tol: 0.0581200876862984}, sub: {kind_sel: all, n_neighbors: 6, smo_grp: UNDER, type: EditedNearestNeighbours}}					

TABLE S-10
"GLASS0"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	No resampling	No resampling	0.87
Grid	18	RF	CondensedNearest Neighbour	Under resampling	0.8859
Grid	27	RF	SMOTENC	Over resampling	0.8717
Grid	29	RF	SVMSMOTE	Over resampling	0.8606
Grid	36	RF	SMOTENC	Over resampling	0.8745
Grid	39	RF	CondensedNearest Neighbour	Under resampling	0.8728
Grid	59	RF	SMOTE	Over resampling	0.8752
Grid	79	RF	SMOTENC	Over resampling	0.8723
Grid	90	RF	SMOTENC	Over resampling	0.8673
Grid	109	RF	SMOTE	Over resampling	0.8681
Random	9	RF	SVMSMOTE	Over resampling	0.8574

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 6, min_samples_split: 3, n_estimators: 22, name: RF, random_state: 9}, sub: {k_neighbors: 4, m_neighbors: 9, out_step: 0.7099634758226547, random_state: 9, smo_grp: OVER, type: SVMSMOTE}}

| Random | 18 | RF | SMOTENC | Over resampling | 0.8498 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 8, min_samples_split: 12, n_estimators: 80, name: RF, random_state: 18}, sub: {categorical_features: True, k_neighbors: 6, random_state: 18, smo_grp: OVER, type: SMOTENC}}

| Random | 27 | RF | SMOTENC | Over resampling | 0.8643 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 6, n_estimators: 80, name: RF, random_state: 27}, sub: {categorical_features: True, k_neighbors: 8, random_state: 27, smo_grp: OVER, type: SMOTENC}}

| Random | 29 | RF | SMOTE | Over resampling | 0.8513 |

{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 6, min_samples_split: 18, n_estimators: 70, name: RF, random_state: 29}, sub: {k_neighbors: 9, random_state: 29, smo_grp: OVER, type: SMOTE}}

| Random | 36 | RF | KMeansSMOTE | Over resampling | 0.8613 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 4, min_samples_split: 15, n_estimators: 58, name: RF, random_state: 36}, sub: {cluster_balance_threshold: 0.2077699757275782, k_neighbors: 6, random_state: 36, smo_grp: OVER, type: KMeansSMOTE}}

| Random | 39 | RF | No resampling | No resampling | 0.846 |

{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 2, min_samples_split: 17, n_estimators: 39, name: RF, random_state: 39}, sub: {smo_grp: NO, type: NO}}

| Random | 59 | RF | SMOTENC | Over resampling | 0.8667 |

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 2, n_estimators: 80, name: RF, random_state: 59}, sub: {categorical_features: True, k_neighbors: 1, random_state: 59, smo_grp: OVER, type: SMOTENC}}

| Random | 79 | DT | OneSidedSelection | Under resampling | 0.86 |

{classifier: {criterion: gini, max_depth: 15, max_features: log2, min_samples_leaf: 6, min_samples_split: 16, name: DTC, random_state: 79}, sub: {n_neighbors: 8, n_seeds_S: 14, random_state: 79, smo_grp: UNDER, type: OneSidedSelection}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	SVMSMOTE	Over resampling	0.8667

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 6, min_samples_split: 8, n_estimators: 9, name: RF, random_state: 90}, sub: {k_neighbors: 2, m_neighbors: 8, out_step: 0.15754165250058705, random_state: 90, smo_grp: OVER, type: SVMSMOTE}}

| Random | 109 | RF | SVMSMOTE | Over resampling | 0.8647 |

{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 8, n_estimators: 85, name: RF, random_state: 109}, sub: {k_neighbors: 5, out_step: 0.8191826102746397, random_state: 109, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 9 | RF | SVMSMOTE | Over resampling | 0.8717 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 6, min_samples_split: 9, n_estimators: 29, name: RF, random_state: 9}, sub: {k_neighbors: 6, m_neighbors: 3, out_step: 0.9547389416822453, random_state: 9, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 18 | RF | SMOTENC | Over resampling | 0.887 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 3, min_samples_split: 4, n_estimators: 107, name: RF, random_state: 18}, sub: {categorical_features: True, k_neighbors: 5, random_state: 18, smo_grp: OVER, type: SMOTENC}}

| TPE | 27 | RF | RandomOverSampler | Over resampling | 0.8647 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 11, n_estimators: 112, name: RF, random_state: 27}, sub: {random_state: 27, smo_grp: OVER, type: RandomOverSampler}}

| TPE | 29 | RF | SMOTENC | Over resampling | 0.8785 |

{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: sqrt, min_samples_leaf: 3, min_samples_split: 7, n_estimators: 63, name: RF, random_state: 29}, sub: {categorical_features: True, k_neighbors: 5, random_state: 29, smo_grp: OVER, type: SMOTENC}}

| TPE | 36 | RF | SMOTENC | Over resampling | 0.879 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 4, min_samples_split: 3, n_estimators: 77, name: RF, random_state: 36}, sub: {categorical_features: True, k_neighbors: 5, random_state: 36, smo_grp: OVER, type: SMOTENC}}

| TPE | 39 | RF | RandomOverSampler | Over resampling | 0.8643 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 3, min_samples_split: 5, n_estimators: 32, name: RF, random_state: 39}, sub: {random_state: 39, smo_grp: OVER, type: RandomOverSampler}}

| TPE | 59 | RF | SVMSMOTE | Over resampling | 0.8755 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 5, min_samples_split: 4, n_estimators: 87, name: RF, random_state: 59}, sub: {k_neighbors: 2, m_neighbors: 3, out_step: 0.5877239189003498, random_state: 59, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 79 | RF | SMOTETomek | Combine resampling | 0.876 |

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 7, min_samples_split: 11, n_estimators: 5, name: RF, random_state: 79}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}

| TPE | 90 | RF | SMOTE | Over resampling | 0.8654 |

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 4, min_samples_split: 13, n_estimators: 30, name: RF, random_state: 90}, sub: {k_neighbors: 5, random_state: 90, smo_grp: OVER, type: SMOTE}}

| TPE | 109 | RF | SMOTENC | Over resampling | 0.8867 |

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 4, n_estimators: 13, name: RF, random_state: 109}, sub: {categorical_features: True, k_neighbors: 9, random_state: 109, smo_grp: OVER, type: SMOTENC}}

TABLE S-11
"YEAST1"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	Neighbourhood CleaningRule	Under resampling	0.7211
Grid	18	RF	Neighbourhood CleaningRule	Under resampling	0.7217
Grid	27	RF	Neighbourhood CleaningRule	Under resampling	0.7224
Grid	29	LR	RandomUnderSampler	Under resampling	0.7181
Grid	36	RF	Neighbourhood CleaningRule	Under resampling	0.7163
Grid	39	RF	Neighbourhood CleaningRule	Under resampling	0.7171
Grid	59	LR	EditedNearest Neighbours	Under resampling	0.7148
Grid	79	RF	Neighbourhood CleaningRule	Under resampling	0.7212
Grid	90	SVM	CondensedNearest Neighbour	Under resampling	0.7153
Grid	109	LR	EditedNearest Neighbours	Under resampling	0.7148
Random	9	RF	SMOTENC	Over resampling	0.734
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 19, min_samples_split: 17, n_estimators: 80, name: RF, random_state: 9}, sub: {categorical_features: True, k_neighbors: 4, random_state: 9, smo_grp: OVER, type: SMOTENC}}					
Random	18	RF	TomekLinks	Under resampling	0.7257
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 19, min_samples_split: 16, n_estimators: 138, name: RF, random_state: 18}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	27	RF	BorderlineSMOTE	Over resampling	0.7348
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 17, n_estimators: 126, name: RF, random_state: 27}, sub: {k_neighbors: 4, kind: borderline-1, m_neighbors: 7, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	29	RF	RandomOverSampler	Over resampling	0.7322
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 15, min_samples_split: 6, n_estimators: 143, name: RF, random_state: 29}, sub: {random_state: 29, smo_grp: OVER, type: RandomOverSampler}}					
Random	36	RF	RandomOverSampler	Over resampling	0.7296
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 12, min_samples_split: 11, n_estimators: 63, name: RF, random_state: 36}, sub: {random_state: 36, smo_grp: OVER, type: RandomOverSampler}}					
Random	39	RF	OneSidedSelection	Under resampling	0.7285
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 8, n_estimators: 126, name: RF, random_state: 39}, sub: {n_neighbors: 10, n_seeds_S: 13, random_state: 39, smo_grp: UNDER, type: OneSidedSelection}}					
Random	59	RF	SMOTE	Over resampling	0.727
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 16, min_samples_split: 13, n_estimators: 22, name: RF, random_state: 59}, sub: {k_neighbors: 4, random_state: 59, smo_grp: OVER, type: SMOTE}}					
Random	79	RF	No resampling	No resampling	0.7295
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 18, min_samples_split: 18, n_estimators: 30, name: RF, random_state: 79}, sub: {smo_grp: NO, type: NO}}					

continued on the next column

TABLE S-11
"YEAST1" − CONTINUED FROM PREVIOUS COLUMN

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	TomekLinks	Under resampling	0.7334
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 11, min_samples_split: 17, n_estimators: 26, name: RF, random_state: 90}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	109	RF	ADASYN	Over resampling	0.7294
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 19, min_samples_split: 18, n_estimators: 38, name: RF, random_state: 109}, sub: {n_neighbors: 2, random_state: 109, smo_grp: OVER, type: ADASYN}}					
TPE	9	RF	ADASYN	Over resampling	0.7335
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 12, min_samples_split: 14, n_estimators: 13, name: RF, random_state: 9}, sub: {n_neighbors: 7, random_state: 9, smo_grp: OVER, type: ADASYN}}					
TPE	18	RF	OneSidedSelection	Under resampling	0.7294
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 16, min_samples_split: 13, n_estimators: 61, name: RF, random_state: 18}, sub: {n_neighbors: 7, n_seeds_S: 4, random_state: 18, smo_grp: UNDER, type: OneSidedSelection}}					
TPE	27	RF	BorderlineSMOTE	Over resampling	0.7348
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 17, n_estimators: 126, name: RF, random_state: 27}, sub: {k_neighbors: 4, kind: borderline-1, m_neighbors: 7, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	29	RF	RandomOverSampler	Over resampling	0.7345
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 13, min_samples_split: 4, n_estimators: 41, name: RF, random_state: 29}, sub: {random_state: 29, smo_grp: OVER, type: RandomOverSampler}}					
TPE	36	RF	Instance HardnessThreshold	Under resampling	0.733
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 5, min_samples_split: 19, n_estimators: 52, name: RF, random_state: 36}, sub: {cv: 7, estimator: decision-tree, random_state: 36, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
TPE	39	RF	OneSidedSelection	Under resampling	0.732
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 8, min_samples_split: 7, n_estimators: 127, name: RF, random_state: 39}, sub: {n_neighbors: 16, n_seeds_S: 11, random_state: 39, smo_grp: UNDER, type: OneSidedSelection}}					
TPE	59	RF	No resampling	No resampling	0.7322
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 13, min_samples_split: 8, n_estimators: 57, name: RF, random_state: 59}, sub: {smo_grp: NO, type: NO}}					
TPE	79	RF	TomekLinks	Under resampling	0.729
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: None, min_samples_leaf: 9, min_samples_split: 15, n_estimators: 133, name: RF, random_state: 79}, sub: {smo_grp: UNDER, type: TomekLinks}}					
TPE	90	RF	OneSidedSelection	Under resampling	0.733
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 6, min_samples_split: 13, n_estimators: 61, name: RF, random_state: 90}, sub: {n_neighbors: 15, n_seeds_S: 12, random_state: 90, smo_grp: UNDER, type: OneSidedSelection}}					
TPE	109	RF	SMOTE	Over resampling	0.7327
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: sqrt, min_samples_leaf: 17, min_samples_split: 8, n_estimators: 90, name: RF, random_state: 109}, sub: {k_neighbors: 2, random_state: 109, smo_grp: OVER, type: SMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	Neighbourhood CleaningRule	Under resampling	0.6819
Grid	18	LR	Instance HardnessThreshold	Under resampling	0.6706
Grid	27	LR	Instance HardnessThreshold	Under resampling	0.6665
Grid	29	LR	Instance HardnessThreshold	Under resampling	0.6626
Grid	36	RF	Neighbourhood CleaningRule	Under resampling	0.6685
Grid	39	LR	Instance HardnessThreshold	Under resampling	0.671
Grid	59	RF	EditedNearest Neighbours	Under resampling	0.6614
Grid	79	LR	NearMiss	Under resampling	0.6614
Grid	90	RF	SMOTEENN	Combine resampling	0.6669
Grid	109	LR	Instance HardnessThreshold	Under resampling	0.667
Random	9	RF	ADASYN	Over resampling	0.6839
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 19, min_samples_split: 10, n_estimators: 128, name: RF, random_state: 9}, sub: {n_neighbors: 6, random_state: 9, smo_grp: OVER, type: ADASYN}}					
Random	18	RF	SMOTEENN	Combine resampling	0.6838
{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 13, min_samples_split: 13, n_estimators: 57, name: RF, random_state: 18}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTEENN}}					
Random	27	RF	BorderlineSMOTE	Over resampling	0.6994
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 13, min_samples_split: 4, n_estimators: 90, name: RF, random_state: 27}, sub: {k_neighbors: 9, kind: borderline-1, m_neighbors: 7, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	29	LR	NearMiss	Under resampling	0.6987
{classifier: {C: 65.57580735207308, l1_ratio: 0.14850718351798925, name: LR, penalty_solver: l2+sag, random_state: 29, tol: 0.058609653502002736}, sub: {n_neighbors: 5, n_neighbors_ver3: 15, smo_grp: UNDER, type: NearMiss, version: 1}}					
Random	36	LR	NearMiss	Under resampling	0.6973
{classifier: {C: 52.96765147566629, l1_ratio: 0.44402290753558415, name: LR, penalty_solver: elasticnet+saga, random_state: 36, tol: 0.06915535156949242}, sub: {n_neighbors: 6, n_neighbors_ver3: 10, smo_grp: UNDER, type: NearMiss, version: 1}}					
Random	39	SVM	NearMiss	Under resampling	0.6979
{classifier: {C: 132.86532501550488, coef0: 0.3040515351651769, degree: 4, gamma: scale, gamma_value: 3.685983178779961, kernel: linear, name: SVM, probability: False, random_state: 39, shrinking: False, tol: 0.028019408999591617}, sub: {n_neighbors: 7, n_neighbors_ver3: 12, smo_grp: UNDER, type: NearMiss, version: 1}}					
Random	59	RF	ADASYN	Over resampling	0.6876
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 11, min_samples_split: 7, n_estimators: 62, name: RF, random_state: 59}, sub: {n_neighbors: 8, random_state: 59, smo_grp: OVER, type: ADASYN}}					
Random	79	RF	TomekLinks	Under resampling	0.6945
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 6, min_samples_split: 7, n_estimators: 38, name: RF, random_state: 79}, sub: {smo_grp: UNDER, type: TomekLinks}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	ADASYN	Over resampling	0.6907
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 14, min_samples_split: 18, n_estimators: 71, name: RF, random_state: 90}, sub: {n_neighbors: 5, random_state: 90, smo_grp: OVER, type: ADASYN}}					
Random	109	RF	ADASYN	Over resampling	0.6926
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 8, min_samples_split: 9, n_estimators: 64, name: RF, random_state: 109}, sub: {n_neighbors: 6, random_state: 109, smo_grp: OVER, type: ADASYN}}					
TPE	9	RF	ADASYN	Over resampling	0.7094
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: None, min_samples_leaf: 9, min_samples_split: 4, n_estimators: 32, name: RF, random_state: 9}, sub: {n_neighbors: 8, random_state: 9, smo_grp: OVER, type: ADASYN}}					
TPE	18	RF	ADASYN	Over resampling	0.698
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 18, min_samples_split: 4, n_estimators: 126, name: RF, random_state: 18}, sub: {n_neighbors: 4, random_state: 18, smo_grp: OVER, type: ADASYN}}					
TPE	27	RF	SMOTE	Over resampling	0.7012
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 17, n_estimators: 40, name: RF, random_state: 27}, sub: {k_neighbors: 9, random_state: 27, smo_grp: OVER, type: SMOTE}}					
TPE	29	RF	ADASYN	Over resampling	0.7052
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 12, min_samples_split: 15, n_estimators: 49, name: RF, random_state: 29}, sub: {n_neighbors: 6, random_state: 29, smo_grp: OVER, type: ADASYN}}					
TPE	36	RF	NearMiss	Under resampling	0.7038
{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 7, min_samples_split: 3, n_estimators: 7, name: RF, random_state: 36}, sub: {n_neighbors: 1, n_neighbors_ver3: 11, smo_grp: UNDER, type: NearMiss, version: 1}}					
TPE	39	RF	SMOTE	Over resampling	0.703
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 18, min_samples_split: 2, n_estimators: 114, name: RF, random_state: 39}, sub: {k_neighbors: 9, random_state: 39, smo_grp: OVER, type: SMOTE}}					
TPE	59	RF	SMOTETomek	Combine resampling	0.6987
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 13, min_samples_split: 11, n_estimators: 41, name: RF, random_state: 59}, sub: {random_state: 59, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	79	RF	BorderlineSMOTE	Over resampling	0.705
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: None, min_samples_leaf: 15, min_samples_split: 10, n_estimators: 113, name: RF, random_state: 79}, sub: {k_neighbors: 6, kind: borderline-1, m_neighbors: 9, random_state: 79, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	90	RF	ADASYN	Over resampling	0.7035
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 14, min_samples_split: 18, n_estimators: 137, name: RF, random_state: 90}, sub: {n_neighbors: 5, random_state: 90, smo_grp: OVER, type: ADASYN}}					
TPE	109	RF	SMOTE	Over resampling	0.6969
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 17, min_samples_split: 8, n_estimators: 112, name: RF, random_state: 109}, sub: {k_neighbors: 9, random_state: 109, smo_grp: OVER, type: SMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	SVMSMOTE	Over resampling	0.9898
Grid	18	RF	SMOTENC	Over resampling	0.9868
Grid	27	RF	SMOTETomek	Combine resampling	0.9899
Grid	29	RF	RandomOverSampler	Over resampling	0.9891
Grid	36	RF	BorderlineSMOTE	Over resampling	0.9891
Grid	39	RF	SMOTE	Over resampling	0.9899
Grid	59	RF	SVMSMOTE	Over resampling	0.9921
Grid	79	RF	SVMSMOTE	Over resampling	0.9883
Grid	90	RF	BorderlineSMOTE	Over resampling	0.9883
Grid	109	RF	SVMSMOTE	Over resampling	0.9921
Random	9	RF	KMeansSMOTE	Over resampling	0.9853
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 17, n_estimators: 60, name: RF, random_state: 9}, sub: {cluster_balance_threshold: 0.023948298652457213, k_neighbors: 1, random_state: 9, smo_grp: OVER, type: KMeansSMOTE}}					
Random	18	RF	SMOTE	Over resampling	0.9868
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 4, n_estimators: 41, name: RF, random_state: 18}, sub: {k_neighbors: 3, random_state: 18, smo_grp: OVER, type: SMOTE}}					
Random	27	RF	TomekLinks	Under resampling	0.986
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 3, min_samples_split: 4, n_estimators: 45, name: RF, random_state: 27}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	29	RF	SVMSMOTE	Over resampling	0.9892
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 2, min_samples_split: 17, n_estimators: 97, name: RF, random_state: 29}, sub: {k_neighbors: 1, m_neighbors: 7, out_step: 0.5977045234971797, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}					
Random	36	RF	SVMSMOTE	Over resampling	0.986
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 4, n_estimators: 73, name: RF, random_state: 36}, sub: {k_neighbors: 3, m_neighbors: 6, out_step: 0.1599253896568441, random_state: 36, smo_grp: OVER, type: SVMSMOTE}}					
Random	39	RF	ADASYN	Over resampling	0.9867
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 10, min_samples_split: 13, n_estimators: 79, name: RF, random_state: 39}, sub: {n_neighbors: 4, random_state: 39, smo_grp: OVER, type: ADASYN}}					
Random	59	RF	SMOTE	Over resampling	0.9891
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 1, min_samples_split: 13, n_estimators: 129, name: RF, random_state: 59}, sub: {k_neighbors: 1, random_state: 59, smo_grp: OVER, type: SMOTE}}					
Random	79	RF	ADASYN	Over resampling	0.9876
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 3, min_samples_split: 19, n_estimators: 149, name: RF, random_state: 79}, sub: {n_neighbors: 7, random_state: 79, smo_grp: OVER, type: ADASYN}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	SMOTENC	Over resampling	0.9883
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 2, min_samples_split: 10, n_estimators: 88, name: RF, random_state: 90}, sub: {categorical_features: True, k_neighbors: 7, random_state: 90, smo_grp: OVER, type: SMOTENC}}					
Random	109	RF	SVMSMOTE	Over resampling	0.989
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 3, min_samples_split: 7, n_estimators: 93, name: RF, random_state: 109}, sub: {k_neighbors: 4, m_neighbors: 9, out_step: 0.9743476905492334, random_state: 109, smo_grp: OVER, type: SVMSMOTE}}					
TPE	9	RF	BorderlineSMOTE	Over resampling	0.9913
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 3, min_samples_split: 5, n_estimators: 50, name: RF, random_state: 9}, sub: {k_neighbors: 4, kind: borderline-2, m_neighbors: 8, random_state: 9, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	18	RF	BorderlineSMOTE	Over resampling	0.9899
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 8, n_estimators: 141, name: RF, random_state: 18}, sub: {k_neighbors: 2, kind: borderline-1, m_neighbors: 8, random_state: 18, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	27	RF	BorderlineSMOTE	Over resampling	0.9898
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 1, min_samples_split: 3, n_estimators: 120, name: RF, random_state: 27}, sub: {k_neighbors: 7, kind: borderline-2, m_neighbors: 4, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	29	RF	SVMSMOTE	Over resampling	0.9921
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 15, n_estimators: 121, name: RF, random_state: 29}, sub: {k_neighbors: 9, m_neighbors: 8, out_step: 0.6304096644589139, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}					
TPE	36	RF	SVMSMOTE	Over resampling	0.9945
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 2, min_samples_split: 2, n_estimators: 62, name: RF, random_state: 36}, sub: {k_neighbors: 7, m_neighbors: 8, out_step: 0.7923868717955455, random_state: 36, smo_grp: OVER, type: SVMSMOTE}}					
TPE	39	RF	ADASYN	Over resampling	0.9914
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 5, n_estimators: 20, name: RF, random_state: 39}, sub: {n_neighbors: 8, random_state: 39, smo_grp: OVER, type: ADASYN}}					
TPE	59	RF	SVMSMOTE	Over resampling	0.9907
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 15, n_estimators: 52, name: RF, random_state: 59}, sub: {k_neighbors: 6, m_neighbors: 7, out_step: 0.8725381270051368, random_state: 59, smo_grp: OVER, type: SVMSMOTE}}					
TPE	79	RF	SVMSMOTE	Over resampling	0.9929
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 3, min_samples_split: 6, n_estimators: 139, name: RF, random_state: 79}, sub: {k_neighbors: 7, m_neighbors: 7, out_step: 0.8059404498162256, random_state: 79, smo_grp: OVER, type: SVMSMOTE}}					
TPE	90	RF	BorderlineSMOTE	Over resampling	0.9905
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 4, min_samples_split: 4, n_estimators: 72, name: RF, random_state: 90}, sub: {k_neighbors: 4, kind: borderline-2, m_neighbors: 9, random_state: 90, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	109	RF	SVMSMOTE	Over resampling	0.9921
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 2, min_samples_split: 14, n_estimators: 145, name: RF, random_state: 109}, sub: {k_neighbors: 6, m_neighbors: 7, out_step: 0.7860618467299478, random_state: 109, smo_grp: OVER, type: SVMSMOTE}}					

TABLE S-14
"VEHICLE1"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	SMOTENC	Over resampling	0.8305
Grid	18	SVM	RandomOverSampler	Over resampling	0.8355
Grid	27	SVM	BorderlineSMOTE	Over resampling	0.8376
Grid	29	SVM	BorderlineSMOTE	Over resampling	0.8348
Grid	36	SVM	ADASYN	Over resampling	0.83
Grid	39	SVM	ADASYN	Over resampling	0.835
Grid	59	SVM	SMOTE	Over resampling	0.8317
Grid	79	SVM	SMOTE	Over resampling	0.8358
Grid	90	SVM	BorderlineSMOTE	Over resampling	0.8322
Grid	109	SVM	ADASYN	Over resampling	0.83
Random	9	SVM	ClusterCentroids	Under resampling	0.8307

{classifier: {C: 178.21552256419878, coef0: -0.46612314101013586, degree: 2, gamma: scale, gamma_value: 0.5369190164853789, kernel: rbf, name: SVM, probability: False, random_state: 9, shrinking: False, tol: 0.09543901231623098}, sub: {estimator: MiniBatchKMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	18	SVM	SMOTE	Over resampling	0.8443

{classifier: {C: 5.212351844781458, coef0: -0.2155124024703299, degree: 3, gamma: scale, gamma_value: 5.3352584901892905, kernel: rbf, name: SVM, probability: True, random_state: 18, shrinking: False, tol: 0.04247568382314695}, sub: {k_neighbors: 1, random_state: 18, smo_grp: OVER, type: SMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	27	SVM	ADASYN	Over resampling	0.8549

{classifier: {C: 5.230745879472635, coef0: 0.1133419210936486, degree: 2, gamma: scale, gamma_value: 0.6039984805598337, kernel: poly, name: SVM, probability: False, random_state: 27, shrinking: False, tol: 0.024564596241323945}, sub: {n_neighbors: 3, random_state: 27, smo_grp: OVER, type: ADASYN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	29	SVM	SMOTE	Over resampling	0.8536

{classifier: {C: 9.378334758825629, coef0: 0.3567418456468734, degree: 4, gamma: scale, gamma_value: 4.585575128370061, kernel: rbf, name: SVM, probability: False, random_state: 29, shrinking: False, tol: 0.028256310301937922}, sub: {k_neighbors: 2, random_state: 29, smo_grp: OVER, type: SMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	36	SVM	BorderlineSMOTE	Over resampling	0.8179

{classifier: {C: 45.81894195069051, coef0: -0.7612768893150073, degree: 3, gamma: scale, gamma_value: 7.659099468821291, kernel: rbf, name: SVM, probability: True, random_state: 36, shrinking: False, tol: 0.04369377107358044}, sub: {k_neighbors: 2, kind: borderline-2, m_neighbors: 4, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	39	SVM	TomekLinks	Under resampling	0.8288

{classifier: {C: 157.54582326687355, coef0: 0.9516279094742264, degree: 2, gamma: scale, gamma_value: 2.5000184697658154, kernel: poly, name: SVM, probability: False, random_state: 39, shrinking: False, tol: 0.025168360631658265}, sub: {smo_grp: UNDER, type: TomekLinks}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	59	SVM	SMOTETomek	Combine resampling	0.8434

{classifier: {C: 33.78031236445637, coef0: 0.7493265079914884, degree: 2, gamma: scale, gamma_value: 2.136515862066533, kernel: poly, name: SVM, probability: True, random_state: 59, shrinking: False, tol: 0.08240900514591198}, sub: {random_state: 59, smo_grp: COMBINE, type: SMOTETomek}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	79	SVM	RandomOverSampler	Over resampling	0.8565

{classifier: {C: 7.801230781426841, coef0: -0.9401742443104519, degree: 4, gamma: auto, gamma_value: 7.993812742363991, kernel: rbf, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.036954761646811204}, sub: {random_state: 79, smo_grp: OVER, type: RandomOverSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	SVM	RandomOverSampler	Over resampling	0.8372

{classifier: {C: 25.396853593900108, coef0: 0.0890075039581999, degree: 3, gamma: auto, gamma_value: 4.385824511795294, kernel: rbf, name: SVM, probability: False, random_state: 90, shrinking: False, tol: 0.0465027305200106}, sub: {random_state: 90, smo_grp: OVER, type: RandomOverSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	109	SVM	RandomOverSampler	Over resampling	0.8614

{classifier: {C: 9.946729371649164, coef0: -0.7487563078401414, degree: 3, gamma: scale, gamma_value: 1.1062175499259805, kernel: rbf, name: SVM, probability: True, random_state: 109, shrinking: True, tol: 0.08964241512265896}, sub: {random_state: 109, smo_grp: OVER, type: RandomOverSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	9	SVM	OneSidedSelection	Under resampling	0.874

{classifier: {C: 19.173628823750022, coef0: 0.7399341007470008, degree: 3, gamma: scale, gamma_value: 5.4655957826573305, kernel: poly, name: SVM, probability: False, random_state: 9, shrinking: False, tol: 0.07677589467028181}, sub: {n_neighbors: 3, n_seeds_S: 17, random_state: 9, smo_grp: UNDER, type: OneSidedSelection}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	18	SVM	SMOTETomek	Combine resampling	0.8612

{classifier: {C: 12.768085505688656, coef0: -0.453770509986004, degree: 2, gamma: scale, gamma_value: 2.598461817109982, kernel: rbf, name: SVM, probability: False, random_state: 18, shrinking: False, tol: 0.04271439566227483}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTETomek}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	27	SVM	SVMSMOTE	Over resampling	0.8609

{classifier: {C: 5.731166426675977, coef0: -0.23558913507173665, degree: 4, gamma: auto, gamma_value: 2.127076257046763, kernel: rbf, name: SVM, probability: False, random_state: 27, shrinking: True, tol: 0.048046998665046234}, sub: {k_neighbors: 5, m_neighbors: 7, out_step: 0.046782376043304104, random_state: 27, smo_grp: OVER, type: SVMSMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	29	SVM	RandomUnderSampler	Under resampling	0.8603

{classifier: {C: 44.34708095681374, coef0: 0.8919317320296027, degree: 2, gamma: scale, gamma_value: 0.7213655626816293, kernel: poly, name: SVM, probability: False, random_state: 29, shrinking: False, tol: 0.053546805037016074}, sub: {random_state: 29, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	36	SVM	BorderlineSMOTE	Over resampling	0.8643

{classifier: {C: 16.079227794269283, coef0: 0.8280055708314797, degree: 2, gamma: scale, gamma_value: 7.473022697760765, kernel: poly, name: SVM, probability: False, random_state: 36, shrinking: True, tol: 0.0074365240772148525}, sub: {k_neighbors: 1, kind: borderline-2, m_neighbors: 7, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	39	SVM	ClusterCentroids	Under resampling	0.8584

{classifier: {C: 43.610523116876884, coef0: -0.21801303877676528, degree: 3, gamma: auto, gamma_value: 6.604766126969048, kernel: rbf, name: SVM, probability: False, random_state: 39, shrinking: True, tol: 0.02563186879812432}, sub: {estimator: MiniBatchKMeans, random_state: 39, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	59	SVM	RandomUnderSampler	Under resampling	0.8605

{classifier: {C: 77.06804819391388, coef0: 0.6845619484065346, degree: 2, gamma: scale, gamma_value: 1.4547658375882713, kernel: poly, name: SVM, probability: False, random_state: 59, shrinking: True, tol: 0.011905946261382026}, sub: {random_state: 59, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	79	SVM	RandomOverSampler	Over resampling	0.8695

{classifier: {C: 14.619179253154758, coef0: 0.7923102941730931, degree: 2, gamma: auto, gamma_value: 0.29419823301795583, kernel: rbf, name: SVM, probability: True, random_state: 79, shrinking: True, tol: 0.024187964885061877}, sub: {random_state: 79, smo_grp: OVER, type: RandomOverSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	90	SVM	SMOTE	Over resampling	0.8836

{classifier: {C: 5.39927036453945, coef0: 0.6846867406101356, degree: 3, gamma: auto, gamma_value: 1.1148125062855092, kernel: poly, name: SVM, probability: False, random_state: 90, shrinking: False, tol: 0.09039808695136453}, sub: {k_neighbors: 5, random_state: 90, smo_grp: OVER, type: SMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	109	SVM	ClusterCentroids	Under resampling	0.8658

{classifier: {C: 16.716573221480612, coef0: 0.5337093865077166, degree: 3, gamma: scale, gamma_value: 5.039464012412406, kernel: poly, name: SVM, probability: False, random_state: 109, shrinking: False, tol: 0.00038782764076021213}, sub: {estimator: MiniBatchKMeans, random_state: 109, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

TABLE S-15
"VEHICLE3"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	ADASYN	Over resampling	0.8124
Grid	18	SVM	ADASYN	Over resampling	0.8106
Grid	27	SVM	RandomOverSampler	Over resampling	0.8063
Grid	29	SVM	BorderlineSMOTE	Over resampling	0.81
Grid	36	SVM	SMOTE	Over resampling	0.8137
Grid	39	SVM	ADASYN	Over resampling	0.8154
Grid	59	SVM	ADASYN	Over resampling	0.8102
Grid	79	SVM	ADASYN	Over resampling	0.8116
Grid	90	SVM	BorderlineSMOTE	Over resampling	0.8116
Grid	109	SVM	RandomOverSampler	Over resampling	0.8064
Random	9	SVM	SMOTE	Over resampling	0.8211
{classifier: {C: 115.01385278275117, coef0: 0.07625101226447017, degree: 2, gamma: auto, gamma_value: 2.536514474038563, kernel: poly, name: SVM, probability: True, random_state: 9, shrinking: True, tol: 0.023375244132562787}, sub: {k_neighbors: 6, random_state: 9, smo_grp: OVER, type: SMOTE}}					
Random	18	SVM	EditedNearest Neighbours	Under resampling	0.8238
{classifier: {C: 187.9829236024165, coef0: -0.5345175953001926, degree: 2, gamma: auto, gamma_value: 1.7150019258674072, kernel: rbf, name: SVM, probability: False, random_state: 18, shrinking: True, tol: 0.07991025930301716}, sub: {kind_sel: all, n_neighbors: 4, smo_grp: UNDER, type: EditedNearestNeighbours}}					
Random	27	SVM	ADASYN	Over resampling	0.8353
{classifier: {C: 5.230745879472635, coef0: 0.1133419210936486, degree: 2, gamma: scale, gamma_value: 0.6039984805598337, kernel: poly, name: SVM, probability: False, random_state: 27, shrinking: False, tol: 0.024564596241323945}, sub: {n_neighbors: 3, random_state: 27, smo_grp: OVER, type: ADASYN}}					
Random	29	SVM	RandomOverSampler	Over resampling	0.8428
{classifier: {C: 28.381138235988487, coef0: 0.5129861926611614, degree: 2, gamma: auto, gamma_value: 4.354391098164566, kernel: poly, name: SVM, probability: False, random_state: 29, shrinking: False, tol: 0.029902965231229765}, sub: {random_state: 29, smo_grp: OVER, type: RandomOverSampler}}					
Random	36	SVM	SMOTE	Over resampling	0.8039
{classifier: {C: 146.1565657904602, coef0: 0.13405152246659235, degree: 2, gamma: auto, gamma_value: 6.595120466095489, kernel: poly, name: SVM, probability: False, random_state: 36, shrinking: False, tol: 0.08194517353704968}, sub: {k_neighbors: 3, random_state: 36, smo_grp: OVER, type: SMOTE}}					
Random	39	SVM	AllKNN	Under resampling	0.8186
{classifier: {C: 112.35942517040154, coef0: 0.9568815957072394, degree: 3, gamma: auto, gamma_value: 2.448317010579557, kernel: rbf, name: SVM, probability: False, random_state: 39, shrinking: True, tol: 0.041641397024663}, sub: {allow_minority: True, kind_sel: mode, n_neighbors: 5, smo_grp: UNDER, type: AllKNN}}					
Random	59	SVM	SMOTEENN	Combine resampling	0.8248
{classifier: {C: 150.07008750914366, coef0: 0.11949954670646146, degree: 2, gamma: scale, gamma_value: 6.975256166910008, kernel: poly, name: SVM, probability: False, random_state: 59, shrinking: False, tol: 0.05870080340829132}, sub: {random_state: 59, smo_grp: COMBINE, type: SMOTEENN}}					
Random	79	SVM	RandomOverSampler	Over resampling	0.809
{classifier: {C: 7.801230781426841, coef0: -0.9401742443104519, degree: 4, gamma: auto, gamma_value: 7.993812742363991, kernel: rbf, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.036954761646811204}, sub: {random_state: 79, smo_grp: OVER, type: RandomOverSampler}}					

TABLE S-15
"VEHICLE3" – CONTINUED FROM PREVIOUS COLUMN

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	SVM	ClusterCentroids	Under resampling	0.8243
{classifier: {C: 155.99742838390506, coef0: 0.9798509379078422, degree: 2, gamma: auto, gamma_value: 6.38676016936881, kernel: poly, name: SVM, probability: True, random_state: 90, shrinking: False, tol: 0.08016742589955095}, sub: {estimator: MiniBatchKMeans, random_state: 90, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
Random	109	SVM	SMOTEENN	Combine resampling	0.8278
{classifier: {C: 66.07091589976159, coef0: 0.30388678232033917, degree: 2, gamma: auto, gamma_value: 0.1183654520030403, kernel: poly, name: SVM, probability: True, random_state: 109, shrinking: False, tol: 0.01491577315249919}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	9	SVM	ClusterCentroids	Under resampling	0.8299
{classifier: {C: 16.87102392287053, coef0: -0.8141907644620539, degree: 2, gamma: auto, gamma_value: 6.863824998003427, kernel: rbf, name: SVM, probability: False, random_state: 9, shrinking: True, tol: 0.05098614631042014}, sub: {estimator: KMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
TPE	18	SVM	SMOTE	Over resampling	0.8504
{classifier: {C: 14.388528869968374, coef0: 0.20050314620630263, degree: 2, gamma: auto, gamma_value: 4.604388569413083, kernel: poly, name: SVM, probability: True, random_state: 18, shrinking: False, tol: 0.019592169418908647}, sub: {k_neighbors: 2, random_state: 18, smo_grp: OVER, type: SMOTE}}					
TPE	27	SVM	BorderlineSMOTE	Over resampling	0.8525
{classifier: {C: 55.56739093389544, coef0: 0.4411914281595733, degree: 2, gamma: value, gamma_value: 0.024036845094725867, kernel: poly, name: SVM, probability: False, random_state: 27, shrinking: True, tol: 0.062265681396424875}, sub: {k_neighbors: 1, kind: borderline-1, m_neighbors: 7, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	29	SVM	SMOTEENN	Combine resampling	0.8436
{classifier: {C: 89.9966430284435, coef0: 0.7983852810397156, degree: 2, gamma: auto, gamma_value: 6.553799217589195, kernel: poly, name: SVM, probability: True, random_state: 29, shrinking: False, tol: 0.03135337218508405}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	36	SVM	ADASYN	Over resampling	0.8584
{classifier: {C: 12.504519220398997, coef0: 0.24404828650060892, degree: 2, gamma: auto, gamma_value: 7.879175578523068, kernel: poly, name: SVM, probability: True, random_state: 36, shrinking: True, tol: 0.0965480273313113}, sub: {n_neighbors: 2, random_state: 36, smo_grp: OVER, type: ADASYN}}					
TPE	39	SVM	SMOTENC	Over resampling	0.8513
{classifier: {C: 12.258445766977756, coef0: 0.6866822240646469, degree: 2, gamma: scale, gamma_value: 1.05246413864904, kernel: poly, name: SVM, probability: False, random_state: 39, shrinking: False, tol: 0.030529021996935204}, sub: {categorical_features: True, k_neighbors: 2, random_state: 39, smo_grp: OVER, type: SMOTENC}}					
TPE	59	SVM	SMOTENC	Over resampling	0.8472
{classifier: {C: 17.431809442673345, coef0: 0.5647761651038182, degree: 2, gamma: auto, gamma_value: 7.264319595187864, kernel: poly, name: SVM, probability: False, random_state: 59, shrinking: True, tol: 0.007324173378245834}, sub: {categorical_features: True, k_neighbors: 9, random_state: 59, smo_grp: OVER, type: SMOTENC}}					
TPE	79	SVM	SMOTETomek	Combine resampling	0.8471
{classifier: {C: 9.108303487451996, coef0: 0.8146159830174203, degree: 2, gamma: scale, gamma_value: 7.341687380332827, kernel: poly, name: SVM, probability: False, random_state: 79, shrinking: False, tol: 0.004245236330874242}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	90	SVM	RandomOverSampler	Over resampling	0.8592
{classifier: {C: 6.977293498445895, coef0: 0.7913248779955301, degree: 2, gamma: auto, gamma_value: 6.479826447441846, kernel: poly, name: SVM, probability: False, random_state: 90, shrinking: True, tol: 0.05762033375939168}, sub: {random_state: 90, smo_grp: OVER, type: RandomOverSampler}}					
TPE	109	SVM	ClusterCentroids	Under resampling	0.8421
{classifier: {C: 174.60203246449476, coef0: 0.12464629443251601, degree: 2, gamma: auto, gamma_value: 7.614599623435601, kernel: poly, name: SVM, probability: True, random_state: 109, shrinking: True, tol: 0.06348289250381968}, sub: {estimator: MiniBatchKMeans, random_state: 109, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	DT	RepeatedEdited NearestNeighbours	Under resampling	0.9467
Grid	18	RF	RandomUnderSampler	Under resampling	0.953
Grid	27	DT	EditedNearest Neighbours	Under resampling	0.953
Grid	29	RF	RandomUnderSampler	Under resampling	0.953
Grid	36	DT	RepeatedEdited NearestNeighbours	Under resampling	0.9364
Grid	39	DT	SMOTEENN	Combine resampling	0.953
Grid	59	DT	SMOTEENN	Combine resampling	0.9429
Grid	79	RF	RepeatedEdited NearestNeighbours	Under resampling	0.9498
Grid	90	RF	RandomUnderSampler	Under resampling	0.9465
Grid	109	SVM	ADASYN	Over resampling	0.9489
Random	9	RF	Instance HardnessThreshold	Under resampling	0.9432
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 12, min_samples_split: 4, n_estimators: 88, name: RF, random_state: 9}, sub: {cv: 5, estimator: decision-tree, random_state: 9, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
Random	18	RF	ADASYN	Over resampling	0.9594
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 10, min_samples_split: 7, n_estimators: 104, name: RF, random_state: 18}, sub: {n_neighbors: 5, random_state: 18, smo_grp: OVER, type: ADASYN}}					
Random	27	RF	ADASYN	Over resampling	0.95
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 14, min_samples_split: 12, n_estimators: 87, name: RF, random_state: 27}, sub: {n_neighbors: 9, random_state: 27, smo_grp: OVER, type: ADASYN}}					
Random	29	RF	AllKNN	Under resampling	0.95
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 1, min_samples_split: 2, n_estimators: 17, name: RF, random_state: 29}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 16, smo_grp: UNDER, type: AllKNN}}					
Random	36	RF	BorderlineSMOTE	Over resampling	0.946
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 5, min_samples_split: 9, n_estimators: 115, name: RF, random_state: 36}, sub: {k_neighbors: 4, kind: borderline-2, m_neighbors: 9, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	39	RF	ADASYN	Over resampling	0.9421
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 4, min_samples_split: 9, n_estimators: 120, name: RF, random_state: 39}, sub: {n_neighbors: 7, random_state: 39, smo_grp: OVER, type: ADASYN}}					
Random	59	RF	RepeatedEdited NearestNeighbours	Under resampling	0.9465
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 4, n_estimators: 104, name: RF, random_state: 59}, sub: {kind_sel: all, n_neighbors: 5, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	79	RF	ADASYN	Over resampling	0.9562
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 3, min_samples_split: 19, n_estimators: 149, name: RF, random_state: 79}, sub: {n_neighbors: 7, random_state: 79, smo_grp: OVER, type: ADASYN}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	ADASYN	Over resampling	0.953
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 6, min_samples_split: 4, n_estimators: 122, name: RF, random_state: 90}, sub: {n_neighbors: 7, random_state: 90, smo_grp: OVER, type: ADASYN}}					
Random	109	RF	CondensedNearest Neighbour	Under resampling	0.9588
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 8, n_estimators: 62, name: RF, random_state: 109}, sub: {n_neighbors: 22, n_seeds_S: 27, random_state: 109, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	9	RF	SVMSMOTE	Over resampling	0.9498
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: sqrt, min_samples_leaf: 19, min_samples_split: 4, n_estimators: 77, name: RF, random_state: 9}, sub: {k_neighbors: 2, m_neighbors: 9, out_step: 0.8673084632496273, random_state: 9, smo_grp: OVER, type: SVMSMOTE}}					
TPE	18	RF	AllKNN	Under resampling	0.9498
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 3, min_samples_split: 10, n_estimators: 83, name: RF, random_state: 18}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 9, smo_grp: UNDER, type: AllKNN}}					
TPE	27	RF	ADASYN	Over resampling	0.9627
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 5, min_samples_split: 2, n_estimators: 34, name: RF, random_state: 27}, sub: {n_neighbors: 8, random_state: 27, smo_grp: OVER, type: ADASYN}}					
TPE	29	RF	BorderlineSMOTE	Over resampling	0.9594
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 8, min_samples_split: 4, n_estimators: 119, name: RF, random_state: 29}, sub: {k_neighbors: 7, kind: borderline-2, m_neighbors: 3, random_state: 29, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	36	RF	ADASYN	Over resampling	0.9626
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 10, n_estimators: 62, name: RF, random_state: 36}, sub: {n_neighbors: 5, random_state: 36, smo_grp: OVER, type: ADASYN}}					
TPE	39	RF	SMOTEENN	Combine resampling	0.953
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: None, min_samples_leaf: 2, min_samples_split: 3, n_estimators: 21, name: RF, random_state: 39}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	59	RF	CondensedNearest Neighbour	Under resampling	0.9594
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 9, n_estimators: 134, name: RF, random_state: 59}, sub: {n_neighbors: 2, n_seeds_S: 46, random_state: 59, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	79	DT	SMOTEENN	Combine resampling	0.9529
{classifier: {criterion: gini, max_depth: 12, max_features: log2, min_samples_leaf: 1, min_samples_split: 17, name: DTC, random_state: 79}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	90	RF	ADASYN	Over resampling	0.9595
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 4, min_samples_split: 4, n_estimators: 25, name: RF, random_state: 90}, sub: {n_neighbors: 3, random_state: 90, smo_grp: OVER, type: ADASYN}}					
TPE	109	RF	SMOTEENN	Combine resampling	0.9498
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 1, min_samples_split: 4, n_estimators: 134, name: RF, random_state: 109}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}					

TABLE S-17
"VEHICLE0"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	SMOTETomek	Combine resampling	0.978
Grid	18	SVM	SMOTENC	Over resampling	0.9772
Grid	27	SVM	SMOTE	Over resampling	0.9772
Grid	29	SVM	SMOTENC	Over resampling	0.9771
Grid	36	SVM	SMOTENC	Over resampling	0.9779
Grid	39	RF	ADASYN	Over resampling	0.9767
Grid	59	SVM	SVMSMOTE	Over resampling	0.9757
Grid	79	SVM	SMOTENC	Over resampling	0.978
Grid	90	SVM	SMOTE	Over resampling	0.9756
Grid	109	SVM	SVMSMOTE	Over resampling	0.9725
Random	9	SVM	SMOTETomek	Combine resampling	0.9769

{classifier: {C: 195.78664072053508, coef0: 0.6255693774611439, degree: 3, gamma: auto, gamma_value: 5.369845990506937, kernel: rbf, name: SVM, probability: True, random_state: 9, shrinking: True, tol: 0.059647939179874265}, sub: {random_state: 9, smo_grp: COMBINE, type: SMOTETomek}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	18	SVM	CondensedNearest Neighbour	Under resampling	0.9808

{classifier: {C: 65.80453124133993, coef0: 0.6632565165801838, degree: 2, gamma: scale, gamma_value: 3.597805279497578, kernel: rbf, name: SVM, probability: False, random_state: 18, shrinking: False, tol: 0.03549173074478728}, sub: {n_neighbors: 4, n_seeds_S: 25, random_state: 18, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| Random | 27 | SVM | ClusterCentroids | Under resampling | 0.9848 |

{classifier: {C: 71.66921041010797, coef0: -0.9997291102176713, degree: 2, gamma: scale, gamma_value: 3.6739305085754417, kernel: rbf, name: SVM, probability: False, random_state: 27, shrinking: True, tol: 0.004450978957569772}, sub: {estimator: MiniBatchKMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

| Random | 29 | SVM | SMOTE | Over resampling | 0.9821 |

{classifier: {C: 9.378334758825629, coef0: 0.3567418456468734, degree: 4, gamma: scale, gamma_value: 4.585575128370061, kernel: rbf, name: SVM, probability: False, random_state: 29, shrinking: False, tol: 0.028256310301937922}, sub: {k_neighbors: 2, random_state: 29, smo_grp: OVER, type: SMOTE}}

| Random | 36 | SVM | TomekLinks | Under resampling | 0.9796 |

{classifier: {C: 101.2787784936156, coef0: -0.29982973385031864, degree: 3, gamma: scale, gamma_value: 4.025922556592814, kernel: rbf, name: SVM, probability: True, random_state: 36, shrinking: True, tol: 0.022034983956257446}, sub: {smo_grp: UNDER, type: TomekLinks}}

| Random | 39 | SVM | KMeansSMOTE | Over resampling | 0.9798 |

{classifier: {C: 1.8982119313885093, coef0: 0.5712153546722254, degree: 3, gamma: auto, gamma_value: 6.573625187206937, kernel: poly, name: SVM, probability: False, random_state: 39, shrinking: True, tol: 0.07398227265014279}, sub: {cluster_balance_threshold: 0.38425620690221785, k_neighbors: 2, random_state: 39, smo_grp: OVER, type: KMeansSMOTE}}

| Random | 59 | SVM | TomekLinks | Under resampling | 0.9788 |

{classifier: {C: 28.463987933276915, coef0: 0.13042270580392157, degree: 3, gamma: auto, gamma_value: 2.407519954551295, kernel: rbf, name: SVM, probability: True, random_state: 59, shrinking: True, tol: 0.06296539213402995}, sub: {smo_grp: UNDER, type: TomekLinks}}

| Random | 79 | SVM | RandomOverSampler | Over resampling | 0.9831 |

{classifier: {C: 7.801230781426841, coef0: -0.9401742443104519, degree: 4, gamma: auto, gamma_value: 7.993812742363991, kernel: rbf, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.036954761646811204}, sub: {random_state: 79, smo_grp: OVER, type: RandomOverSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	SVM	OneSidedSelection	Under resampling	0.9813

{classifier: {C: 12.866337456402338, coef0: 0.5584943761887837, degree: 2, gamma: scale, gamma_value: 1.684811306384249, kernel: rbf, name: SVM, probability: False, random_state: 90, shrinking: True, tol: 0.01750925824148213}, sub: {n_neighbors: 19, n_seeds_S: 7, random_state: 90, smo_grp: UNDER, type: OneSidedSelection}}

| Random | 109 | SVM | RandomOverSampler | Over resampling | 0.9815 |

{classifier: {C: 9.946729371649164, coef0: -0.7487563078401414, degree: 3, gamma: scale, gamma_value: 1.1062175499259805, kernel: rbf, name: SVM, probability: True, random_state: 109, shrinking: True, tol: 0.08964241512265896}, sub: {random_state: 109, smo_grp: OVER, type: RandomOverSampler}}

| TPE | 9 | SVM | SMOTENC | Over resampling | 0.9871 |

{classifier: {C: 12.763129117122205, coef0: -0.6214115929127139, degree: 3, gamma: scale, gamma_value: 6.841103989125405, kernel: rbf, name: SVM, probability: True, random_state: 9, shrinking: False, tol: 0.08037223169166317}, sub: {categorical_features: True, k_neighbors: 8, random_state: 9, smo_grp: OVER, type: SMOTENC}}

| TPE | 18 | SVM | SVMSMOTE | Over resampling | 0.9888 |

{classifier: {C: 29.015677456946516, coef0: -0.5451284340253635, degree: 2, gamma: scale, gamma_value: 6.507259833918013, kernel: rbf, name: SVM, probability: False, random_state: 18, shrinking: False, tol: 0.0741659457711833}, sub: {k_neighbors: 3, m_neighbors: 3, out_step: 0.9740428002835999, random_state: 18, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 27 | SVM | ClusterCentroids | Under resampling | 0.9856 |

{classifier: {C: 46.887903319725766, coef0: 0.8147202170314983, degree: 2, gamma: auto, gamma_value: 5.140420081506767, kernel: rbf, name: SVM, probability: True, random_state: 27, shrinking: True, tol: 0.04887788574587452}, sub: {estimator: MiniBatchKMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

| TPE | 29 | SVM | SVMSMOTE | Over resampling | 0.9872 |

{classifier: {C: 40.352990102325165, coef0: 0.4815786302194765, degree: 3, gamma: scale, gamma_value: 3.017197197585807, kernel: rbf, name: SVM, probability: False, random_state: 29, shrinking: True, tol: 0.0920819797087162}, sub: {k_neighbors: 7, m_neighbors: 3, out_step: 0.591486754392182, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 36 | SVM | RandomOverSampler | Over resampling | 0.9856 |

{classifier: {C: 7.207111509898273, coef0: 0.8350492519257482, degree: 4, gamma: scale, gamma_value: 2.4544866554113076, kernel: rbf, name: SVM, probability: False, random_state: 36, shrinking: True, tol: 0.0701465190169247}, sub: {random_state: 36, smo_grp: OVER, type: RandomOverSampler}}

| TPE | 39 | SVM | SVMSMOTE | Over resampling | 0.985 |

{classifier: {C: 9.880742788963122, coef0: 0.644986090992779, degree: 2, gamma: auto, gamma_value: 1.2120439727350187, kernel: rbf, name: SVM, probability: True, random_state: 39, shrinking: False, tol: 0.07860610303635047}, sub: {k_neighbors: 7, m_neighbors: 3, out_step: 0.5701939587869904, random_state: 39, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 59 | SVM | TomekLinks | Under resampling | 0.9854 |

{classifier: {C: 13.747789248743937, coef0: 0.47377636731649614, degree: 3, gamma: scale, gamma_value: 1.1930260207496233, kernel: poly, name: SVM, probability: True, random_state: 59, shrinking: True, tol: 0.08415595386523772}, sub: {smo_grp: UNDER, type: TomekLinks}}

| TPE | 79 | SVM | SVMSMOTE | Over resampling | 0.9857 |

{classifier: {C: 10.440224870094994, coef0: -0.8726725497678783, degree: 3, gamma: scale, gamma_value: 2.632568459180909, kernel: rbf, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.07352794114451866}, sub: {k_neighbors: 6, m_neighbors: 3, out_step: 0.33276747379503774, random_state: 79, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 90 | SVM | SVMSMOTE | Over resampling | 0.989 |

{classifier: {C: 24.54880492902339, coef0: 0.9364816643111318, degree: 4, gamma: auto, gamma_value: 1.573034426297078, kernel: rbf, name: SVM, probability: False, random_state: 90, shrinking: False, tol: 0.00019425750097002217}, sub: {k_neighbors: 9, m_neighbors: 5, out_step: 0.5435568267562326, random_state: 90, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 109 | SVM | ClusterCentroids | Under resampling | 0.984 |

{classifier: {C: 21.698482877601926, coef0: 0.5644552391390437, degree: 2, gamma: auto, gamma_value: 3.1122979495459084, kernel: rbf, name: SVM, probability: True, random_state: 109, shrinking: False, tol: 0.07911412880738587}, sub: {estimator: KMeans, random_state: 109, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	RepeatedEdited NearestNeighbours	Under resampling	0.904
Grid	18	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8979
Grid	27	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8979
Grid	29	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8979
Grid	36	RF	AllKNN	Under resampling	0.902
Grid	39	RF	AllKNN	Under resampling	0.9
Grid	59	RF	AllKNN	Under resampling	0.9
Grid	79	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8979
Grid	90	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8979
Grid	109	RF	RepeatedEdited NearestNeighbours	Under resampling	0.904
Random	9	RF	TomekLinks	Under resampling	0.9015
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 16, min_samples_split: 18, n_estimators: 48, name: RF, random_state: 9}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	18	RF	Neighbourhood CleaningRule	Under resampling	0.8948
{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: sqrt, min_samples_leaf: 10, min_samples_split: 6, n_estimators: 6, name: RF, random_state: 18}, sub: {n_neighbors: 15, smo_grp: UNDER, threshold_cleaning: 0.7447132207721371, type: NeighbourhoodCleaningRule}}					
Random	27	RF	AllKNN	Under resampling	0.904
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 2, min_samples_split: 18, n_estimators: 43, name: RF, random_state: 27}, sub: {allow_minority: True, kind_sel: mode, n_neighbors: 14, smo_grp: UNDER, type: AllKNN}}					
Random	29	RF	AllKNN	Under resampling	0.8959
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 4, min_samples_split: 5, n_estimators: 142, name: RF, random_state: 29}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 8, smo_grp: UNDER, type: AllKNN}}					
Random	36	RF	AllKNN	Under resampling	0.8945
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 10, min_samples_split: 19, n_estimators: 81, name: RF, random_state: 36}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 11, smo_grp: UNDER, type: AllKNN}}					
Random	39	DT	CondensedNearest Neighbour	Under resampling	0.9001
{classifier: {criterion: entropy, max_depth: 2, max_features: sqrt, min_samples_leaf: 2, min_samples_split: 17, name: DTC, random_state: 39}, sub: {n_neighbors: 44, n_seeds_S: 12, random_state: 39, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
Random	59	RF	EditedNearest Neighbours	Under resampling	0.8925
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 19, min_samples_split: 3, n_estimators: 119, name: RF, random_state: 59}, sub: {kind_sel: all, n_neighbors: 12, smo_grp: UNDER, type: EditedNearestNeighbours}}					
Random	79	RF	ClusterCentroids	Under resampling	0.8899
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 11, min_samples_split: 5, n_estimators: 125, name: RF, random_state: 79}, sub: {estimator: KMeans, random_state: 79, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					

continued on the next column

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	Neighbourhood CleaningRule	Under resampling	0.8951
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 6, min_samples_split: 7, n_estimators: 120, name: RF, random_state: 90}, sub: {n_neighbors: 7, smo_grp: UNDER, threshold_cleaning: 0.5541770575378014, type: NeighbourhoodCleaningRule}}					
Random	109	RF	OneSidedSelection	Under resampling	0.8974
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 10, min_samples_split: 19, n_estimators: 5, name: RF, random_state: 109}, sub: {n_neighbors: 19, n_seeds_S: 6, random_state: 109, smo_grp: UNDER, type: OneSidedSelection}}					
TPE	9	RF	EditedNearest Neighbours	Under resampling	0.906
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 16, n_estimators: 48, name: RF, random_state: 9}, sub: {kind_sel: all, n_neighbors: 1, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	18	RF	RepeatedEdited NearestNeighbours	Under resampling	0.906
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 5, min_samples_split: 17, n_estimators: 30, name: RF, random_state: 18}, sub: {kind_sel: mode, n_neighbors: 8, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	27	RF	AllKNN	Under resampling	0.904
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 3, min_samples_split: 9, n_estimators: 44, name: RF, random_state: 27}, sub: {allow_minority: True, kind_sel: mode, n_neighbors: 13, smo_grp: UNDER, type: AllKNN}}					
TPE	29	RF	AllKNN	Under resampling	0.904
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 1, min_samples_split: 18, n_estimators: 54, name: RF, random_state: 29}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 8, smo_grp: UNDER, type: AllKNN}}					
TPE	36	RF	EditedNearest Neighbours	Under resampling	0.904
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 3, min_samples_split: 11, n_estimators: 36, name: RF, random_state: 36}, sub: {kind_sel: all, n_neighbors: 5, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	39	RF	CondensedNearest Neighbour	Under resampling	0.909
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 16, min_samples_split: 6, n_estimators: 105, name: RF, random_state: 39}, sub: {n_neighbors: 47, n_seeds_S: 5, random_state: 39, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
TPE	59	RF	AllKNN	Under resampling	0.906
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 6, min_samples_split: 14, n_estimators: 107, name: RF, random_state: 59}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 1, smo_grp: UNDER, type: AllKNN}}					
TPE	79	RF	ClusterCentroids	Under resampling	0.8994
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 15, min_samples_split: 3, n_estimators: 8, name: RF, random_state: 79}, sub: {estimator: KMeans, random_state: 79, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
TPE	90	RF	Neighbourhood CleaningRule	Under resampling	0.904
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 3, min_samples_split: 2, n_estimators: 52, name: RF, random_state: 90}, sub: {n_neighbors: 3, smo_grp: UNDER, threshold_cleaning: 0.4473362524854016, type: NeighbourhoodCleaningRule}}					
TPE	109	RF	RepeatedEdited NearestNeighbours	Under resampling	0.9048
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 2, min_samples_split: 4, n_estimators: 28, name: RF, random_state: 109}, sub: {kind_sel: all, n_neighbors: 2, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					

TABLE S-19
"NEW-THYROID1"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	SMOTE	Over resampling	0.9944
Grid	18	SVM	SMOTE	Over resampling	0.9944
Grid	27	SVM	SMOTE	Over resampling	0.9944
Grid	29	SVM	SMOTE	Over resampling	0.9944
Grid	36	SVM	SMOTE	Over resampling	0.9944
Grid	39	SVM	SMOTE	Over resampling	0.9944
Grid	59	SVM	SMOTE	Over resampling	0.9944
Grid	79	SVM	SMOTE	Over resampling	0.9944
Grid	90	SVM	SMOTE	Over resampling	0.9944
Grid	109	SVM	SMOTE	Over resampling	0.9944
Random	9	LR	SMOTENC	Over resampling	0.9944

{classifier: {C: 19.2546942836186, l1_ratio: 0.03617503016224583, name: LR, penalty_solver: l2+newton-cg, random_state: 9, tol: 0.029096464508344525}, sub: {categorical_features: True, k_neighbors: 1, random_state: 9, smo_grp: OVER, type: SMOTENC}}

Random	18	KNN	Instance HardnessThreshold	Under resampling	0.9972

{classifier: {algorithm: brute, n_neighbors: 22, name: KNN, p: 1, random_state: 18, weights: distance}, sub: {cv: 7, estimator: adaboost, random_state: 18, smo_grp: UNDER, type: InstanceHardnessThreshold}}

Random	27	RF	Instance HardnessThreshold	Under resampling	1.0

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 3, min_samples_split: 17, n_estimators: 67, name: RF, random_state: 27}, sub: {cv: 4, estimator: decision-tree, random_state: 27, smo_grp: UNDER, type: InstanceHardnessThreshold}}

Random	29	RF	OneSidedSelection	Under resampling	0.9944

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 9, min_samples_split: 16, n_estimators: 134, name: RF, random_state: 29}, sub: {n_neighbors: 1, n_seeds_S: 18, random_state: 29, smo_grp: UNDER, type: OneSidedSelection}}

Random	36	RF	AllKNN	Under resampling	0.9972

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 1, min_samples_split: 19, n_estimators: 142, name: RF, random_state: 36}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 18, smo_grp: UNDER, type: AllKNN}}

Random	39	SVM	RandomUnderSampler	Under resampling	0.9972

{classifier: {C: 118.27491871654843, coef0: -0.7013771573751213, degree: 4, gamma: scale, gamma_value: 7.553834176279271, kernel: sigmoid, name: SVM, probability: False, random_state: 39, shrinking: True, tol: 0.010200595741797599}, sub: {random_state: 39, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

Random	59	SVM	KMeansSMOTE	Over resampling	0.9972

{classifier: {C: 65.07402399123973, coef0: -0.9208479414355175, degree: 4, gamma: scale, gamma_value: 7.988911075763181, kernel: sigmoid, name: SVM, probability: False, random_state: 59, shrinking: False, tol: 0.04541002260639259}, sub: {cluster_balance_threshold: 0.7919138323869498, k_neighbors: 4, random_state: 59, smo_grp: OVER, type: KMeansSMOTE}}

Random	79	SVM	SMOTEENN	Combine resampling	0.9972

{classifier: {C: 57.49962942618902, coef0: -0.8984611943322356, degree: 4, gamma: auto, gamma_value: 4.476177611304981, kernel: sigmoid, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.025126604212062257}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTEENN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	AllKNN	Under resampling	0.9944

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 8, min_samples_split: 8, n_estimators: 19, name: RF, random_state: 90}, sub: {allow_minority: False, kind_sel: mode, n_neighbors: 17, smo_grp: UNDER, type: AllKNN}}

Random	109	SVM	BorderlineSMOTE	Over resampling	0.9972

{classifier: {C: 11.439169900812075, coef0: 0.38793838127194635, degree: 2, gamma: auto, gamma_value: 3.564363364031135, kernel: poly, name: SVM, probability: False, random_state: 109, shrinking: False, tol: 0.09248237128158954}, sub: {k_neighbors: 2, kind: borderline-1, m_neighbors: 3, random_state: 109, smo_grp: OVER, type: BorderlineSMOTE}}

TPE	9	LR	RandomOverSampler	Over resampling	0.9944

{classifier: {C: 35.49604968767363, l1_ratio: 0.8394654870401828, name: LR, penalty_solver: l2+sag, random_state: 9, tol: 0.015379601485652834}, sub: {random_state: 9, smo_grp: OVER, type: RandomOverSampler}}

TPE	18	SVM	SMOTENC	Over resampling	0.9972

{classifier: {C: 36.480995221748465, coef0: 0.551354346370921, degree: 4, gamma: scale, gamma_value: 2.517556708664174, kernel: rbf, name: SVM, probability: False, random_state: 18, shrinking: False, tol: 0.006591026869056189}, sub: {categorical_features: True, k_neighbors: 7, random_state: 18, smo_grp: OVER, type: SMOTENC}}

TPE	27	RF	Instance HardnessThreshold	Under resampling	0.9972

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 3, min_samples_split: 7, n_estimators: 76, name: RF, random_state: 27}, sub: {cv: 8, estimator: knn, random_state: 27, smo_grp: UNDER, type: InstanceHardnessThreshold}}

TPE	29	SVM	SVMSMOTE	Over resampling	0.9972

{classifier: {C: 60.85867708192562, coef0: -0.9117905771622428, degree: 4, gamma: value, gamma_value: 7.873497248644398, kernel: linear, name: SVM, probability: False, random_state: 29, shrinking: True, tol: 0.09403410347251911}, sub: {k_neighbors: 9, m_neighbors: 4, out_step: 0.9962299585700485, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}

TPE	36	RF	OneSidedSelection	Under resampling	1.0

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 13, min_samples_split: 17, n_estimators: 108, name: RF, random_state: 36}, sub: {n_neighbors: 12, n_seeds_S: 12, random_state: 36, smo_grp: UNDER, type: OneSidedSelection}}

TPE	39	SVM	Neighbourhood CleaningRule	Under resampling	0.9944

{classifier: {C: 189.82736477222, coef0: 0.7537278291600538, degree: 4, gamma: auto, gamma_value: 0.9973878196058544, kernel: linear, name: SVM, probability: True, random_state: 39, shrinking: False, tol: 0.080165475688721}, sub: {n_neighbors: 7, smo_grp: UNDER, threshold_cleaning: 0.43072590634086616, type: NeighbourhoodCleaningRule}}

TPE	59	SVM	Instance HardnessThreshold	Under resampling	0.9972

{classifier: {C: 66.4830011501743, coef0: -0.9747722572171734, degree: 2, gamma: auto, gamma_value: 5.582820161759245, kernel: sigmoid, name: SVM, probability: True, random_state: 59, shrinking: True, tol: 0.09298176317257457}, sub: {cv: 7, estimator: knn, random_state: 59, smo_grp: UNDER, type: InstanceHardnessThreshold}}

TPE	79	SVM	SMOTEENN	Combine resampling	0.9972

{classifier: {C: 86.83172244440834, coef0: -0.8969519564589864, degree: 2, gamma: auto, gamma_value: 7.869170990805236, kernel: sigmoid, name: SVM, probability: False, random_state: 79, shrinking: False, tol: 0.09924158206808104}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTEENN}}

TPE	90	RF	SMOTETomek	Combine resampling	0.9972

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 12, min_samples_split: 17, n_estimators: 68, name: RF, random_state: 90}, sub: {random_state: 90, smo_grp: COMBINE, type: SMOTETomek}}

TPE	109	SVM	SVMSMOTE	Over resampling	0.9972

{classifier: {C: 30.349264079525184, coef0: 0.5022539524484256, degree: 3, gamma: scale, gamma_value: 3.986075607291251, kernel: poly, name: SVM, probability: True, random_state: 109, shrinking: False, tol: 0.09016399718992194}, sub: {k_neighbors: 3, m_neighbors: 9, out_step: 0.8127730316556684, random_state: 109, smo_grp: OVER, type: SVMSMOTE}}

TABLE S-20
"NEW-THYROID2"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	NearMiss	Under resampling	0.9944
Grid	18	KNN	SVMSMOTE	Over resampling	0.9888
Grid	27	RF	RandomUnderSampler	Under resampling	0.9916
Grid	29	KNN	SVMSMOTE	Over resampling	0.9888
Grid	36	KNN	RandomOverSampler	Over resampling	0.9916
Grid	39	RF	RandomUnderSampler	Under resampling	0.9888
Grid	59	LR	SMOTEENN	Combine resampling	0.9916
Grid	79	KNN	SMOTE	Over resampling	0.9888
Grid	90	KNN	SMOTE	Over resampling	0.9916
Grid	109	RF	SVMSMOTE	Over resampling	0.9944
Random	9	SVM	CondensedNearest Neighbour	Under resampling	0.9944
{classifier: {C: 48.160159091821946, coef0: -0.8901924287398961, degree: 3, gamma: value, gamma_value: 0.4450234466376783, kernel: sigmoid, name: SVM, probability: True, random_state: 9, shrinking: True, tol: 0.0045398716664963625}, sub: {n_neighbors: 38, n_seeds_S: 29, random_state: 9, smo_grp: UNDER, type: CondensedNearestNeighbour}}				
Random	18	RF	EditedNearest Neighbours	Under resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 4, min_samples_split: 14, n_estimators: 73, name: RF, random_state: 18}, sub: {kind_sel: mode, n_neighbors: 1, smo_grp: UNDER, type: EditedNearestNeighbours}}				
Random	27	RF	AllKNN	Under resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 10, min_samples_split: 15, n_estimators: 69, name: RF, random_state: 27}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 2, smo_grp: UNDER, type: AllKNN}}				
Random	29	SVM	SVMSMOTE	Over resampling	0.9972
{classifier: {C: 95.89380549114401, coef0: -0.10957779614901764, degree: 3, gamma: auto, gamma_value: 2.6350645034694424, kernel: linear, name: SVM, probability: True, random_state: 29, shrinking: True, tol: 0.05135723142602328}, sub: {k_neighbors: 7, m_neighbors: 3, out_step: 0.7793234712092627, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}				
Random	36	RF	EditedNearest Neighbours	Under resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 11, min_samples_split: 6, n_estimators: 148, name: RF, random_state: 36}, sub: {kind_sel: mode, n_neighbors: 1, smo_grp: UNDER, type: EditedNearestNeighbours}}				
Random	39	SVM	SMOTEENN	Combine resampling	0.9972
{classifier: {C: 58.650617043484004, coef0: 0.2434941581477299, degree: 3, gamma: scale, gamma_value: 5.80789745146224, kernel: poly, name: SVM, probability: False, random_state: 39, shrinking: True, tol: 0.08444171512780263}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTEENN}}				
Random	59	LR	SMOTENC	Over resampling	0.9944
{classifier: {C: 6.2641586828950375, l1_ratio: 0.10534198740142142, name: LR, penalty_solver: l2+lbfgs, random_state: 59, tol: 0.05332642422202746}, sub: {categorical_features: True, k_neighbors: 2, random_state: 59, smo_grp: OVER, type: SMOTENC}}				
Random	79	RF	TomekLinks	Under resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 5, min_samples_split: 3, n_estimators: 99, name: RF, random_state: 79}, sub: {smo_grp: UNDER, type: TomekLinks}}				

TABLE S-20
"NEW-THYROID2" – CONTINUED FROM PREVIOUS COLUMN

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	SMOTE	Over resampling	0.9972
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 11, min_samples_split: 7, n_estimators: 27, name: RF, random_state: 90}, sub: {k_neighbors: 4, random_state: 90, smo_grp: OVER, type: SMOTE}}				
Random	109	RF	OneSidedSelection	Under resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 5, min_samples_split: 3, n_estimators: 97, name: RF, random_state: 109}, sub: {n_neighbors: 14, n_seeds_S: 3, random_state: 109, smo_grp: UNDER, type: OneSidedSelection}}				
TPE	9	RF	Neighbourhood CleaningRule	Under resampling	0.9972
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 4, min_samples_split: 5, n_estimators: 113, name: RF, random_state: 9}, sub: {n_neighbors: 3, smo_grp: UNDER, threshold_cleaning: 0.39639470399089943, type: NeighbourhoodCleaningRule}}				
TPE	18	RF	OneSidedSelection	Under resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 8, min_samples_split: 12, n_estimators: 129, name: RF, random_state: 18}, sub: {n_neighbors: 15, n_seeds_S: 6, random_state: 18, smo_grp: UNDER, type: OneSidedSelection}}				
TPE	27	RF	AllKNN	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 5, min_samples_split: 16, n_estimators: 30, name: RF, random_state: 27}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 8, smo_grp: UNDER, type: AllKNN}}				
TPE	29	RF	SMOTETomek	Combine resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 19, min_samples_split: 16, n_estimators: 25, name: RF, random_state: 29}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTETomek}}				
TPE	36	SVM	Neighbourhood CleaningRule	Under resampling	0.9972
{classifier: {C: 102.5082678217494, coef0: -0.35229390390472237, degree: 4, gamma: scale, gamma_value: 3.6324867847885463, kernel: sigmoid, name: SVM, probability: True, random_state: 36, shrinking: False, tol: 0.08910389648635615}, sub: {n_neighbors: 1, smo_grp: UNDER, threshold_cleaning: 0.29045053790620823, type: NeighbourhoodCleaningRule}}				
TPE	39	RF	SMOTE	Over resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 17, min_samples_split: 17, n_estimators: 109, name: RF, random_state: 39}, sub: {k_neighbors: 3, random_state: 39, smo_grp: OVER, type: SMOTE}}				
TPE	59	RF	AllKNN	Under resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 6, min_samples_split: 12, n_estimators: 116, name: RF, random_state: 59}, sub: {allow_minority: False, kind_sel: mode, n_neighbors: 18, smo_grp: UNDER, type: AllKNN}}				
TPE	79	RF	NearMiss	Under resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 10, min_samples_split: 17, n_estimators: 126, name: RF, random_state: 79}, sub: {n_neighbors: 5, n_neighbors_ver3: 19, smo_grp: UNDER, type: NearMiss, version: 1}}				
TPE	90	SVM	SMOTE	Over resampling	0.9972
{classifier: {C: 122.84121619938267, coef0: -0.9147529042522482, degree: 3, gamma: scale, gamma_value: 6.604627147334015, kernel: sigmoid, name: SVM, probability: True, random_state: 90, shrinking: False, tol: 0.05249769196797212}, sub: {k_neighbors: 4, random_state: 90, smo_grp: OVER, type: SMOTE}}				
TPE	109	RF	SMOTE	Over resampling	0.9972
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 10, n_estimators: 96, name: RF, random_state: 109}, sub: {k_neighbors: 8, random_state: 109, smo_grp: OVER, type: SMOTE}}				

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	KMeansSMOTE	Over resampling	0.9335
Grid	18	SVM	RandomOverSampler	Over resampling	0.9348
Grid	27	SVM	SMOTE	Over resampling	0.9365
Grid	29	SVM	SMOTE	Over resampling	0.9365
Grid	36	SVM	SMOTE	Over resampling	0.9365
Grid	39	SVM	SMOTEENN	Combine resampling	0.9348
Grid	59	SVM	SMOTETomek	Combine resampling	0.94
Grid	79	SVM	SMOTE	Over resampling	0.9382
Grid	90	SVM	SMOTE	Over resampling	0.9365
Grid	109	SVM	KMeansSMOTE	Over resampling	0.9336
Random	9	KNN	TomekLinks	Under resampling	0.932
{classifier: {algorithm: ball_tree, n_neighbors: 17, name: KNN, p: 15, random_state: 9, weights: distance}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	18	KNN	Instance HardnessThreshold	Under resampling	0.9335
{classifier: {algorithm: brute, n_neighbors: 32, name: KNN, p: 11, random_state: 18, weights: distance}, sub: {cv: 6, estimator: decision-tree, random_state: 18, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
Random	27	KNN	TomekLinks	Under resampling	0.9319
{classifier: {algorithm: ball_tree, n_neighbors: 23, name: KNN, p: 12, random_state: 27, weights: distance}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	29	KNN	TomekLinks	Under resampling	0.9305
{classifier: {algorithm: brute, n_neighbors: 14, name: KNN, p: 7, random_state: 29, weights: uniform}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	36	KNN	AllKNN	Under resampling	0.9337
{classifier: {algorithm: brute, n_neighbors: 24, name: KNN, p: 17, random_state: 36, weights: distance}, sub: {allow_minority: False, kind_sel: mode, n_neighbors: 5, smo_grp: UNDER, type: AllKNN}}					
Random	39	KNN	EditedNearest Neighbours	Under resampling	0.9369
{classifier: {algorithm: auto, n_neighbors: 30, name: KNN, p: 0, random_state: 39, weights: distance}, sub: {kind_sel: mode, n_neighbors: 16, smo_grp: UNDER, type: EditedNearestNeighbours}}					
Random	59	KNN	TomekLinks	Under resampling	0.9353
{classifier: {algorithm: ball_tree, n_neighbors: 26, name: KNN, p: 16, random_state: 59, weights: distance}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	79	KNN	EditedNearest Neighbours	Under resampling	0.9303
{classifier: {algorithm: brute, n_neighbors: 26, name: KNN, p: 7, random_state: 79, weights: distance}, sub: {kind_sel: mode, n_neighbors: 4, smo_grp: UNDER, type: EditedNearestNeighbours}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	KNN	TomekLinks	Under resampling	0.9369
{classifier: {algorithm: brute, n_neighbors: 29, name: KNN, p: 0, random_state: 90, weights: distance}, sub: {smo_grp: UNDER, type: TomekLinks}}					
Random	109	KNN	No resampling	No resampling	0.9353
{classifier: {algorithm: ball_tree, n_neighbors: 29, name: KNN, p: 14, random_state: 109, weights: distance}, sub: {smo_grp: NO, type: NO}}					
TPE	9	KNN	AllKNN	Under resampling	0.9369
{classifier: {algorithm: ball_tree, n_neighbors: 24, name: KNN, p: 0, random_state: 9, weights: uniform}, sub: {allow_minority: False, kind_sel: mode, n_neighbors: 17, smo_grp: UNDER, type: AllKNN}}					
TPE	18	KNN	EditedNearest Neighbours	Under resampling	0.9369
{classifier: {algorithm: ball_tree, n_neighbors: 29, name: KNN, p: 0, random_state: 18, weights: distance}, sub: {kind_sel: mode, n_neighbors: 9, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	27	KNN	TomekLinks	Under resampling	0.9369
{classifier: {algorithm: brute, n_neighbors: 12, name: KNN, p: 0, random_state: 27, weights: uniform}, sub: {smo_grp: UNDER, type: TomekLinks}}					
TPE	29	KNN	RepeatedEdited NearestNeighbours	Under resampling	0.9337
{classifier: {algorithm: auto, n_neighbors: 29, name: KNN, p: 17, random_state: 29, weights: distance}, sub: {kind_sel: mode, n_neighbors: 7, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	36	KNN	No resampling	No resampling	0.9337
{classifier: {algorithm: auto, n_neighbors: 15, name: KNN, p: 11, random_state: 36, weights: uniform}, sub: {smo_grp: NO, type: NO}}					
TPE	39	SVM	SMOTENC	Over resampling	0.94
{classifier: {C: 5.948693911444963, coef0: -0.9096602289896746, degree: 2, gamma: scale, gamma_value: 7.3290632829136655, kernel: rbf, name: SVM, probability: True, random_state: 39, shrinking: True, tol: 0.00019143351644126808}, sub: {categorical_features: True, k_neighbors: 9, random_state: 39, smo_grp: OVER, type: SMOTENC}}					
TPE	59	KNN	No resampling	No resampling	0.9353
{classifier: {algorithm: brute, n_neighbors: 16, name: KNN, p: 13, random_state: 59, weights: uniform}, sub: {smo_grp: NO, type: NO}}					
TPE	79	KNN	No resampling	No resampling	0.9353
{classifier: {algorithm: auto, n_neighbors: 12, name: KNN, p: 15, random_state: 79, weights: uniform}, sub: {smo_grp: NO, type: NO}}					
TPE	90	KNN	TomekLinks	Under resampling	0.9369
{classifier: {algorithm: brute, n_neighbors: 27, name: KNN, p: 0, random_state: 90, weights: distance}, sub: {smo_grp: UNDER, type: TomekLinks}}					
TPE	109	KNN	RepeatedEdited NearestNeighbours	Under resampling	0.9353
{classifier: {algorithm: kd_tree, n_neighbors: 27, name: KNN, p: 17, random_state: 109, weights: distance}, sub: {kind_sel: all, n_neighbors: 1, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					

TABLE S-22
"segment0"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	SVMSMOTE	Over resampling	0.9967
Grid	18	RF	BorderlineSMOTE	Over resampling	0.9959
Grid	27	RF	ADASYN	Over resampling	0.9975
Grid	29	RF	SVMSMOTE	Over resampling	0.9967
Grid	36	RF	SVMSMOTE	Over resampling	0.9965
Grid	39	RF	BorderlineSMOTE	Over resampling	0.9977
Grid	59	RF	BorderlineSMOTE	Over resampling	0.9962
Grid	79	LR	SVMSMOTE	Over resampling	0.9957
Grid	90	RF	SVMSMOTE	Over resampling	0.9965
Grid	109	RF	SVMSMOTE	Over resampling	0.9959
Random	9	SVM	SMOTE	Over resampling	0.9987
{classifier: {C: 115.01385278275117, coef0: 0.07625101226447017, degree: 2, gamma: auto, gamma_value: 2.536514474038563, kernel: poly, name: SVM, probability: True, random_state: 9, shrinking: True, tol: 0.023375244132562787}, sub: {k_neighbors: 6, random_state: 9, smo_grp: OVER, type: SMOTE}}
Random	18	SVM	SMOTE	Over resampling	0.999
{classifier: {C: 12.564677066598628, coef0: 0.6224476477780945, degree: 4, gamma: scale, gamma_value: 3.076791161982053, kernel: poly, name: SVM, probability: True, random_state: 18, shrinking: True, tol: 0.0053738212866635412}, sub: {k_neighbors: 2, random_state: 18, smo_grp: OVER, type: SMOTE}}
Random	27	LR	RandomOverSampler	Over resampling	0.999
{classifier: {C: 65.7676687656629, l1_ratio: 0.6593791318269705, name: LR, penalty_solver: l2+lbfgs, random_state: 27, tol: 0.018455121995032724}, sub: {random_state: 27, smo_grp: OVER, type: RandomOverSampler}}
Random	29	SVM	SMOTETomek	Combine resampling	0.9992
{classifier: {C: 23.90340553323731, coef0: -0.9702854316283962, degree: 4, gamma: value, gamma_value: 3.850581010284013, kernel: poly, name: SVM, probability: True, random_state: 29, shrinking: False, tol: 0.04695650278273037}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTETomek}}
Random	36	LR	SMOTENC	Over resampling	0.999
{classifier: {C: 96.64795014543228, l1_ratio: 0.670246297296362, name: LR, penalty_solver: l2+lbfgs, random_state: 36, tol: 0.06782998625960161}, sub: {categorical_features: True, k_neighbors: 2, random_state: 36, smo_grp: OVER, type: SMOTENC}}
Random	39	LR	RandomOverSampler	Over resampling	0.9992
{classifier: {C: 53.490775611401205, l1_ratio: 0.09545589802380705, name: LR, penalty_solver: l2+lbfgs, random_state: 39, tol: 0.08177730228843112}, sub: {random_state: 39, smo_grp: OVER, type: RandomOverSampler}}
Random	59	SVM	ADASYN	Over resampling	0.999
{classifier: {C: 45.11574393213028, coef0: -0.08412776813298128, degree: 2, gamma: scale, gamma_value: 3.0844517060163317, kernel: linear, name: SVM, probability: True, random_state: 59, shrinking: True, tol: 0.027635446466349512}, sub: {n_neighbors: 3, random_state: 59, smo_grp: OVER, type: ADASYN}}
Random	79	SVM	ADASYN	Over resampling	0.999
{classifier: {C: 64.36882101164771, coef0: 0.3207756732434728, degree: 3, gamma: auto, gamma_value: 0.29834138096852497, kernel: poly, name: SVM, probability: True, random_state: 79, shrinking: True, tol: 0.03376011552449215}, sub: {n_neighbors: 6, random_state: 79, smo_grp: OVER, type: ADASYN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	LR	SVMSMOTE	Over resampling	0.9987
{classifier: {C: 55.61057611907868, l1_ratio: 0.17385851971964494, name: LR, penalty_solver: l2+newton-cg, random_state: 90, tol: 0.010505207389819164}, sub: {k_neighbors: 8, m_neighbors: 1, out_step: 0.30099213095258226, random_state: 90, smo_grp: OVER, type: SVMSMOTE}}
Random	109	SVM	EditedNearest Neighbours	Under resampling	0.9995
{classifier: {C: 35.19416944269927, coef0: 0.713103618700079, degree: 3, gamma: auto, gamma_value: 5.876518879328954, kernel: poly, name: SVM, probability: False, random_state: 109, shrinking: False, tol: 0.0581200876862984}, sub: {kind_sel: all, n_neighbors: 6, smo_grp: UNDER, type: EditedNearestNeighbours}}
TPE	9	SVM	ClusterCentroids	Under resampling	0.9995
{classifier: {C: 14.062263850265587, coef0: 0.9124193166964846, degree: 3, gamma: scale, gamma_value: 7.997093581969811, kernel: poly, name: SVM, probability: False, random_state: 9, shrinking: True, tol: 0.018911405219056834}, sub: {estimator: KMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}
TPE	18	SVM	ADASYN	Over resampling	0.9992
{classifier: {C: 17.328672207123354, coef0: 0.3559904959284852, degree: 4, gamma: auto, gamma_value: 4.437523069690297, kernel: poly, name: SVM, probability: True, random_state: 18, shrinking: False, tol: 0.06733776510222393}, sub: {n_neighbors: 5, random_state: 18, smo_grp: OVER, type: ADASYN}}
TPE	27	LR	SMOTENC	Over resampling	0.9992
{classifier: {C: 70.31796612428597, l1_ratio: 0.444066928697584, name: LR, penalty_solver: l2+newton-cg, random_state: 27, tol: 0.09582654948265962}, sub: {categorical_features: True, k_neighbors: 1, random_state: 27, smo_grp: OVER, type: SMOTENC}}
TPE	29	SVM	EditedNearest Neighbours	Under resampling	0.9992
{classifier: {C: 146.33535726860575, coef0: 0.1403795795914932, degree: 2, gamma: scale, gamma_value: 4.1373654670683475, kernel: poly, name: SVM, probability: True, random_state: 29, shrinking: False, tol: 0.08847215532231173}, sub: {kind_sel: all, n_neighbors: 3, smo_grp: UNDER, type: EditedNearestNeighbours}}
TPE	36	SVM	BorderlineSMOTE	Over resampling	0.9992
{classifier: {C: 13.30259826852118, coef0: 0.6649736319816826, degree: 4, gamma: scale, gamma_value: 4.774632641066813, kernel: poly, name: SVM, probability: False, random_state: 36, shrinking: True, tol: 0.08134768561524852}, sub: {k_neighbors: 7, kind: borderline-1, m_neighbors: 6, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}
TPE	39	SVM	ADASYN	Over resampling	0.9992
{classifier: {C: 20.4357158073206, coef0: 0.7418779963989027, degree: 3, gamma: auto, gamma_value: 7.040689664152088, kernel: poly, name: SVM, probability: True, random_state: 39, shrinking: True, tol: 0.009711641473577459}, sub: {n_neighbors: 7, random_state: 39, smo_grp: OVER, type: ADASYN}}
TPE	59	SVM	SMOTENC	Over resampling	0.9992
{classifier: {C: 21.463171048113878, coef0: 0.7197009014882161, degree: 2, gamma: scale, gamma_value: 2.65705740926446, kernel: poly, name: SVM, probability: False, random_state: 59, shrinking: False, tol: 0.05593277995233277}, sub: {categorical_features: True, k_neighbors: 4, random_state: 59, smo_grp: OVER, type: SMOTENC}}
TPE	79	SVM	EditedNearest Neighbours	Under resampling	0.9992
{classifier: {C: 199.55101970997177, coef0: 0.6754667905642873, degree: 3, gamma: scale, gamma_value: 3.6413263600963375, kernel: poly, name: SVM, probability: False, random_state: 79, shrinking: True, tol: 0.08550290646200281}, sub: {kind_sel: all, n_neighbors: 4, smo_grp: UNDER, type: EditedNearestNeighbours}}
TPE	90	SVM	SVMSMOTE	Over resampling	0.9992
{classifier: {C: 40.26839780569037, coef0: -0.7789337522161955, degree: 3, gamma: auto, gamma_value: 1.501807752599459, kernel: rbf, name: SVM, probability: False, random_state: 90, shrinking: True, tol: 0.06740466260817714}, sub: {k_neighbors: 7, m_neighbors: 2, out_step: 0.9295873007559433, random_state: 90, smo_grp: OVER, type: SVMSMOTE}}
TPE	109	SVM	EditedNearest Neighbours	Under resampling	0.9995
{classifier: {C: 35.19416944269927, coef0: 0.713103618700079, degree: 3, gamma: auto, gamma_value: 5.876518879328954, kernel: poly, name: SVM, probability: False, random_state: 109, shrinking: False, tol: 0.0581200876862984}, sub: {kind_sel: all, n_neighbors: 6, smo_grp: UNDER, type: EditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	DT	TomekLinks	Under resampling	0.9327
Grid	18	RF	EditedNearest Neighbours	Under resampling	0.9404
Grid	27	RF	EditedNearest Neighbours	Under resampling	0.9377
Grid	29	RF	CondensedNearest Neighbour	Under resampling	0.9364
Grid	36	RF	RandomUnderSampler	Under resampling	0.9398
Grid	39	RF	OneSidedSelection	Under resampling	0.9432
Grid	59	DT	SVMSMOTE	Over resampling	0.9354
Grid	79	RF	TomekLinks	Under resampling	0.9377
Grid	90	RF	Neighbourhood CleaningRule	Under resampling	0.9377
Grid	109	RF	EditedNearest Neighbours	Under resampling	0.9404
Random	9	KNN	RandomUnderSampler	Under resampling	0.9569
{classifier: {algorithm: auto, n_neighbors: 37, name: KNN, p: 7, random_state: 9, weights: distance}, sub: {random_state: 9, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
Random	18	KNN	ClusterCentroids	Under resampling	0.9574
{classifier: {algorithm: auto, n_neighbors: 40, name: KNN, p: 12, random_state: 18, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 18, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	27	KNN	ClusterCentroids	Under resampling	0.9519
{classifier: {algorithm: kd_tree, n_neighbors: 34, name: KNN, p: 13, random_state: 27, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	29	KNN	ClusterCentroids	Under resampling	0.9716
{classifier: {algorithm: brute, n_neighbors: 27, name: KNN, p: 4, random_state: 29, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 29, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
Random	36	KNN	ClusterCentroids	Under resampling	0.9603
{classifier: {algorithm: brute, n_neighbors: 31, name: KNN, p: 8, random_state: 36, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 36, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	39	RF	Neighbourhood CleaningRule	Under resampling	0.9432
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 1, min_samples_split: 18, n_estimators: 13, name: RF, random_state: 39}, sub: {n_neighbors: 4, smo_grp: UNDER, threshold_cleaning: 0.7690210298756313, type: NeighbourhoodCleaningRule}}					
Random	59	RF	SVMSMOTE	Over resampling	0.9404
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 9, min_samples_split: 8, n_estimators: 93, name: RF, random_state: 59}, sub: {k_neighbors: 8, m_neighbors: 5, out_step: 0.031348356632264096, random_state: 59, smo_grp: OVER, type: SVMSMOTE}}					
Random	79	KNN	ClusterCentroids	Under resampling	0.9486
{classifier: {algorithm: ball_tree, n_neighbors: 32, name: KNN, p: 2, random_state: 79, weights: distance}, sub: {estimator: KMeans, random_state: 79, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	DT	SMOTENC	Over resampling	0.9433
{classifier: {criterion: gini, max_depth: 8, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 6, name: DTC, random_state: 90}, sub: {categorical_features: True, k_neighbors: 3, random_state: 90, smo_grp: OVER, type: SMOTENC}}					
Random	109	DT	RandomUnderSampler	Under resampling	0.9428
{classifier: {criterion: gini, max_depth: 8, max_features: log2, min_samples_leaf: 2, min_samples_split: 4, name: DTC, random_state: 109}, sub: {random_state: 109, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	9	KNN	ClusterCentroids	Under resampling	0.9688
{classifier: {algorithm: kd_tree, n_neighbors: 28, name: KNN, p: 10, random_state: 9, weights: distance}, sub: {estimator: KMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	18	KNN	ClusterCentroids	Under resampling	0.966
{classifier: {algorithm: ball_tree, n_neighbors: 30, name: KNN, p: 19, random_state: 18, weights: distance}, sub: {estimator: KMeans, random_state: 18, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	27	RF	RandomOverSampler	Over resampling	0.9432
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 8, n_estimators: 35, name: RF, random_state: 27}, sub: {random_state: 27, smo_grp: OVER, type: RandomOverSampler}}					
TPE	29	RF	ClusterCentroids	Under resampling	0.9432
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 6, n_estimators: 142, name: RF, random_state: 29}, sub: {estimator: KMeans, random_state: 29, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	36	KNN	ClusterCentroids	Under resampling	0.9661
{classifier: {algorithm: kd_tree, n_neighbors: 28, name: KNN, p: 12, random_state: 36, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 36, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	39	RF	EditedNearest Neighbours	Under resampling	0.9432
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 13, n_estimators: 65, name: RF, random_state: 39}, sub: {kind_sel: mode, n_neighbors: 10, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	59	RF	Neighbourhood CleaningRule	Under resampling	0.9404
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 19, n_estimators: 66, name: RF, random_state: 59}, sub: {n_neighbors: 16, smo_grp: UNDER, threshold_cleaning: 0.23287886649023412, type: NeighbourhoodCleaningRule}}					
TPE	79	DT	EditedNearest Neighbours	Under resampling	0.9409
{classifier: {criterion: entropy, max_depth: 17, max_features: None, min_samples_leaf: 2, min_samples_split: 11, name: DTC, random_state: 79}, sub: {kind_sel: mode, n_neighbors: 17, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	90	KNN	ClusterCentroids	Under resampling	0.9687
{classifier: {algorithm: brute, n_neighbors: 31, name: KNN, p: 9, random_state: 90, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 90, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	109	RF	SVMSMOTE	Over resampling	0.9432
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: sqrt, min_samples_leaf: 6, min_samples_split: 13, n_estimators: 69, name: RF, random_state: 109}, sub: {k_neighbors: 3, m_neighbors: 3, out_step: 0.24999244782630028, random_state: 109, smo_grp: OVER, type: SVMSMOTE}}					

TABLE S-24
"YEAST3"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	ClusterCentroids	Under resampling	0.9286
Grid	18	SVM	ClusterCentroids	Under resampling	0.9286
Grid	27	RF	SMOTEENN	Combine resampling	0.9287
Grid	29	SVM	ClusterCentroids	Under resampling	0.9294
Grid	36	RF	RandomUnderSampler	Under resampling	0.9307
Grid	39	SVM	ClusterCentroids	Under resampling	0.9245
Grid	59	SVM	ClusterCentroids	Under resampling	0.927
Grid	79	SVM	ClusterCentroids	Under resampling	0.9316
Grid	90	RF	RandomUnderSampler	Under resampling	0.9311
Grid	109	SVM	ClusterCentroids	Under resampling	0.9302
Random	9	DT	RandomUnderSampler	Under resampling	0.9353

{classifier: {criterion: entropy, max_depth: 2, max_features: None, min_samples_leaf: 4, min_samples_split: 6, name: DTC, random_state: 9}, sub: {random_state: 9, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	18	RF	ADASYN	Over resampling	0.9444

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 15, min_samples_split: 12, n_estimators: 55, name: RF, random_state: 18}, sub: {n_neighbors: 6, random_state: 18, smo_grp: OVER, type: ADASYN}}

| Random | 27 | RF | ADASYN | Over resampling | 0.9397 |

{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 15, min_samples_split: 12, n_estimators: 136, name: RF, random_state: 27}, sub: {n_neighbors: 5, random_state: 27, smo_grp: OVER, type: ADASYN}}

| Random | 29 | RF | ADASYN | Over resampling | 0.9432 |

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 13, min_samples_split: 2, n_estimators: 95, name: RF, random_state: 29}, sub: {n_neighbors: 4, random_state: 29, smo_grp: OVER, type: ADASYN}}

| Random | 36 | RF | SMOTETomek | Combine resampling | 0.9369 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 17, min_samples_split: 4, n_estimators: 15, name: RF, random_state: 36}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTETomek}}

| Random | 39 | RF | BorderlineSMOTE | Over resampling | 0.9402 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 10, min_samples_split: 10, n_estimators: 63, name: RF, random_state: 39}, sub: {k_neighbors: 7, kind: borderline-2, m_neighbors: 9, random_state: 39, smo_grp: OVER, type: BorderlineSMOTE}}

| Random | 59 | RF | ADASYN | Over resampling | 0.9401 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 19, min_samples_split: 8, n_estimators: 97, name: RF, random_state: 59}, sub: {n_neighbors: 8, random_state: 59, smo_grp: OVER, type: ADASYN}}

| Random | 79 | RF | ADASYN | Over resampling | 0.9378 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 7, n_estimators: 127, name: RF, random_state: 79}, sub: {n_neighbors: 8, random_state: 79, smo_grp: OVER, type: ADASYN}}

TABLE S-24
"YEAST3" − CONTINUED FROM PREVIOUS COLUMN

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	AllKNN	Under resampling	0.9363

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 19, min_samples_split: 4, n_estimators: 139, name: RF, random_state: 90}, sub: {allow_minority: True, kind_sel: mode, n_neighbors: 4, smo_grp: UNDER, type: AllKNN}}

| Random | 109 | RF | Neighbourhood CleaningRule | Under resampling | 0.941 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 14, min_samples_split: 15, n_estimators: 97, name: RF, random_state: 109}, sub: {n_neighbors: 2, smo_grp: UNDER, threshold_cleaning: 0.2578404119645694, type: NeighbourhoodCleaningRule}}

| TPE | 9 | RF | Instance HardnessThreshold | Under resampling | 0.9452 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 12, min_samples_split: 17, n_estimators: 148, name: RF, random_state: 9}, sub: {cv: 6, estimator: knn, random_state: 9, smo_grp: UNDER, type: InstanceHardnessThreshold}}

| TPE | 18 | RF | RandomUnderSampler | Under resampling | 0.9418 |

{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: None, min_samples_leaf: 5, min_samples_split: 3, n_estimators: 55, name: RF, random_state: 18}, sub: {random_state: 18, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}

| TPE | 27 | RF | SMOTEENN | Combine resampling | 0.9445 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 4, min_samples_split: 13, n_estimators: 14, name: RF, random_state: 27}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTEENN}}

| TPE | 29 | RF | SMOTEENN | Combine resampling | 0.9409 |

{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 10, min_samples_split: 7, n_estimators: 119, name: RF, random_state: 29}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTEENN}}

| TPE | 36 | RF | BorderlineSMOTE | Over resampling | 0.9455 |

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 8, min_samples_split: 13, n_estimators: 66, name: RF, random_state: 36}, sub: {k_neighbors: 6, kind: borderline-2, m_neighbors: 6, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}

| TPE | 39 | RF | ADASYN | Over resampling | 0.9425 |

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 17, min_samples_split: 16, n_estimators: 66, name: RF, random_state: 39}, sub: {n_neighbors: 5, random_state: 39, smo_grp: OVER, type: ADASYN}}

| TPE | 59 | RF | ADASYN | Over resampling | 0.9432 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 9, min_samples_split: 2, n_estimators: 13, name: RF, random_state: 59}, sub: {n_neighbors: 5, random_state: 59, smo_grp: OVER, type: ADASYN}}

| TPE | 79 | RF | RandomUnderSampler | Under resampling | 0.9447 |

{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 3, min_samples_split: 2, n_estimators: 72, name: RF, random_state: 79}, sub: {random_state: 79, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

| TPE | 90 | RF | SMOTEENN | Combine resampling | 0.9394 |

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 9, min_samples_split: 8, n_estimators: 148, name: RF, random_state: 90}, sub: {random_state: 90, smo_grp: COMBINE, type: SMOTEENN}}

| TPE | 109 | RF | EditedNearest Neighbours | Under resampling | 0.9406 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 8, min_samples_split: 15, n_estimators: 91, name: RF, random_state: 109}, sub: {kind_sel: all, n_neighbors: 5, smo_grp: UNDER, type: EditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	ClusterCentroids	Under resampling	0.9119
Grid	18	RF	RandomUnderSampler	Under resampling	0.9048
Grid	27	SVM	AllKNN	Under resampling	0.9034
Grid	29	SVM	AllKNN	Under resampling	0.9034
Grid	36	SVM	AllKNN	Under resampling	0.9034
Grid	39	SVM	AllKNN	Under resampling	0.9034
Grid	59	SVM	AllKNN	Under resampling	0.9034
Grid	79	SVM	AllKNN	Under resampling	0.9034
Grid	90	SVM	AllKNN	Under resampling	0.9034
Grid	109	SVM	AllKNN	Under resampling	0.9034
Random	9	KNN	Instance HardnessThreshold	Under resampling	0.9033
{classifier: {algorithm: kd_tree, n_neighbors: 25, name: KNN, p: 3, random_state: 9, weights: uniform}, sub: {cv: 7, estimator: knn, random_state: 9, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
Random	18	SVM	Neighbourhood CleaningRule	Under resampling	0.905
{classifier: {C: 20.31584877962912, coef0: -0.07360114591616918, degree: 2, gamma: value, gamma_value: 4.648489528361493, kernel: linear, name: SVM, probability: False, random_state: 18, shrinking: True, tol: 0.0038897861244040566}, sub: {n_neighbors: 12, smo_grp: UNDER, threshold_cleaning: 0.4705387865935655, type: NeighbourhoodCleaningRule}}					
Random	27	RF	ClusterCentroids	Under resampling	0.9017
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 4, min_samples_split: 7, n_estimators: 118, name: RF, random_state: 27}, sub: {estimator: KMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
Random	29	LR	SVMSMOTE	Over resampling	0.8998
{classifier: {C: 37.03018515356831, l1_ratio: 0.3895919488299791, name: LR, penalty_solver: none+lbfgs, random_state: 29, tol: 0.07725375523893797}, sub: {k_neighbors: 3, m_neighbors: 8, out_step: 0.20205889382477793, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}					
Random	36	KNN	BorderlineSMOTE	Over resampling	0.9022
{classifier: {algorithm: kd_tree, n_neighbors: 17, name: KNN, p: 16, random_state: 36, weights: uniform}, sub: {k_neighbors: 4, kind: borderline-1, m_neighbors: 3, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	39	LR	KMeansSMOTE	Over resampling	0.8996
{classifier: {C: 43.2906435494196, l1_ratio: 0.3989314382180151, name: LR, penalty_solver: l2+newton-cg, random_state: 39, tol: 0.011267331180967965}, sub: {cluster_balance_threshold: 0.3247795223180144, k_neighbors: 3, random_state: 39, smo_grp: OVER, type: KMeansSMOTE}}					
Random	59	RF	SMOTE	Over resampling	0.9086
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 7, n_estimators: 137, name: RF, random_state: 59}, sub: {k_neighbors: 9, random_state: 59, smo_grp: OVER, type: SMOTE}}					
Random	79	RF	SMOTE	Over resampling	0.9035
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 17, min_samples_split: 11, n_estimators: 64, name: RF, random_state: 79}, sub: {k_neighbors: 2, random_state: 79, smo_grp: OVER, type: SMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	LR	SVMSMOTE	Over resampling	0.9017
{classifier: {C: 39.31140224652814, l1_ratio: 0.7497819443826321, name: LR, penalty_solver: l2+lbfgs, random_state: 90, tol: 5.485801327818933e-05}, sub: {k_neighbors: 4, m_neighbors: 5, out_step: 0.29230798832274174, random_state: 90, smo_grp: OVER, type: SVMSMOTE}}					
Random	109	KNN	Instance HardnessThreshold	Under resampling	0.8979
{classifier: {algorithm: auto, n_neighbors: 25, name: KNN, p: 1, random_state: 109, weights: uniform}, sub: {cv: 4, estimator: knn, random_state: 109, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
TPE	9	LR	SVMSMOTE	Over resampling	0.9049
{classifier: {C: 85.67513176463702, l1_ratio: 0.29330500489393047, name: LR, penalty_solver: none+newton-cg, random_state: 9, tol: 0.0818413217643173}, sub: {k_neighbors: 1, m_neighbors: 5, out_step: 0.8152051901261064, random_state: 9, smo_grp: OVER, type: SVMSMOTE}}					
TPE	18	RF	SMOTETomek	Combine resampling	0.9171
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 8, min_samples_split: 13, n_estimators: 46, name: RF, random_state: 18}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	27	LR	SVMSMOTE	Over resampling	0.9035
{classifier: {C: 69.65782003621429, l1_ratio: 0.8552698328802459, name: LR, penalty_solver: l2+lbfgs, random_state: 27, tol: 0.08165808432863733}, sub: {k_neighbors: 4, m_neighbors: 4, out_step: 0.286501346742171, random_state: 27, smo_grp: OVER, type: SVMSMOTE}}					
TPE	29	LR	SVMSMOTE	Over resampling	0.905
{classifier: {C: 37.3989699683583, l1_ratio: 0.3976255540817645, name: LR, penalty_solver: none+newton-cg, random_state: 29, tol: 0.0935677794550107}, sub: {k_neighbors: 5, m_neighbors: 4, out_step: 0.7569467367641128, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}					
TPE	36	LR	SVMSMOTE	Over resampling	0.9067
{classifier: {C: 75.69705127052599, l1_ratio: 0.574230825083061, name: LR, penalty_solver: l2+newton-cg, random_state: 36, tol: 0.025760343952625567}, sub: {k_neighbors: 8, m_neighbors: 4, out_step: 0.7715419227435837, random_state: 36, smo_grp: OVER, type: SVMSMOTE}}					
TPE	39	LR	SVMSMOTE	Over resampling	0.9032
{classifier: {C: 96.66709681127165, l1_ratio: 0.9486223327382934, name: LR, penalty_solver: none+lbfgs, random_state: 39, tol: 0.012776638398823759}, sub: {k_neighbors: 3, m_neighbors: 4, out_step: 0.5984854067416396, random_state: 39, smo_grp: OVER, type: SVMSMOTE}}					
TPE	59	RF	SMOTE	Over resampling	0.9121
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 8, min_samples_split: 19, n_estimators: 52, name: RF, random_state: 59}, sub: {k_neighbors: 5, random_state: 59, smo_grp: OVER, type: SMOTE}}					
TPE	79	LR	SVMSMOTE	Over resampling	0.9036
{classifier: {C: 21.45948981188397, l1_ratio: 0.5287544899867095, name: LR, penalty_solver: none+newton-cg, random_state: 79, tol: 0.0840388838647985}, sub: {k_neighbors: 5, m_neighbors: 7, out_step: 0.20059782265360054, random_state: 79, smo_grp: OVER, type: SVMSMOTE}}					
TPE	90	RF	ADASYN	Over resampling	0.9
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: 1, min_samples_leaf: 14, min_samples_split: 4, n_estimators: 142, name: RF, random_state: 90}, sub: {n_neighbors: 4, random_state: 90, smo_grp: OVER, type: ADASYN}}					
TPE	109	LR	SVMSMOTE	Over resampling	0.9049
{classifier: {C: 34.380362014182275, l1_ratio: 0.8320092804375266, name: LR, penalty_solver: l2+newton-cg, random_state: 109, tol: 0.01720514659398221}, sub: {k_neighbors: 7, m_neighbors: 6, out_step: 0.7075706363858056, random_state: 109, smo_grp: OVER, type: SVMSMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	Instance HardnessThreshold	Under resampling	0.9356
Grid	18	RF	Instance HardnessThreshold	Under resampling	0.9395
Grid	27	RF	Instance HardnessThreshold	Under resampling	0.935
Grid	29	RF	Instance HardnessThreshold	Under resampling	0.9385
Grid	36	RF	RandomUnderSampler	Under resampling	0.941
Grid	39	RF	RandomUnderSampler	Under resampling	0.9477
Grid	59	RF	RandomUnderSampler	Under resampling	0.942
Grid	79	RF	RandomUnderSampler	Under resampling	0.9425
Grid	90	RF	Instance HardnessThreshold	Under resampling	0.9412
Grid	109	RF	Instance HardnessThreshold	Under resampling	0.9384
Random	9	RF	ADASYN	Over resampling	0.9425
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 19, min_samples_split: 10, n_estimators: 128, name: RF, random_state: 9}, sub: {n_neighbors: 6, random_state: 9, smo_grp: OVER, type: ADASYN}}				
Random	18	RF	ADASYN	Over resampling	0.9413
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 13, min_samples_split: 14, n_estimators: 108, name: RF, random_state: 18}, sub: {n_neighbors: 8, random_state: 18, smo_grp: OVER, type: ADASYN}}				
Random	27	RF	ADASYN	Over resampling	0.9434
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 14, min_samples_split: 12, n_estimators: 87, name: RF, random_state: 27}, sub: {n_neighbors: 9, random_state: 27, smo_grp: OVER, type: ADASYN}}				
Random	29	RF	Neighbourhood CleaningRule	Under resampling	0.9407
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 19, min_samples_split: 19, n_estimators: 41, name: RF, random_state: 29}, sub: {n_neighbors: 10, smo_grp: UNDER, threshold_cleaning: 0.13520644048542885, type: NeighbourhoodCleaningRule}}				
Random	36	RF	AllKNN	Under resampling	0.9418
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 10, min_samples_split: 19, n_estimators: 81, name: RF, random_state: 36}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 11, smo_grp: UNDER, type: AllKNN}}				
Random	39	RF	RandomUnderSampler	Under resampling	0.9416
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 1, min_samples_split: 15, n_estimators: 134, name: RF, random_state: 39}, sub: {random_state: 39, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}				
Random	59	RF	Neighbourhood CleaningRule	Under resampling	0.9407
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 9, min_samples_split: 4, n_estimators: 79, name: RF, random_state: 59}, sub: {n_neighbors: 7, smo_grp: UNDER, threshold_cleaning: 0.7668093596046256, type: NeighbourhoodCleaningRule}}				
Random	79	RF	EditedNearest Neighbours	Under resampling	0.9433
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 3, min_samples_split: 17, n_estimators: 78, name: RF, random_state: 79}, sub: {kind_sel: all, n_neighbors: 18, smo_grp: UNDER, type: EditedNearestNeighbours}}				

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	Neighbourhood CleaningRule	Under resampling	0.9426
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 8, min_samples_split: 9, n_estimators: 85, name: RF, random_state: 90}, sub: {n_neighbors: 11, smo_grp: UNDER, threshold_cleaning: 0.4904103123812551, type: NeighbourhoodCleaningRule}}				
Random	109	RF	ADASYN	Over resampling	0.944
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 15, min_samples_split: 3, n_estimators: 116, name: RF, random_state: 109}, sub: {n_neighbors: 3, random_state: 109, smo_grp: OVER, type: ADASYN}}				
TPE	9	RF	Neighbourhood CleaningRule	Under resampling	0.9437
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 5, n_estimators: 103, name: RF, random_state: 9}, sub: {n_neighbors: 15, smo_grp: UNDER, threshold_cleaning: 0.39852597553586067, type: NeighbourhoodCleaningRule}}				
TPE	18	RF	RandomUnderSampler	Under resampling	0.9415
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 1, min_samples_split: 9, n_estimators: 122, name: RF, random_state: 18}, sub: {random_state: 18, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}				
TPE	27	RF	AllKNN	Under resampling	0.9433
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 19, min_samples_split: 3, n_estimators: 27, name: RF, random_state: 27}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 10, smo_grp: UNDER, type: AllKNN}}				
TPE	29	RF	Neighbourhood CleaningRule	Under resampling	0.9457
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 9, n_estimators: 55, name: RF, random_state: 29}, sub: {n_neighbors: 12, smo_grp: UNDER, threshold_cleaning: 0.30370440463541265, type: NeighbourhoodCleaningRule}}				
TPE	36	RF	AllKNN	Under resampling	0.9475
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 11, n_estimators: 114, name: RF, random_state: 36}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 15, smo_grp: UNDER, type: AllKNN}}				
TPE	39	RF	AllKNN	Under resampling	0.9484
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 5, min_samples_split: 12, n_estimators: 76, name: RF, random_state: 39}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 11, smo_grp: UNDER, type: AllKNN}}				
TPE	59	RF	RepeatedEdited NearestNeighbours	Under resampling	0.9487
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 7, min_samples_split: 8, n_estimators: 133, name: RF, random_state: 59}, sub: {kind_sel: all, n_neighbors: 8, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}				
TPE	79	RF	Neighbourhood CleaningRule	Under resampling	0.9461
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 8, min_samples_split: 4, n_estimators: 131, name: RF, random_state: 79}, sub: {n_neighbors: 17, smo_grp: UNDER, threshold_cleaning: 0.30255295015831085, type: NeighbourhoodCleaningRule}}				
TPE	90	RF	ADASYN	Over resampling	0.9461
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 17, min_samples_split: 6, n_estimators: 121, name: RF, random_state: 90}, sub: {n_neighbors: 9, random_state: 90, smo_grp: OVER, type: ADASYN}}				
TPE	109	RF	Neighbourhood CleaningRule	Under resampling	0.9456
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 7, min_samples_split: 18, n_estimators: 38, name: RF, random_state: 109}, sub: {n_neighbors: 12, smo_grp: UNDER, threshold_cleaning: 0.521833520183619, type: NeighbourhoodCleaningRule}}				

TABLE S-27
"YEAST-2_VS_4"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	DT	Instance HardnessThreshold	Under resampling	0.9442
Grid	18	DT	Instance HardnessThreshold	Under resampling	0.9279
Grid	27	DT	ClusterCentroids	Under resampling	0.9383
Grid	29	DT	Neighbourhood CleaningRule	Under resampling	0.9393
Grid	36	DT	Instance HardnessThreshold	Under resampling	0.9477
Grid	39	RF	RandomUnderSampler	Under resampling	0.9396
Grid	59	RF	RandomUnderSampler	Under resampling	0.9344
Grid	79	DT	Instance HardnessThreshold	Under resampling	0.9392
Grid	90	DT	Instance HardnessThreshold	Under resampling	0.9557
Grid	109	RF	ClusterCentroids	Under resampling	0.935
Random	9	RF	CondensedNearest Neighbour	Under resampling	0.949
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 3, n_estimators: 23, name: RF, random_state: 9}, sub: {n_neighbors: 46, n_seeds_S: 37, random_state: 9, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
Random	18	RF	SMOTEENN	Combine resampling	0.9455
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 18, min_samples_split: 2, n_estimators: 79, name: RF, random_state: 18}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTEENN}}					
Random	27	DT	Neighbourhood CleaningRule	Under resampling	0.9499
{classifier: {criterion: entropy, max_depth: 13, max_features: None, min_samples_leaf: 3, min_samples_split: 17, name: DTC, random_state: 27}, sub: {n_neighbors: 13, smo_grp: UNDER, threshold_cleaning: 0.16674445185232178, type: NeighbourhoodCleaningRule}}					
Random	29	RF	RepeatedEdited NearestNeighbours	Under resampling	0.9488
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 2, min_samples_split: 5, n_estimators: 60, name: RF, random_state: 29}, sub: {kind_sel: all, n_neighbors: 11, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	36	RF	RandomUnderSampler	Under resampling	0.95
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 11, n_estimators: 62, name: RF, random_state: 36}, sub: {random_state: 36, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
Random	39	DT	RandomUnderSampler	Under resampling	0.9535
{classifier: {criterion: gini, max_depth: 11, max_features: None, min_samples_leaf: 7, min_samples_split: 17, name: DTC, random_state: 39}, sub: {random_state: 39, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}					
Random	59	DT	RepeatedEdited NearestNeighbours	Under resampling	0.9533
{classifier: {criterion: entropy, max_depth: 17, max_features: None, min_samples_leaf: 8, min_samples_split: 12, name: DTC, random_state: 59}, sub: {kind_sel: all, n_neighbors: 14, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	79	DT	CondensedNearest Neighbour	Under resampling	0.9416
{classifier: {criterion: gini, max_depth: 8, max_features: None, min_samples_leaf: 11, min_samples_split: 11, name: DTC, random_state: 79}, sub: {n_neighbors: 31, n_seeds_S: 47, random_state: 79, smo_grp: UNDER, type: CondensedNearestNeighbour}}					

TABLE S-27
"YEAST-2_VS_4" – CONTINUED FROM PREVIOUS COLUMN

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	Instance HardnessThreshold	Under resampling	0.9403
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 5, min_samples_split: 16, n_estimators: 130, name: RF, random_state: 90}, sub: {cv: 2, estimator: gradient-boosting, random_state: 90, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
Random	109	DT	Instance HardnessThreshold	Under resampling	0.9419
{classifier: {criterion: gini, max_depth: 13, max_features: log2, min_samples_leaf: 5, min_samples_split: 2, name: DTC, random_state: 109}, sub: {cv: 6, estimator: gradient-boosting, random_state: 109, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
TPE	9	RF	RepeatedEdited NearestNeighbours	Under resampling	0.9692
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 2, min_samples_split: 2, n_estimators: 69, name: RF, random_state: 9}, sub: {kind_sel: all, n_neighbors: 12, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	18	RF	SMOTE	Over resampling	0.9477
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: None, min_samples_leaf: 18, min_samples_split: 2, n_estimators: 143, name: RF, random_state: 18}, sub: {k_neighbors: 7, random_state: 18, smo_grp: OVER, type: SMOTE}}					
TPE	27	DT	Neighbourhood CleaningRule	Under resampling	0.951
{classifier: {criterion: entropy, max_depth: 14, max_features: None, min_samples_leaf: 6, min_samples_split: 17, name: DTC, random_state: 27}, sub: {n_neighbors: 9, smo_grp: UNDER, threshold_cleaning: 0.6411390082502698, type: NeighbourhoodCleaningRule}}					
TPE	29	RF	RandomUnderSampler	Under resampling	0.9489
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 8, min_samples_split: 16, n_estimators: 79, name: RF, random_state: 29}, sub: {random_state: 29, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	36	RF	Instance HardnessThreshold	Under resampling	0.9601
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 18, min_samples_split: 17, n_estimators: 38, name: RF, random_state: 36}, sub: {cv: 3, estimator: decision-tree, random_state: 36, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
TPE	39	RF	RandomUnderSampler	Under resampling	0.9535
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 6, min_samples_split: 16, n_estimators: 136, name: RF, random_state: 39}, sub: {random_state: 39, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	59	RF	TomekLinks	Under resampling	0.9621
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 11, min_samples_split: 6, n_estimators: 43, name: RF, random_state: 59}, sub: {smo_grp: UNDER, type: TomekLinks}}					
TPE	79	RF	No resampling	No resampling	0.9564
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 12, min_samples_split: 10, n_estimators: 110, name: RF, random_state: 79}, sub: {smo_grp: NO, type: NO}}					
TPE	90	RF	AllKNN	Under resampling	0.9582
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: None, min_samples_leaf: 1, min_samples_split: 7, n_estimators: 3, name: RF, random_state: 90}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 13, smo_grp: UNDER, type: AllKNN}}					
TPE	109	RF	Instance HardnessThreshold	Under resampling	0.9521
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 8, min_samples_split: 10, n_estimators: 68, name: RF, random_state: 109}, sub: {cv: 8, estimator: knn, random_state: 109, smo_grp: UNDER, type: InstanceHardnessThreshold}}					

TABLE S-28
"YEAST-0-5-6-7-9_VS_4"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	Instance HardnessThreshold	Under resampling	0.7876
Grid	18	SVM	RandomUnderSampler	Under resampling	0.7797
Grid	27	DT	SMOTEENN	Combine resampling	0.7928
Grid	29	RF	SMOTEENN	Combine resampling	0.7698
Grid	36	RF	RandomUnderSampler	Under resampling	0.8077
Grid	39	RF	RandomUnderSampler	Under resampling	0.8242
Grid	59	RF	SMOTEENN	Combine resampling	0.7975
Grid	79	RF	RandomUnderSampler	Under resampling	0.7967
Grid	90	RF	RandomUnderSampler	Under resampling	0.7921
Grid	109	DT	RandomUnderSampler	Under resampling	0.7901
Random	9	RF	AllKNN	Under resampling	0.8084
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 5, min_samples_split: 13, n_estimators: 90, name: RF, random_state: 9}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 5, smo_grp: UNDER, type: AllKNN}}					
Random	18	RF	SMOTEENN	Combine resampling	0.8202
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 7, n_estimators: 18, name: RF, random_state: 18}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTEENN}}					
Random	27	DT	SMOTETomek	Combine resampling	0.7982
{classifier: {criterion: gini, max_depth: 18, max_features: None, min_samples_leaf: 9, min_samples_split: 15, name: DTC, random_state: 27}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTETomek}}					
Random	29	RF	Neighbourhood CleaningRule	Under resampling	0.8234
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 13, min_samples_split: 17, n_estimators: 21, name: RF, random_state: 29}, sub: {n_neighbors: 11, smo_grp: UNDER, threshold_cleaning: 0.5280623036986037, type: NeighbourhoodCleaningRule}}					
Random	36	SVM	Neighbourhood CleaningRule	Under resampling	0.7962
{classifier: {C: 172.16355552677487, coef0: 0.9595051783537512, degree: 4, gamma: value, gamma_value: 1.862279098923641, kernel: linear, name: SVM, probability: True, random_state: 36, shrinking: False, tol: 0.05163619207662601}, sub: {n_neighbors: 13, smo_grp: UNDER, threshold_cleaning: 0.3271424565033806, type: NeighbourhoodCleaningRule}}					
Random	39	DT	ClusterCentroids	Under resampling	0.8102
{classifier: {criterion: entropy, max_depth: 19, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 11, name: DTC, random_state: 39}, sub: {estimator: KMeans, random_state: 39, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	59	RF	Neighbourhood CleaningRule	Under resampling	0.8011
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 10, min_samples_split: 8, n_estimators: 146, name: RF, random_state: 59}, sub: {n_neighbors: 19, smo_grp: UNDER, threshold_cleaning: 0.16449237420215534, type: NeighbourhoodCleaningRule}}					
Random	79	RF	EditedNearest Neighbours	Under resampling	0.8012
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 12, min_samples_split: 5, n_estimators: 129, name: RF, random_state: 79}, sub: {kind_sel: all, n_neighbors: 19, smo_grp: UNDER, type: EditedNearestNeighbours}}					

continued on the next column

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	ClusterCentroids	Under resampling	0.7977
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 9, min_samples_split: 9, n_estimators: 120, name: RF, random_state: 90}, sub: {estimator: KMeans, random_state: 90, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	109	LR	Neighbourhood CleaningRule	Under resampling	0.806
{classifier: {C: 40.189127656411635, l1_ratio: 0.5887814659672886, name: LR, penalty_solver: l2+lbfgs, random_state: 109, tol: 0.09126062635234855}, sub: {n_neighbors: 13, smo_grp: UNDER, threshold_cleaning: 0.7428442213924005, type: NeighbourhoodCleaningRule}}					
TPE	9	RF	Neighbourhood CleaningRule	Under resampling	0.8175
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 12, min_samples_split: 18, n_estimators: 95, name: RF, random_state: 9}, sub: {n_neighbors: 5, smo_grp: UNDER, threshold_cleaning: 0.4886035872872093, type: NeighbourhoodCleaningRule}}					
TPE	18	RF	AllKNN	Under resampling	0.8296
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 2, min_samples_split: 16, n_estimators: 112, name: RF, random_state: 18}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 6, smo_grp: UNDER, type: AllKNN}}					
TPE	27	SVM	Neighbourhood CleaningRule	Under resampling	0.8124
{classifier: {C: 17.411000519004872, coef0: -0.7299616439604879, degree: 3, gamma: auto, gamma_value: 4.764367310222173, kernel: linear, name: SVM, probability: True, random_state: 27, shrinking: False, tol: 0.08686798620113807}, sub: {n_neighbors: 18, smo_grp: UNDER, threshold_cleaning: 0.09599093054386619, type: NeighbourhoodCleaningRule}}					
TPE	29	RF	SMOTE	Over resampling	0.8279
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: None, min_samples_leaf: 14, min_samples_split: 2, n_estimators: 59, name: RF, random_state: 29}, sub: {k_neighbors: 9, random_state: 29, smo_grp: OVER, type: SMOTE}}					
TPE	36	SVM	Neighbourhood CleaningRule	Under resampling	0.8146
{classifier: {C: 38.90670627224082, coef0: -0.21119315699110977, degree: 4, gamma: scale, gamma_value: 5.845639469727934, kernel: linear, name: SVM, probability: True, random_state: 36, shrinking: True, tol: 0.04774513060854087}, sub: {n_neighbors: 18, smo_grp: UNDER, threshold_cleaning: 0.19001385345311106, type: NeighbourhoodCleaningRule}}					
TPE	39	DT	EditedNearest Neighbours	Under resampling	0.8183
{classifier: {criterion: gini, max_depth: 10, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 12, name: DTC, random_state: 39}, sub: {kind_sel: all, n_neighbors: 18, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	59	RF	EditedNearest Neighbours	Under resampling	0.8263
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 9, n_estimators: 74, name: RF, random_state: 59}, sub: {kind_sel: all, n_neighbors: 15, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	79	RF	Neighbourhood CleaningRule	Under resampling	0.8262
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 17, min_samples_split: 4, n_estimators: 112, name: RF, random_state: 79}, sub: {n_neighbors: 5, smo_grp: UNDER, threshold_cleaning: 0.4562349522895284, type: NeighbourhoodCleaningRule}}					
TPE	90	RF	RandomUnderSampler	Under resampling	0.8161
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 3, min_samples_split: 4, n_estimators: 121, name: RF, random_state: 90}, sub: {random_state: 90, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	109	RF	Neighbourhood CleaningRule	Under resampling	0.8236
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 12, n_estimators: 24, name: RF, random_state: 109}, sub: {n_neighbors: 16, smo_grp: UNDER, threshold_cleaning: 0.17091360393978366, type: NeighbourhoodCleaningRule}}					

TABLE S-29
"VOWEL0"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	DT	Instance HardnessThreshold	Under resampling	0.9424
Grid	18	DT	Instance HardnessThreshold	Under resampling	0.9659
Grid	27	KNN	RandomUnderSampler	Under resampling	0.9303
Grid	29	SVM	RandomUnderSampler	Under resampling	0.9314
Grid	36	RF	CondensedNearest Neighbour	Under resampling	0.9268
Grid	39	DT	Instance HardnessThreshold	Under resampling	0.9572
Grid	59	DT	Instance HardnessThreshold	Under resampling	0.9659
Grid	79	RF	CondensedNearest Neighbour	Under resampling	0.945
Grid	90	DT	Instance HardnessThreshold	Under resampling	0.9314
Grid	109	RF	CondensedNearest Neighbour	Under resampling	0.9308
Random	9	DT	RepeatedEdited NearestNeighbours	Under resampling	0.9592

{classifier: {criterion: gini, max_depth: 6, max_features: log2, min_samples_leaf: 10, min_samples_split: 16, name: DTC, random_state: 9}, sub: {kind_sel: all, n_neighbors: 13, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	18	RF	RandomUnderSampler	Under resampling	0.9405

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 2, min_samples_split: 6, n_estimators: 14, name: RF, random_state: 18}, sub: {random_state: 18, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	27	DT	ClusterCentroids	Under resampling	0.9607

{classifier: {criterion: gini, max_depth: 11, max_features: None, min_samples_leaf: 6, min_samples_split: 8, name: DTC, random_state: 27}, sub: {estimator: MiniBatchKMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	29	RF	ClusterCentroids	Under resampling	0.9453

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 13, min_samples_split: 19, n_estimators: 25, name: RF, random_state: 29}, sub: {estimator: MiniBatchKMeans, random_state: 29, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	36	RF	NearMiss	Under resampling	0.9469

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 4, min_samples_split: 11, n_estimators: 128, name: RF, random_state: 36}, sub: {n_neighbors: 7, n_neighbors_ver3: 18, smo_grp: UNDER, type: NearMiss, version: 2}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	39	DT	Neighbourhood CleaningRule	Under resampling	0.9633

{classifier: {criterion: entropy, max_depth: 9, max_features: None, min_samples_leaf: 7, min_samples_split: 17, name: DTC, random_state: 39}, sub: {n_neighbors: 18, smo_grp: UNDER, threshold_cleaning: 0.7375389907289757, type: Neighbourhood-CleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	59	DT	RepeatedEdited NearestNeighbours	Under resampling	0.9575

{classifier: {criterion: gini, max_depth: 12, max_features: None, min_samples_leaf: 10, min_samples_split: 18, name: DTC, random_state: 59}, sub: {kind_sel: all, n_neighbors: 14, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	79	DT	NearMiss	Under resampling	0.9293

{classifier: {criterion: gini, max_depth: 15, max_features: None, min_samples_leaf: 2, min_samples_split: 8, name: DTC, random_state: 79}, sub: {n_neighbors: 15, n_neighbors_ver3: 9, smo_grp: UNDER, type: NearMiss, version: 2}}

continued on the next column

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	DT	RepeatedEdited NearestNeighbours	Under resampling	0.947

{classifier: {criterion: entropy, max_depth: 3, max_features: None, min_samples_leaf: 1, min_samples_split: 15, name: DTC, random_state: 90}, sub: {kind_sel: all, n_neighbors: 19, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	109	DT	Neighbourhood CleaningRule	Under resampling	0.9333

{classifier: {criterion: entropy, max_depth: 10, max_features: None, min_samples_leaf: 2, min_samples_split: 10, name: DTC, random_state: 109}, sub: {n_neighbors: 13, smo_grp: UNDER, threshold_cleaning: 0.4568822107121995, type: Neighbourhood-CleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	9	RF	SVMSMOTE	Over resampling	0.9595

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: None, min_samples_leaf: 13, min_samples_split: 4, n_estimators: 45, name: RF, random_state: 9}, sub: {k_neighbors: 4, m_neighbors: 2, out_step: 0.3247599845557617, random_state: 9, smo_grp: OVER, type: SVMSMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	18	SVM	Instance HardnessThreshold	Under resampling	0.9593

{classifier: {C: 198.32623429946415, coef0: 0.06392652974988786, degree: 3, gamma: value, gamma_value: 5.305609198215354, kernel: poly, name: SVM, probability: True, random_state: 18, shrinking: False, tol: 0.02019496347860576}, sub: {cv: 8, estimator: linear-svm, random_state: 18, smo_grp: UNDER, type: InstanceHardnessThreshold}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	27	DT	Neighbourhood CleaningRule	Under resampling	0.9633

{classifier: {criterion: entropy, max_depth: 19, max_features: None, min_samples_leaf: 7, min_samples_split: 6, name: DTC, random_state: 27}, sub: {n_neighbors: 19, smo_grp: UNDER, threshold_cleaning: 0.4714043233145441, type: Neighbourhood-CleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	29	DT	Neighbourhood CleaningRule	Under resampling	0.9662

{classifier: {criterion: entropy, max_depth: 3, max_features: None, min_samples_leaf: 7, min_samples_split: 19, name: DTC, random_state: 29}, sub: {n_neighbors: 15, smo_grp: UNDER, threshold_cleaning: 0.43799464030396684, type: Neighbourhood-CleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	36	RF	ClusterCentroids	Under resampling	0.9595

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 3, min_samples_split: 10, n_estimators: 45, name: RF, random_state: 36}, sub: {estimator: MiniBatchKMeans, random_state: 36, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	39	RF	RandomUnderSampler	Under resampling	0.9473

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 2, min_samples_split: 3, n_estimators: 138, name: RF, random_state: 39}, sub: {random_state: 39, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	59	SVM	Instance HardnessThreshold	Under resampling	0.9451

{classifier: {C: 124.60103887700755, coef0: -0.12721527626419113, degree: 2, gamma: auto, gamma_value: 3.327241326663295, kernel: rbf, name: SVM, probability: True, random_state: 59, shrinking: False, tol: 0.09813194380104923}, sub: {cv: 8, estimator: gradient-boosting, random_state: 59, smo_grp: UNDER, type: InstanceHardnessThreshold}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	79	DT	Neighbourhood CleaningRule	Under resampling	0.9711

{classifier: {criterion: gini, max_depth: 18, max_features: None, min_samples_leaf: 8, min_samples_split: 10, name: DTC, random_state: 79}, sub: {n_neighbors: 12, smo_grp: UNDER, threshold_cleaning: 0.6573272613862768, type: Neighbourhood-CleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	90	KNN	SMOTENC	Over resampling	0.9513

{classifier: {algorithm: brute, n_neighbors: 23, name: KNN, p: 1, random_state: 90, weights: distance}, sub: {categorical_features: True, k_neighbors: 9, random_state: 90, smo_grp: OVER, type: SMOTENC}}

Method	Seed	Classifier	Resampler	Res.Group	GM
TPE	109	RF	Neighbourhood CleaningRule	Under resampling	0.9584

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 12, min_samples_split: 11, n_estimators: 138, name: RF, random_state: 109}, sub: {n_neighbors: 18, smo_grp: UNDER, threshold_cleaning: 0.5018227594572606, type: NeighbourhoodCleaningRule}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	SVM	ClusterCentroids	Under resampling	0.8254
{classifier: {C: 155.99742838390506, coef0: 0.9798509379078422, degree: 2, gamma: auto, gamma_value: 6.38676016936881, kernel: poly, name: SVM, probability: True, random_state: 90, shrinking: False, tol: 0.08016742589955095}, sub: {estimator: Mini-BatchKMeans, random_state: 90, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}						
Random	109	LR	ADASYN	Over resampling	0.8233
{classifier: {C: 38.04567346384948, l1_ratio: 0.6364891908311562, name: LR, penalty_solver: l2+liblinear, random_state: 109, tol: 0.0935559496259103}, sub: {n_neighbors: 7, random_state: 109, smo_grp: OVER, type: ADASYN}}						
TPE	9	SVM	SMOTETomek	Combine resampling	0.855
{classifier: {C: 121.6092224522427, coef0: -0.34922380417739174, degree: 2, gamma: auto, gamma_value: 6.753462701781763, kernel: linear, name: SVM, probability: False, random_state: 9, shrinking: False, tol: 0.05151674384868718}, sub: {random_state: 9, smo_grp: COMBINE, type: SMOTETomek}}						
TPE	18	SVM	CondensedNearest Neighbour	Under resampling	0.884
{classifier: {C: 19.09695252325417, coef0: 0.649305026091159, degree: 2, gamma: value, gamma_value: 7.806940783808728, kernel: linear, name: SVM, probability: True, random_state: 18, shrinking: False, tol: 0.09806270973122709}, sub: {n_neighbors: 17, n_seeds_S: 12, random_state: 18, smo_grp: UNDER, type: CondensedNearestNeighbour}}						
TPE	27	SVM	CondensedNearest Neighbour	Under resampling	0.843
{classifier: {C: 114.91382952501614, coef0: -0.24006953902188632, degree: 4, gamma: value, gamma_value: 0.7265082544596413, kernel: linear, name: SVM, probability: True, random_state: 27, shrinking: False, tol: 0.059392718696284846}, sub: {n_neighbors: 6, n_seeds_S: 38, random_state: 27, smo_grp: UNDER, type: CondensedNearestNeighbour}}						
TPE	29	SVM	SMOTEENN	Combine resampling	0.8333
{classifier: {C: 122.28488281542874, coef0: 0.758251813141835, degree: 2, gamma: auto, gamma_value: 0.17753666719938382, kernel: poly, name: SVM, probability: True, random_state: 29, shrinking: False, tol: 0.046125726487719794}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTEENN}}						
TPE	36	SVM	ClusterCentroids	Under resampling	0.8745
{classifier: {C: 153.1605817527016, coef0: 0.8136579666161791, degree: 3, gamma: scale, gamma_value: 1.112037101619353, kernel: poly, name: SVM, probability: True, random_state: 36, shrinking: True, tol: 0.004123242794004112}, sub: {estimator: KMeans, random_state: 36, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}						
TPE	39	LR	SMOTETomek	Combine resampling	0.8341
{classifier: {C: 42.22915973127503, l1_ratio: 0.7679051073115388, name: LR, penalty_solver: l2+liblinear, random_state: 39, tol: 0.013576260226257528}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTETomek}}						
TPE	59	LR	ADASYN	Over resampling	0.8309
{classifier: {C: 79.80553651455683, l1_ratio: 0.14372704171167952, name: LR, penalty_solver: l1+liblinear, random_state: 59, tol: 0.04478258910854041}, sub: {n_neighbors: 3, random_state: 59, smo_grp: OVER, type: ADASYN}}						
TPE	79	LR	RandomUnderSampler	Under resampling	0.8478
{classifier: {C: 89.88850746029294, l1_ratio: 0.460872612669673, name: LR, penalty_solver: l2+lbfgs, random_state: 79, tol: 0.05055022487543911}, sub: {random_state: 79, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}						
TPE	90	SVM	SMOTEENN	Combine resampling	0.8577
{classifier: {C: 186.90195688249193, coef0: 0.2682496538054604, degree: 4, gamma: scale, gamma_value: 6.623700229567763, kernel: poly, name: SVM, probability: False, random_state: 90, shrinking: True, tol: 0.08336828688880986}, sub: {random_state: 90, smo_grp: COMBINE, type: SMOTEENN}}						
TPE	109	LR	RandomUnderSampler	Under resampling	0.8372
{classifier: {C: 9.569647024533175, l1_ratio: 0.2417143322527701, name: LR, penalty_solver: none+lbfgs, random_state: 109, tol: 0.014843282115729328}, sub: {random_state: 109, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}						

TABLE S-30
"GLASS-0-1-6_VS_2"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	KNN	ADASYN	Over resampling	0.7882
Grid	18	LR	RandomOverSampler	Over resampling	0.8004
Grid	27	LR	RandomOverSampler	Over resampling	0.7919
Grid	29	LR	SMOTE	Over resampling	0.7854
Grid	36	LR	RandomOverSampler	Over resampling	0.8064
Grid	39	LR	SMOTE	Over resampling	0.7844
Grid	59	LR	RandomOverSampler	Over resampling	0.7856
Grid	79	SVM	RandomOverSampler	Over resampling	0.7876
Grid	90	KNN	SMOTE	Over resampling	0.7856
Grid	109	LR	RandomOverSampler	Over resampling	0.7883
Random	9	LR	RandomOverSampler	Over resampling	0.8143
{classifier: {C: 75.48177436495227, l1_ratio: 0.8068432565926712, name: LR, penalty_solver: l2+saga, random_state: 9, tol: 0.009595549865841447}, sub: {random_state: 9, smo_grp: OVER, type: RandomOverSampler}}						
Random	18	LR	SMOTE	Over resampling	0.8074
{classifier: {C: 84.18871429455189, l1_ratio: 0.0313943753239668135, name: LR, penalty_solver: none+newton-cg, random_state: 18, tol: 0.02153169993600245}, sub: {k_neighbors: 2, random_state: 18, smo_grp: OVER, type: SMOTE}}						
Random	27	LR	ADASYN	Over resampling	0.8048
{classifier: {C: 67.65594851992624, l1_ratio: 0.16333865846994794, name: LR, penalty_solver: l2+newton-cg, random_state: 27, tol: 0.04156905140848651}, sub: {n_neighbors: 1, random_state: 27, smo_grp: OVER, type: ADASYN}}						
Random	29	SVM	ClusterCentroids	Under resampling	0.8302
{classifier: {C: 140.55061716068317, coef0: 0.9836581443011898, degree: 4, gamma: scale, gamma_value: 4.618089099543733, kernel: linear, name: SVM, probability: False, random_state: 29, shrinking: False, tol: 0.06230275347653504}, sub: {estimator: MiniBatchKMeans, random_state: 29, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}						
Random	36	LR	RandomOverSampler	Over resampling	0.812
{classifier: {C: 66.41225329820318, l1_ratio: 0.43194655533119786, name: LR, penalty_solver: none+lbfgs, random_state: 36, tol: 0.04931194444057016}, sub: {random_state: 36, smo_grp: OVER, type: RandomOverSampler}}						
Random	39	LR	SMOTETomek	Combine resampling	0.8341
{classifier: {C: 40.99672634590339, l1_ratio: 0.633375997751731, name: LR, penalty_solver: l2+lbfgs, random_state: 39, tol: 0.08098649952226862}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTETomek}}						
Random	59	LR	ADASYN	Over resampling	0.8202
{classifier: {C: 95.48374274579845, l1_ratio: 0.8845962213066086, name: LR, penalty_solver: l1+liblinear, random_state: 59, tol: 0.06927703998537592}, sub: {n_neighbors: 8, random_state: 59, smo_grp: OVER, type: ADASYN}}						
Random	79	LR	RandomUnderSampler	Under resampling	0.8442
{classifier: {C: 84.55456856569356, l1_ratio: 0.1138429316630179, name: LR, penalty_solver: l2+lbfgs, random_state: 79, tol: 0.0255985821097188}, sub: {random_state: 79, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}						

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	KNN	ADASYN	Over resampling	0.7903
Grid	18	LR	RandomOverSampler	Over resampling	0.7823
Grid	27	LR	SMOTETomek	Combine resampling	0.811
Grid	29	LR	BorderlineSMOTE	Over resampling	0.7916
Grid	36	LR	BorderlineSMOTE	Over resampling	0.7872
Grid	39	LR	BorderlineSMOTE	Over resampling	0.7894
Grid	59	LR	BorderlineSMOTE	Over resampling	0.7864
Grid	79	KNN	SMOTE	Over resampling	0.793
Grid	90	LR	SMOTENC	Over resampling	0.7892
Grid	109	LR	BorderlineSMOTE	Over resampling	0.7826
Random	9	RF	CondensedNearest Neighbour	Under resampling	0.8383
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 3, n_estimators: 23, name: RF, random_state: 9}, sub: {n_neighbors: 46, n_seeds_S: 37, random_state: 9, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
Random	18	LR	SVMSMOTE	Over resampling	0.8152
{classifier: {C: 42.92819973163165, l1_ratio: 0.5979968038254196, name: LR, penalty_solver: l1+liblinear, random_state: 18, tol: 0.0478182881550911}, sub: {k_neighbors: 3, m_neighbors: 3, out_step: 0.46523861666119337, random_state: 18, smo_grp: OVER, type: SVMSMOTE}}					
Random	27	LR	BorderlineSMOTE	Over resampling	0.8184
{classifier: {C: 9.529652080962741, l1_ratio: 0.8594259123848675, name: LR, penalty_solver: elasticnet+saga, random_state: 27, tol: 0.003906565798961128}, sub: {k_neighbors: 2, kind: borderline-2, m_neighbors: 4, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	29	SVM	CondensedNearest Neighbour	Under resampling	0.8539
{classifier: {C: 125.54913814416983, coef0: 0.9299709885731351, degree: 2, gamma: auto, gamma_value: 4.872502000709642, kernel: linear, name: SVM, probability: False, random_state: 29, shrinking: False, tol: 0.056220245726125995}, sub: {n_neighbors: 13, n_seeds_S: 45, random_state: 29, smo_grp: UNDER, type: CondensedNearestNeighbour}}					
Random	36	LR	BorderlineSMOTE	Over resampling	0.8229
{classifier: {C: 10.529912488495441, l1_ratio: 0.4202309600113961, name: LR, penalty_solver: none+lbfgs, random_state: 36, tol: 0.021097155620384556}, sub: {k_neighbors: 9, kind: borderline-2, m_neighbors: 4, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	39	LR	ClusterCentroids	Under resampling	0.8142
{classifier: {C: 0.1363956892011328, l1_ratio: 0.11048266253786253, name: LR, penalty_solver: none+lbfgs, random_state: 39, tol: 0.09886429210100482}, sub: {estimator: KMeans, random_state: 39, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
Random	59	LR	BorderlineSMOTE	Over resampling	0.824
{classifier: {C: 78.03071958550727, l1_ratio: 0.8238671541412613, name: LR, penalty_solver: l2+lbfgs, random_state: 59, tol: 0.08676794164291679}, sub: {k_neighbors: 8, kind: borderline-2, m_neighbors: 9, random_state: 59, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	79	SVM	CondensedNearest Neighbour	Under resampling	0.8358
{classifier: {C: 100.74844366989657, coef0: -0.42117710498134464, degree: 2, gamma: scale, gamma_value: 6.791626003158912, kernel: linear, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.01306710276030176}, sub: {n_neighbors: 13, n_seeds_S: 34, random_state: 79, smo_grp: UNDER, type: CondensedNearestNeighbour}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	LR	ClusterCentroids	Under resampling	0.8427
{classifier: {C: 47.693811034645975, l1_ratio: 0.37873734089916067, name: LR, penalty_solver: l2+liblinear, random_state: 90, tol: 0.0002433598336614427}, sub: {estimator: KMeans, random_state: 90, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	109	LR	ADASYN	Over resampling	0.8053
{classifier: {C: 40.9827697401066, l1_ratio: 0.25105685844700537, name: LR, penalty_solver: l1+liblinear, random_state: 109, tol: 0.04533175511624368}, sub: {n_neighbors: 3, random_state: 109, smo_grp: OVER, type: ADASYN}}					
TPE	9	LR	BorderlineSMOTE	Over resampling	0.8569
{classifier: {C: 51.47425072024525, l1_ratio: 0.639150853236825, name: LR, penalty_solver: l2+newton-cg, random_state: 9, tol: 0.08392244027122764}, sub: {k_neighbors: 8, kind: borderline-2, m_neighbors: 6, random_state: 9, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	18	LR	BorderlineSMOTE	Over resampling	0.8502
{classifier: {C: 72.34655602767137, l1_ratio: 0.87726134816207, name: LR, penalty_solver: l1+liblinear, random_state: 18, tol: 0.02851628829682766}, sub: {k_neighbors: 6, kind: borderline-2, m_neighbors: 5, random_state: 18, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	27	SVM	RandomUnderSampler	Under resampling	0.8441
{classifier: {C: 15.722219083827298, coef0: -0.9018879954453447, degree: 4, gamma: value, gamma_value: 4.650639870265973, kernel: linear, name: SVM, probability: True, random_state: 27, shrinking: True, tol: 0.01235561911589197}, sub: {random_state: 27, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	29	LR	ClusterCentroids	Under resampling	0.8598
{classifier: {C: 15.424146910183218, l1_ratio: 0.112189122535516353, name: LR, penalty_solver: none+newton-cg, random_state: 29, tol: 0.009080800366741495}, sub: {estimator: KMeans, random_state: 29, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	36	LR	BorderlineSMOTE	Over resampling	0.8523
{classifier: {C: 99.13060586485629, l1_ratio: 0.7017111292185436, name: LR, penalty_solver: l1+liblinear, random_state: 36, tol: 0.08499942919183098}, sub: {k_neighbors: 8, kind: borderline-2, m_neighbors: 7, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	39	LR	BorderlineSMOTE	Over resampling	0.8539
{classifier: {C: 15.257571889477607, l1_ratio: 0.5072092427069871, name: LR, penalty_solver: none+sag, random_state: 39, tol: 0.0002918457129169015}, sub: {k_neighbors: 9, kind: borderline-2, m_neighbors: 7, random_state: 39, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	59	LR	BorderlineSMOTE	Over resampling	0.8576
{classifier: {C: 21.780042800710312, l1_ratio: 0.5815858368143092, name: LR, penalty_solver: l2+newton-cg, random_state: 59, tol: 0.08231807564048196}, sub: {k_neighbors: 6, kind: borderline-2, m_neighbors: 5, random_state: 59, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	79	SVM	SMOTETomek	Combine resampling	0.8348
{classifier: {C: 186.0775333200581, coef0: -0.06577466706501278, degree: 2, gamma: auto, gamma_value: 4.303574572499031, kernel: linear, name: SVM, probability: False, random_state: 79, shrinking: False, tol: 0.05733727052001181}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	90	LR	BorderlineSMOTE	Over resampling	0.8515
{classifier: {C: 77.08446227074595, l1_ratio: 0.9138153975543295, name: LR, penalty_solver: l2+liblinear, random_state: 90, tol: 0.06662272119270829}, sub: {k_neighbors: 7, kind: borderline-2, m_neighbors: 5, random_state: 90, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	109	LR	BorderlineSMOTE	Over resampling	0.8549
{classifier: {C: 10.407321611428246, l1_ratio: 0.9489030411359061, name: LR, penalty_solver: l2+newton-cg, random_state: 109, tol: 0.01130089342065971}, sub: {k_neighbors: 4, kind: borderline-2, m_neighbors: 6, random_state: 109, smo_grp: OVER, type: BorderlineSMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	No resampling	No resampling	1.0
Grid	18	RF	No resampling	No resampling	1.0
Grid	27	RF	No resampling	No resampling	1.0
Grid	29	RF	No resampling	No resampling	1.0
Grid	36	RF	No resampling	No resampling	1.0
Grid	39	RF	No resampling	No resampling	1.0
Grid	59	RF	No resampling	No resampling	1.0
Grid	79	RF	No resampling	No resampling	1.0
Grid	90	RF	No resampling	No resampling	1.0
Grid	109	RF	No resampling	No resampling	1.0
Random	9	RF	ClusterCentroids	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 13, n_estimators: 82, name: RF, random_state: 9}, sub: {estimator: KMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	18	DT	EditedNearest Neighbours	Under resampling	1.0
{classifier: {criterion: entropy, max_depth: 5, max_features: None, min_samples_leaf: 14, min_samples_split: 7, name: DTC, random_state: 18}, sub: {kind_sel: all, n_neighbors: 7, smo_grp: UNDER, type: EditedNearestNeighbours}}					
Random	27	RF	BorderlineSMOTE	Over resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 17, n_estimators: 126, name: RF, random_state: 27}, sub: {k_neighbors: 4, kind: borderline-1, m_neighbors: 7, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	29	DT	SMOTETomek	Combine resampling	1.0
{classifier: {criterion: gini, max_depth: 10, max_features: 1, min_samples_leaf: 7, min_samples_split: 15, name: DTC, random_state: 29}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTETomek}}					
Random	36	DT	SMOTE	Over resampling	1.0
{classifier: {criterion: gini, max_depth: 16, max_features: sqrt, min_samples_leaf: 16, min_samples_split: 7, name: DTC, random_state: 36}, sub: {k_neighbors: 3, random_state: 36, smo_grp: OVER, type: SMOTE}}					
Random	39	RF	SMOTE	Over resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 15, n_estimators: 126, name: RF, random_state: 39}, sub: {k_neighbors: 4, random_state: 39, smo_grp: OVER, type: SMOTE}}					
Random	59	RF	SMOTENC	Over resampling	1.0
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 16, min_samples_split: 5, n_estimators: 149, name: RF, random_state: 59}, sub: {categorical_features: True, k_neighbors: 7, random_state: 59, smo_grp: OVER, type: SMOTENC}}					
Random	79	SVM	Neighbourhood CleaningRule	Under resampling	1.0
{classifier: {C: 61.31815747033934, coef0: 0.38949246267747495, degree: 4, gamma: value, gamma_value: 3.325789425123032, kernel: poly, name: SVM, probability: True, random_state: 79, shrinking: True, tol: 0.04718567940080868}, sub: {n_neighbors: 6, smo_grp: UNDER, threshold_cleaning: 0.6311822829764543, type: NeighbourhoodCleaningRule}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	RepeatedEdited NearestNeighbours	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 9, n_estimators: 135, name: RF, random_state: 90}, sub: {kind_sel: mode, n_neighbors: 13, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	109	RF	SMOTEENN	Combine resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 17, n_estimators: 80, name: RF, random_state: 109}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	9	RF	ClusterCentroids	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 13, n_estimators: 82, name: RF, random_state: 9}, sub: {estimator: KMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	18	DT	EditedNearest Neighbours	Under resampling	1.0
{classifier: {criterion: entropy, max_depth: 5, max_features: None, min_samples_leaf: 14, min_samples_split: 7, name: DTC, random_state: 18}, sub: {kind_sel: all, n_neighbors: 7, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	27	RF	BorderlineSMOTE	Over resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 17, n_estimators: 126, name: RF, random_state: 27}, sub: {k_neighbors: 4, kind: borderline-1, m_neighbors: 7, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	29	DT	SMOTETomek	Combine resampling	1.0
{classifier: {criterion: gini, max_depth: 10, max_features: 1, min_samples_leaf: 7, min_samples_split: 15, name: DTC, random_state: 29}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	36	DT	SMOTE	Over resampling	1.0
{classifier: {criterion: gini, max_depth: 16, max_features: sqrt, min_samples_leaf: 16, min_samples_split: 7, name: DTC, random_state: 36}, sub: {k_neighbors: 3, random_state: 36, smo_grp: OVER, type: SMOTE}}					
TPE	39	RF	SMOTE	Over resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 15, n_estimators: 126, name: RF, random_state: 39}, sub: {k_neighbors: 4, random_state: 39, smo_grp: OVER, type: SMOTE}}					
TPE	59	RF	SMOTENC	Over resampling	1.0
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 16, min_samples_split: 5, n_estimators: 149, name: RF, random_state: 59}, sub: {categorical_features: True, k_neighbors: 7, random_state: 59, smo_grp: OVER, type: SMOTENC}}					
TPE	79	SVM	Neighbourhood CleaningRule	Under resampling	1.0
{classifier: {C: 61.31815747033934, coef0: 0.38949246267747495, degree: 4, gamma: value, gamma_value: 3.325789425123032, kernel: poly, name: SVM, probability: True, random_state: 79, shrinking: True, tol: 0.04718567940080868}, sub: {n_neighbors: 6, smo_grp: UNDER, threshold_cleaning: 0.6311822829764543, type: NeighbourhoodCleaningRule}}					
TPE	90	RF	RepeatedEdited NearestNeighbours	Under resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 18, min_samples_split: 9, n_estimators: 135, name: RF, random_state: 90}, sub: {kind_sel: mode, n_neighbors: 13, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	109	RF	SMOTEENN	Combine resampling	1.0
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 14, min_samples_split: 17, n_estimators: 80, name: RF, random_state: 109}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	SMOTENC	Over resampling	0.8092
Grid	18	LR	Instance HardnessThreshold	Under resampling	0.7908
Grid	27	SVM	SMOTENC	Over resampling	0.813
Grid	29	RF	RandomUnderSampler	Under resampling	0.8092
Grid	36	LR	Instance HardnessThreshold	Under resampling	0.795
Grid	39	SVM	SMOTENC	Over resampling	0.7839
Grid	59	LR	SMOTENC	Over resampling	0.7905
Grid	79	LR	Instance HardnessThreshold	Under resampling	0.7881
Grid	90	LR	Instance HardnessThreshold	Under resampling	0.7859
Grid	109	SVM	SMOTENC	Over resampling	0.8134
Random	9	LR	ADASYN	Over resampling	0.8054

{classifier: {C: 50.82328812569247, l1_ratio: 0.19069115556878002, name: LR, penalty_solver: l1+liblinear, random_state: 9, tol: 0.0825207757154436}, sub: {n_neighbors: 1, random_state: 9, smo_grp: OVER, type: ADASYN}}

Random	18	RF	SMOTEENN	Combine resampling	0.7912

{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 16, min_samples_split: 14, n_estimators: 92, random_state: 18}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTEENN}}

Random	27	LR	SMOTENC	Over resampling	0.7883

{classifier: {C: 65.77063444578508, l1_ratio: 0.789138412109934, name: LR, penalty_solver: none+newton-cg, random_state: 27, tol: 0.03995922805063832}, sub: {categorical_features: True, k_neighbors: 6, random_state: 27, smo_grp: OVER, type: SMOTENC}}

Random	29	SVM	Instance HardnessThreshold	Under resampling	0.7914

{classifier: {C: 11.882976931071024, coef0: -0.0465616612038533, degree: 3, gamma: auto, gamma_value: 4.4366913661780805, kernel: linear, name: SVM, probability: True, random_state: 29, shrinking: True, tol: 0.0677145259463377}, sub: {cv: 7, estimator: None, random_state: 29, smo_grp: UNDER, type: InstanceHardnessThreshold}}

Random	36	LR	SVMSMOTE	Over resampling	0.7959

{classifier: {C: 33.9661992759499, l1_ratio: 0.6494457146818768, name: LR, penalty_solver: l1+liblinear, random_state: 36, tol: 0.06775760857708996}, sub: {k_neighbors: 7, m_neighbors: 6, out_step: 0.5132801791930468, random_state: 36, smo_grp: OVER, type: SVMSMOTE}}

Random	39	SVM	ClusterCentroids	Under resampling	0.7794

{classifier: {C: 11.69547834356305, coef0: 0.19555969921100513, degree: 2, gamma: scale, gamma_value: 0.8717226671120625, kernel: linear, name: SVM, probability: False, random_state: 39, shrinking: True, tol: 0.03635778439167239}, sub: {estimator: MiniBatchKMeans, random_state: 39, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

Random	59	LR	ADASYN	Over resampling	0.8029

{classifier: {C: 29.927183626834317, l1_ratio: 0.4815471692549011, name: LR, penalty_solver: l1+saga, random_state: 59, tol: 0.08686551977053959}, sub: {n_neighbors: 1, random_state: 59, smo_grp: OVER, type: ADASYN}}

Random	79	LR	SMOTENC	Over resampling	0.7842

{classifier: {C: 78.17402645169201, l1_ratio: 0.7415454592967455, name: LR, penalty_solver: none+saga, random_state: 79, tol: 0.0833401575787906}, sub: {categorical_features: True, k_neighbors: 1, random_state: 79, smo_grp: OVER, type: SMOTENC}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	LR	ADASYN	Over resampling	0.7882

{classifier: {C: 55.140750467645596, l1_ratio: 0.24044750657469235, name: LR, penalty_solver: l2+newton-cg, random_state: 90, tol: 0.051827436752119}, sub: {n_neighbors: 2, random_state: 90, smo_grp: OVER, type: ADASYN}}

Random	109	LR	ADASYN	Over resampling	0.7992

{classifier: {C: 29.30688554060576, l1_ratio: 0.61915695475505884, name: LR, penalty_solver: l2+saga, random_state: 109, tol: 0.09598711209417332}, sub: {n_neighbors: 1, random_state: 109, smo_grp: OVER, type: ADASYN}}

TPE	9	LR	ADASYN	Over resampling	0.8044

{classifier: {C: 79.69102001855627, l1_ratio: 0.9894550963462856, name: LR, penalty_solver: l1+liblinear, random_state: 9, tol: 0.07059891839498218}, sub: {n_neighbors: 1, random_state: 9, smo_grp: OVER, type: ADASYN}}

TPE	18	LR	ADASYN	Over resampling	0.8053

{classifier: {C: 17.240193968430148, l1_ratio: 0.20552849670459572, name: LR, penalty_solver: l1+liblinear, random_state: 18, tol: 0.04582697277123998}, sub: {n_neighbors: 1, random_state: 18, smo_grp: OVER, type: ADASYN}}

TPE	27	LR	SMOTENC	Over resampling	0.7931

{classifier: {C: 70.5688862442294, l1_ratio: 0.40972333046731, name: LR, penalty_solver: l2+sag, random_state: 27, tol: 0.08441376109305282}, sub: {categorical_features: True, k_neighbors: 4, random_state: 27, smo_grp: OVER, type: SMOTENC}}

TPE	29	LR	ADASYN	Over resampling	0.8029

{classifier: {C: 76.64630364019543, l1_ratio: 0.5811405171366711, name: LR, penalty_solver: none+saga, random_state: 29, tol: 0.045201392380984064}, sub: {n_neighbors: 1, random_state: 29, smo_grp: OVER, type: ADASYN}}

TPE	36	LR	CondensedNearest Neighbour	Under resampling	0.8046

{classifier: {C: 52.22835116504143, l1_ratio: 0.0008586178078128226, name: LR, penalty_solver: none+sag, random_state: 36, tol: 0.03663720671585109}, sub: {n_neighbors: 37, n_seeds_S: 47, random_state: 36, smo_grp: UNDER, type: CondensedNearestNeighbour}}

TPE	39	LR	ADASYN	Over resampling	0.8114

{classifier: {C: 91.17709590060575, l1_ratio: 0.3620247613057664, name: LR, penalty_solver: l1+saga, random_state: 39, tol: 0.013267568342637532}, sub: {n_neighbors: 1, random_state: 39, smo_grp: OVER, type: ADASYN}}

TPE	59	SVM	SVMSMOTE	Over resampling	0.7909

{classifier: {C: 2.090052670017321, coef0: 0.7420377540589964, degree: 3, gamma: value, gamma_value: 5.081295684624548, kernel: linear, name: SVM, probability: True, random_state: 59, shrinking: True, tol: 0.00410353581042683}, sub: {k_neighbors: 5, m_neighbors: 4, out_step: 0.08152834559988797, random_state: 59, smo_grp: OVER, type: SVMSMOTE}}

TPE	79	LR	ADASYN	Over resampling	0.8065

{classifier: {C: 72.05292437006882, l1_ratio: 0.11638787088296743, name: LR, penalty_solver: none+sag, random_state: 79, tol: 0.09981400903325843}, sub: {n_neighbors: 1, random_state: 79, smo_grp: OVER, type: ADASYN}}

TPE	90	LR	ADASYN	Over resampling	0.8041

{classifier: {C: 59.978837497177037, l1_ratio: 0.3682881540994873, name: LR, penalty_solver: l2+liblinear, random_state: 90, tol: 0.0723120980078878}, sub: {n_neighbors: 1, random_state: 90, smo_grp: OVER, type: ADASYN}}

TPE	109	LR	ADASYN	Over resampling	0.8051

{classifier: {C: 63.46962632656172, l1_ratio: 0.30638133544668456, name: LR, penalty_solver: l2+saga, random_state: 109, tol: 0.030808222338005037}, sub: {n_neighbors: 1, random_state: 109, smo_grp: OVER, type: ADASYN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	RandomOverSampler	Over resampling	0.9346
Grid	18	SVM	ADASYN	Over resampling	0.9231
Grid	27	SVM	RandomOverSampler	Over resampling	0.9292
Grid	29	SVM	RandomOverSampler	Over resampling	0.9234
Grid	36	SVM	RandomOverSampler	Over resampling	0.9346
Grid	39	SVM	RandomOverSampler	Over resampling	0.9374
Grid	59	SVM	RandomOverSampler	Over resampling	0.9346
Grid	79	SVM	RandomOverSampler	Over resampling	0.9292
Grid	90	SVM	RandomOverSampler	Over resampling	0.9374
Grid	109	SVM	RandomOverSampler	Over resampling	0.9346
Random	9	SVM	ClusterCentroids	Under resampling	0.9242

{classifier: {C: 178.21552256419878, coef0: -0.46612314101013586, degree: 2, gamma: scale, gamma_value: 0.5369190164853789, kernel: rbf, name: SVM, probability: False, random_state: 9, shrinking: False, tol: 0.09543901231623098}, sub: {estimator: MiniBatchKMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}

| Random | 18 | SVM | RandomUnderSampler | Under resampling | 0.9222 |

{classifier: {C: 169.66484193640792, coef0: 0.0949747297420005, degree: 2, gamma: scale, gamma_value: 6.0091363942821845, kernel: poly, name: SVM, probability: True, random_state: 18, shrinking: True, tol: 0.023147392435267134}, sub: {random_state: 18, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

| Random | 27 | KNN | SMOTETomek | Combine resampling | 0.9046 |

{classifier: {algorithm: ball_tree, n_neighbors: 10, name: KNN, p: 16, random_state: 27, weights: distance}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTETomek}}

| Random | 29 | SVM | Neighbourhood CleaningRule | Under resampling | 0.9183 |

{classifier: {C: 166.06685053924164, coef0: 0.5397052376789149, degree: 3, gamma: scale, gamma_value: 4.8887460360115425, kernel: poly, name: SVM, probability: True, random_state: 29, shrinking: True, tol: 0.03191230894212939}, sub: {n_neighbors: 17, smo_grp: UNDER, threshold_cleaning: 0.07049885115861221, type: NeighbourhoodCleaningRule}}

| Random | 36 | KNN | SMOTETomek | Combine resampling | 0.8972 |

{classifier: {algorithm: brute, n_neighbors: 9, name: KNN, p: 13, random_state: 36, weights: uniform}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTETomek}}

| Random | 39 | DT | SVMSMOTE | Over resampling | 0.948 |

{classifier: {criterion: entropy, max_depth: 18, max_features: sqrt, min_samples_leaf: 9, min_samples_split: 2, name: DTC, random_state: 39}, sub: {k_neighbors: 6, m_neighbors: 6, out_step: 0.49234462961811976, random_state: 39, smo_grp: OVER, type: SVMSMOTE}}

| Random | 59 | DT | SMOTEENN | Combine resampling | 0.9217 |

{classifier: {criterion: gini, max_depth: 10, max_features: None, min_samples_leaf: 3, min_samples_split: 2, name: DTC, random_state: 59}, sub: {random_state: 59, smo_grp: COMBINE, type: SMOTEENN}}

| Random | 79 | DT | SMOTETomek | Combine resampling | 0.9721 |

{classifier: {criterion: entropy, max_depth: 6, max_features: sqrt, min_samples_leaf: 17, min_samples_split: 15, name: DTC, random_state: 79}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	CondensedNearest Neighbour	Under resampling	0.9143

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 8, min_samples_split: 13, n_estimators: 2, name: RF, random_state: 90}, sub: {n_neighbors: 26, n_seeds_S: 44, random_state: 90, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| Random | 109 | KNN | SMOTEENN | Combine resampling | 0.9219 |

{classifier: {algorithm: kd_tree, n_neighbors: 15, name: KNN, p: 18, random_state: 109, weights: uniform}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}

| TPE | 9 | KNN | SMOTE | Over resampling | 0.9192 |

{classifier: {algorithm: auto, n_neighbors: 14, name: KNN, p: 9, random_state: 9, weights: uniform}, sub: {k_neighbors: 7, random_state: 9, smo_grp: OVER, type: SMOTE}}

| TPE | 18 | SVM | RandomUnderSampler | Under resampling | 0.9477 |

{classifier: {C: 28.14146167870133, coef0: -0.6596258626741562, degree: 2, gamma: auto, gamma_value: 4.835976872023263, kernel: sigmoid, name: SVM, probability: False, random_state: 18, shrinking: False, tol: 0.05233808110399944}, sub: {random_state: 18, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

| TPE | 27 | SVM | NearMiss | Under resampling | 0.9174 |

{classifier: {C: 131.65788929219568, coef0: -0.2177070440289059, degree: 2, gamma: value, gamma_value: 1.8795601914286417, kernel: linear, name: SVM, probability: True, random_state: 27, shrinking: True, tol: 0.011670071873932823}, sub: {n_neighbors: 4, n_neighbors_ver3: 11, smo_grp: UNDER, type: NearMiss, version: 1}}

| TPE | 29 | SVM | SMOTEENN | Combine resampling | 0.9158 |

{classifier: {C: 3.272440695035357, coef0: 0.4023123674358682, degree: 2, gamma: auto, gamma_value: 4.182553292010804, kernel: poly, name: SVM, probability: False, random_state: 29, shrinking: True, tol: 0.04751385750087279}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTEENN}}

| TPE | 36 | RF | BorderlineSMOTE | Over resampling | 0.926 |

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 15, min_samples_split: 6, n_estimators: 79, name: RF, random_state: 36}, sub: {k_neighbors: 6, kind: borderline-2, m_neighbors: 8, random_state: 36, smo_grp: OVER, type: BorderlineSMOTE}}

| TPE | 39 | DT | SVMSMOTE | Over resampling | 0.9532 |

{classifier: {criterion: entropy, max_depth: 10, max_features: sqrt, min_samples_leaf: 3, min_samples_split: 5, name: DTC, random_state: 39}, sub: {k_neighbors: 5, m_neighbors: 2, out_step: 0.02415029231026664, random_state: 39, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 59 | KNN | SVMSMOTE | Over resampling | 0.9024 |

{classifier: {algorithm: ball_tree, n_neighbors: 12, name: KNN, p: 13, random_state: 59, weights: uniform}, sub: {k_neighbors: 6, m_neighbors: 3, out_step: 0.140424277522905, random_state: 59, smo_grp: OVER, type: SVMSMOTE}}

| TPE | 79 | DT | SMOTETomek | Combine resampling | 0.9746 |

{classifier: {criterion: entropy, max_depth: 13, max_features: sqrt, min_samples_leaf: 19, min_samples_split: 2, name: DTC, random_state: 79}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}

| TPE | 90 | SVM | CondensedNearest Neighbour | Under resampling | 0.9266 |

{classifier: {C: 124.76065053621302, coef0: 0.4514519259778968, degree: 2, gamma: scale, gamma_value: 3.6475528799890116, kernel: rbf, name: SVM, probability: False, random_state: 90, shrinking: True, tol: 0.08343157435387022}, sub: {n_neighbors: 16, n_seeds_S: 18, random_state: 90, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 109 | SVM | ClusterCentroids | Under resampling | 0.9403 |

{classifier: {C: 64.36757499625851, coef0: 0.23957749030858355, degree: 2, gamma: auto, gamma_value: 4.652904858515328, kernel: rbf, name: SVM, probability: True, random_state: 109, shrinking: True, tol: 0.08404717763641865}, sub: {estimator: MiniBatchKMeans, random_state: 109, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}

TABLE S-35
"ECOLI4"

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	KNN	Instance HardnessThreshold	Under resampling	0.9403
Grid	18	KNN	Instance HardnessThreshold	Under resampling	0.9384
Grid	27	KNN	Instance HardnessThreshold	Under resampling	0.9384
Grid	29	KNN	Instance HardnessThreshold	Under resampling	0.9384
Grid	36	KNN	Instance HardnessThreshold	Under resampling	0.9384
Grid	39	KNN	Instance HardnessThreshold	Under resampling	0.9384
Grid	59	KNN	Instance HardnessThreshold	Under resampling	0.9365
Grid	79	KNN	Instance HardnessThreshold	Under resampling	0.9384
Grid	90	KNN	Instance HardnessThreshold	Under resampling	0.969
Grid	109	KNN	Instance HardnessThreshold	Under resampling	0.9384
Random	9	SVM	SMOTEENN	Combine resampling	0.9584

{classifier: {C: 40.79732006143986, coef0: -0.05547070302822421, degree: 3, gamma: auto, gamma_value: 6.291934230059464, kernel: sigmoid, name: SVM, probability: True, random_state: 9, shrinking: False, tol: 0.027583386716958036}, sub: {random_state: 9, smo_grp: COMBINE, type: SMOTEENN}}

| Random | 18 | KNN | CondensedNearest Neighbour | Under resampling | 0.9549 |

{classifier: {algorithm: auto, n_neighbors: 23, name: KNN, p: 16, random_state: 18, weights: distance}, sub: {n_neighbors: 12, n_seeds_S: 14, random_state: 18, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| Random | 27 | SVM | SMOTEENN | Combine resampling | 0.9552 |

{classifier: {C: 121.3987889895154, coef0: -0.57417047703557, degree: 2, gamma: auto, gamma_value: 6.884098991807362, kernel: sigmoid, name: SVM, probability: True, random_state: 27, shrinking: True, tol: 0.07556636818736552}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTEENN}}

| Random | 29 | KNN | CondensedNearest Neighbour | Under resampling | 0.9566 |

{classifier: {algorithm: kd_tree, n_neighbors: 15, name: KNN, p: 18, random_state: 29, weights: distance}, sub: {n_neighbors: 6, n_seeds_S: 39, random_state: 29, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| Random | 36 | SVM | Neighbourhood CleaningRule | Under resampling | 0.9507 |

{classifier: {C: 183.84983024019255, coef0: -0.7234905795483935, degree: 3, gamma: auto, gamma_value: 4.541580469874344, kernel: sigmoid, name: SVM, probability: True, random_state: 36, shrinking: False, tol: 0.04791172157098777}, sub: {n_neighbors: 18, smo_grp: UNDER, threshold_cleaning: 0.2426016025504243, type: NeighbourhoodCleaningRule}}

| Random | 39 | KNN | RandomUnderSampler | Under resampling | 0.953 |

{classifier: {algorithm: ball_tree, n_neighbors: 10, name: KNN, p: 14, random_state: 39, weights: uniform}, sub: {random_state: 39, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}

| Random | 59 | SVM | Neighbourhood CleaningRule | Under resampling | 0.9568 |

{classifier: {C: 50.522547949581245, coef0: -0.2937167347768268, degree: 2, gamma: scale, gamma_value: 4.794920228915915, kernel: sigmoid, name: SVM, probability: False, random_state: 59, shrinking: True, tol: 0.005358931684652049}, sub: {n_neighbors: 13, smo_grp: UNDER, threshold_cleaning: 0.8284808358248784, type: NeighbourhoodCleaningRule}}

| Random | 79 | KNN | RandomUnderSampler | Under resampling | 0.9638 |

{classifier: {algorithm: brute, n_neighbors: 20, name: KNN, p: 10, random_state: 79, weights: uniform}, sub: {random_state: 79, replacement: False, smo_grp: UNDER, type: RandomUnderSampler}}

TABLE S-35
"ECOLI4" − CONTINUED FROM PREVIOUS COLUMN

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	KNN	RandomUnderSampler	Under resampling	0.9301

{classifier: {algorithm: kd_tree, n_neighbors: 14, name: KNN, p: 10, random_state: 90, weights: uniform}, sub: {random_state: 90, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}

| Random | 109 | SVM | SMOTEENN | Combine resampling | 0.9714 |

{classifier: {C: 120.57302156711913, coef0: -0.08970973018679862, degree: 2, gamma: auto, gamma_value: 4.339745368236571, kernel: sigmoid, name: SVM, probability: True, random_state: 109, shrinking: False, tol: 0.011237879419690218}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}

| TPE | 9 | SVM | ClusterCentroids | Under resampling | 0.964 |

{classifier: {C: 145.05661893464458, coef0: 0.08279865084353631, degree: 3, gamma: auto, gamma_value: 4.706093936312238, kernel: sigmoid, name: SVM, probability: True, random_state: 9, shrinking: False, tol: 0.011182185367931884}, sub: {estimator: KMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

| TPE | 18 | KNN | CondensedNearest Neighbour | Under resampling | 0.9601 |

{classifier: {algorithm: brute, n_neighbors: 25, name: KNN, p: 6, random_state: 18, weights: distance}, sub: {n_neighbors: 8, n_seeds_S: 18, random_state: 18, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 27 | SVM | ClusterCentroids | Under resampling | 0.9657 |

{classifier: {C: 47.332654441270854, coef0: 0.2972598385045751, degree: 2, gamma: scale, gamma_value: 7.0867680991152495, kernel: sigmoid, name: SVM, probability: True, random_state: 27, shrinking: True, tol: 0.09745907720648339}, sub: {estimator: MiniBatchKMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

| TPE | 29 | SVM | ClusterCentroids | Under resampling | 0.9854 |

{classifier: {C: 121.55064996033951, coef0: 0.11654183911964426, degree: 2, gamma: auto, gamma_value: 7.425220534069753, kernel: sigmoid, name: SVM, probability: False, random_state: 29, shrinking: True, tol: 0.09750436868193445}, sub: {estimator: MiniBatchKMeans, random_state: 29, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

| TPE | 36 | KNN | CondensedNearest Neighbour | Under resampling | 0.9732 |

{classifier: {algorithm: brute, n_neighbors: 20, name: KNN, p: 2, random_state: 36, weights: uniform}, sub: {n_neighbors: 48, n_seeds_S: 32, random_state: 36, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 39 | KNN | CondensedNearest Neighbour | Under resampling | 0.982 |

{classifier: {algorithm: ball_tree, n_neighbors: 12, name: KNN, p: 9, random_state: 39, weights: uniform}, sub: {n_neighbors: 43, n_seeds_S: 34, random_state: 39, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 59 | KNN | CondensedNearest Neighbour | Under resampling | 0.9802 |

{classifier: {algorithm: kd_tree, n_neighbors: 20, name: KNN, p: 4, random_state: 59, weights: uniform}, sub: {n_neighbors: 38, n_seeds_S: 25, random_state: 59, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 79 | SVM | ADASYN | Over resampling | 0.9714 |

{classifier: {C: 119.38348082203808, coef0: -0.20037491888299824, degree: 4, gamma: scale, gamma_value: 1.1204226930201462, kernel: sigmoid, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.08447685652946742}, sub: {n_neighbors: 4, random_state: 79, smo_grp: OVER, type: ADASYN}}

| TPE | 90 | KNN | ClusterCentroids | Under resampling | 0.9629 |

{classifier: {algorithm: kd_tree, n_neighbors: 12, name: KNN, p: 19, random_state: 90, weights: uniform}, sub: {estimator: KMeans, random_state: 90, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}

| TPE | 109 | SVM | SMOTEENN | Combine resampling | 0.982 |

{classifier: {C: 141.89154161973755, coef0: -0.4946147610023311, degree: 4, gamma: auto, gamma_value: 3.9841978056448095, kernel: sigmoid, name: SVM, probability: True, random_state: 109, shrinking: False, tol: 0.013199367322053112}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	OneSidedSelection	Under resampling	0.9907
Grid	18	RF	CondensedNearest Neighbour	Under resampling	0.9859
Grid	27	RF	CondensedNearest Neighbour	Under resampling	0.9895
Grid	29	RF	CondensedNearest Neighbour	Under resampling	0.9871
Grid	36	RF	CondensedNearest Neighbour	Under resampling	0.9919
Grid	39	RF	CondensedNearest Neighbour	Under resampling	0.9896
Grid	59	RF	CondensedNearest Neighbour	Under resampling	0.9834
Grid	79	DT	CondensedNearest Neighbour	Under resampling	0.9931
Grid	90	DT	CondensedNearest Neighbour	Under resampling	0.9824
Grid	109	RF	CondensedNearest Neighbour	Under resampling	0.9907
Random	9	RF	OneSidedSelection	Under resampling	0.9895
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 14, n_estimators: 31, name: RF, random_state: 9}, sub: {n_neighbors: 7, n_seeds_S: 13, random_state: 9, smo_grp: UNDER, type: OneSidedSelection}}
Random	18	RF	OneSidedSelection	Under resampling	0.9896
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 5, min_samples_split: 8, n_estimators: 32, name: RF, random_state: 18}, sub: {n_neighbors: 3, n_seeds_S: 15, random_state: 18, smo_grp: UNDER, type: OneSidedSelection}}
Random	27	RF	ClusterCentroids	Under resampling	0.9822
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 9, n_estimators: 19, name: RF, random_state: 27}, sub: {estimator: KMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}
Random	29	RF	OneSidedSelection	Under resampling	0.9811
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 4, n_estimators: 47, name: RF, random_state: 29}, sub: {n_neighbors: 6, n_seeds_S: 9, random_state: 29, smo_grp: UNDER, type: OneSidedSelection}}
Random	36	DT	CondensedNearest Neighbour	Under resampling	0.9932
{classifier: {criterion: entropy, max_depth: 19, max_features: sqrt, min_samples_leaf: 4, min_samples_split: 15, name: DTC, random_state: 36}, sub: {n_neighbors: 7, n_seeds_S: 38, random_state: 36, smo_grp: UNDER, type: CondensedNearestNeighbour}}
Random	39	RF	SVMSMOTE	Over resampling	0.9883
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 1, min_samples_split: 16, n_estimators: 11, name: RF, random_state: 39}, sub: {k_neighbors: 4, m_neighbors: 7, out_step: 0.833362524640542, random_state: 39, smo_grp: OVER, type: SVMSMOTE}}
Random	59	RF	SVMSMOTE	Over resampling	0.9859
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 2, min_samples_split: 9, n_estimators: 63, name: RF, random_state: 59}, sub: {k_neighbors: 5, m_neighbors: 6, out_step: 0.8606459229969204, random_state: 59, smo_grp: OVER, type: SVMSMOTE}}
Random	79	RF	OneSidedSelection	Under resampling	0.9896
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 3, min_samples_split: 4, n_estimators: 66, name: RF, random_state: 79}, sub: {n_neighbors: 18, n_seeds_S: 12, random_state: 79, smo_grp: UNDER, type: OneSidedSelection}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	DT	SVMSMOTE	Over resampling	0.9791
{classifier: {criterion: gini, max_depth: 13, max_features: log2, min_samples_leaf: 10, min_samples_split: 18, name: DTC, random_state: 90}, sub: {k_neighbors: 4, m_neighbors: 4, out_step: 0.8101857565396289, random_state: 90, smo_grp: OVER, type: SVMSMOTE}}
Random	109	DT	OneSidedSelection	Under resampling	0.9989
{classifier: {criterion: entropy, max_depth: 7, max_features: None, min_samples_leaf: 10, min_samples_split: 12, name: DTC, random_state: 109}, sub: {n_neighbors: 3, n_seeds_S: 10, random_state: 109, smo_grp: UNDER, type: OneSidedSelection}}
TPE	9	RF	SVMSMOTE	Over resampling	0.9919
{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 7, n_estimators: 54, name: RF, random_state: 9}, sub: {k_neighbors: 2, m_neighbors: 4, out_step: 0.39227088561725054, random_state: 9, smo_grp: OVER, type: SVMSMOTE}}
TPE	18	RF	CondensedNearest Neighbour	Under resampling	0.9954
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: log2, min_samples_leaf: 2, min_samples_split: 9, n_estimators: 100, name: RF, random_state: 18}, sub: {n_neighbors: 5, n_seeds_S: 31, random_state: 18, smo_grp: UNDER, type: CondensedNearestNeighbour}}
TPE	27	DT	SVMSMOTE	Over resampling	0.9943
{classifier: {criterion: gini, max_depth: 14, max_features: None, min_samples_leaf: 19, min_samples_split: 16, name: DTC, random_state: 27}, sub: {k_neighbors: 7, m_neighbors: 1, out_step: 0.14553819045852984, random_state: 27, smo_grp: OVER, type: SVMSMOTE}}
TPE	29	KNN	RandomOverSampler	Over resampling	0.9784
{classifier: {algorithm: ball_tree, n_neighbors: 5, name: KNN, p: 1, random_state: 29, weights: distance}, sub: {random_state: 29, smo_grp: OVER, type: RandomOverSampler}}
TPE	36	RF	OneSidedSelection	Under resampling	0.9977
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 5, min_samples_split: 18, n_estimators: 10, name: RF, random_state: 36}, sub: {n_neighbors: 6, n_seeds_S: 11, random_state: 36, smo_grp: UNDER, type: OneSidedSelection}}
TPE	39	RF	CondensedNearest Neighbour	Under resampling	0.9931
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 1, min_samples_split: 12, n_estimators: 122, name: RF, random_state: 39}, sub: {n_neighbors: 20, n_seeds_S: 17, random_state: 39, smo_grp: UNDER, type: CondensedNearestNeighbour}}
TPE	59	RF	SVMSMOTE	Over resampling	0.9919
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 1, min_samples_split: 8, n_estimators: 108, name: RF, random_state: 59}, sub: {k_neighbors: 6, m_neighbors: 2, out_step: 0.022868556026705428, random_state: 59, smo_grp: OVER, type: SVMSMOTE}}
TPE	79	RF	CondensedNearest Neighbour	Under resampling	0.9954
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 4, min_samples_split: 11, n_estimators: 28, name: RF, random_state: 79}, sub: {n_neighbors: 7, n_seeds_S: 37, random_state: 79, smo_grp: UNDER, type: CondensedNearestNeighbour}}
TPE	90	KNN	SMOTE	Over resampling	0.9871
{classifier: {algorithm: brute, n_neighbors: 3, name: KNN, p: 1, random_state: 90, weights: distance}, sub: {k_neighbors: 6, random_state: 90, smo_grp: OVER, type: SMOTE}}
TPE	109	DT	OneSidedSelection	Under resampling	1.0
{classifier: {criterion: entropy, max_depth: 11, max_features: None, min_samples_leaf: 5, min_samples_split: 4, name: DTC, random_state: 109}, sub: {n_neighbors: 13, n_seeds_S: 18, random_state: 109, smo_grp: UNDER, type: OneSidedSelection}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	LR	RandomOverSampler	Over resampling	0.8608
Grid	18	LR	RandomOverSampler	Over resampling	0.8486
Grid	27	LR	SMOTENC	Over resampling	0.8494
Grid	29	LR	SMOTENC	Over resampling	0.8494
Grid	36	LR	RandomOverSampler	Over resampling	0.8594
Grid	39	LR	SMOTE	Over resampling	0.8516
Grid	59	LR	RandomOverSampler	Over resampling	0.8559
Grid	79	LR	SMOTENC	Over resampling	0.8509
Grid	90	LR	RandomOverSampler	Over resampling	0.8538
Grid	109	LR	RandomOverSampler	Over resampling	0.856
Random	9	SVM	ADASYN	Over resampling	0.8854

{classifier: {C: 58.64756313448606, coef0: 0.40480598581163996, degree: 3, gamma: auto, gamma_value: 2.0283939053920426, kernel: linear, name: SVM, probability: False, random_state: 9, shrinking: False, tol: 0.05417026293314136}, sub: {n_neighbors: 9, random_state: 9, smo_grp: OVER, type: ADASYN}}

| Random | 18 | SVM | SMOTETomek | Combine resampling | 0.8719 |

{classifier: {C: 55.82769861791409, coef0: 0.40717809307755437, degree: 3, gamma: auto, gamma_value: 0.49894144885457997, kernel: linear, name: SVM, probability: True, random_state: 18, shrinking: False, tol: 0.08244348179487578}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTETomek}}

| Random | 27 | LR | SMOTENC | Over resampling | 0.8693 |

{classifier: {C: 98.38604467957984, l1_ratio: 0.7048837994426485, name: LR, penalty_solver: none+lbfgs, random_state: 27, tol: 0.04806159297476161}, sub: {categorical_features: True, k_neighbors: 1, random_state: 27, smo_grp: OVER, type: SMOTENC}}

| Random | 29 | LR | SMOTE | Over resampling | 0.871 |

{classifier: {C: 23.008223309745926, l1_ratio: 0.31549202120130315, name: LR, penalty_solver: none+lbfgs, random_state: 29, tol: 0.025462746291494042}, sub: {k_neighbors: 7, random_state: 29, smo_grp: OVER, type: SMOTE}}

| Random | 36 | SVM | SMOTENC | Over resampling | 0.8824 |

{classifier: {C: 44.34981981898237, coef0: -0.13687015215419573, degree: 2, gamma: auto, gamma_value: 1.6382662647225437, kernel: linear, name: SVM, probability: False, random_state: 36, shrinking: False, tol: 0.03269193851633511}, sub: {categorical_features: True, k_neighbors: 3, random_state: 36, smo_grp: OVER, type: SMOTENC}}

| Random | 39 | LR | SMOTETomek | Combine resampling | 0.8687 |

{classifier: {C: 49.918260995838, l1_ratio: 0.7919194951035666, name: LR, penalty_solver: l2+lbfgs, random_state: 39, tol: 0.008002570661419234}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTETomek}}

| Random | 59 | SVM | SMOTE | Over resampling | 0.8797 |

{classifier: {C: 65.1801753182949, coef0: 0.4347639500577565, degree: 4, gamma: value, gamma_value: 0.5484826099865728, kernel: linear, name: SVM, probability: True, random_state: 59, shrinking: False, tol: 0.01405094000797983}, sub: {k_neighbors: 8, random_state: 59, smo_grp: OVER, type: SMOTE}}

| Random | 79 | LR | SMOTENC | Over resampling | 0.8713 |

{classifier: {C: 52.78491992750671, l1_ratio: 0.9987748255160342, name: LR, penalty_solver: none+newton-cg, random_state: 79, tol: 0.04981068651223781}, sub: {categorical_features: True, k_neighbors: 8, random_state: 79, smo_grp: OVER, type: SMOTENC}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	SVM	RandomUnderSampler	Under resampling	0.8738

{classifier: {C: 103.39809274240693, coef0: -0.4781096526667936, degree: 2, gamma: auto, gamma_value: 5.669366673305926, kernel: linear, name: SVM, probability: True, random_state: 90, shrinking: False, tol: 0.08387359920077694}, sub: {random_state: 90, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}

| Random | 109 | LR | SMOTENC | Over resampling | 0.8782 |

{classifier: {C: 66.49933672768036, l1_ratio: 0.39073389361357774, name: LR, penalty_solver: none+newton-cg, random_state: 109, tol: 0.016041288922956014}, sub: {categorical_features: True, k_neighbors: 1, random_state: 109, smo_grp: OVER, type: SMOTENC}}

| TPE | 9 | SVM | ADASYN | Over resampling | 0.9005 |

{classifier: {C: 82.3427992598431, coef0: -0.8565857418431722, degree: 2, gamma: value, gamma_value: 3.5985247421791713, kernel: linear, name: SVM, probability: True, random_state: 9, shrinking: True, tol: 0.03877359241963919}, sub: {n_neighbors: 8, random_state: 9, smo_grp: OVER, type: ADASYN}}

| TPE | 18 | LR | SMOTE | Over resampling | 0.885 |

{classifier: {C: 9.034539672150418, l1_ratio: 0.7955438456572941, name: LR, penalty_solver: l2+newton-cg, random_state: 18, tol: 0.07080181339322889}, sub: {k_neighbors: 3, random_state: 18, smo_grp: OVER, type: SMOTE}}

| TPE | 27 | LR | ADASYN | Over resampling | 0.8784 |

{classifier: {C: 11.505204615856726, l1_ratio: 0.09879714942648171, name: LR, penalty_solver: l2+lbfgs, random_state: 27, tol: 0.03354006527744484}, sub: {n_neighbors: 4, random_state: 27, smo_grp: OVER, type: ADASYN}}

| TPE | 29 | LR | NearMiss | Under resampling | 0.882 |

{classifier: {C: 30.415782151623834, l1_ratio: 0.00015493098132079997, name: LR, penalty_solver: l2+lbfgs, random_state: 29, tol: 0.013678308803065756}, sub: {n_neighbors: 3, n_neighbors_ver3: 9, smo_grp: UNDER, type: NearMiss, version: 1}}

| TPE | 36 | LR | SMOTENC | Over resampling | 0.8802 |

{classifier: {C: 88.84685084378319, l1_ratio: 0.3768276665388975, name: LR, penalty_solver: l2+newton-cg, random_state: 36, tol: 0.07100993690601853}, sub: {categorical_features: True, k_neighbors: 1, random_state: 36, smo_grp: OVER, type: SMOTENC}}

| TPE | 39 | SVM | ADASYN | Over resampling | 0.8838 |

{classifier: {C: 62.7807290621454, coef0: -0.8969538024047148, degree: 4, gamma: auto, gamma_value: 5.179676861315502, kernel: linear, name: SVM, probability: True, random_state: 39, shrinking: False, tol: 0.07667324654190562}, sub: {n_neighbors: 6, random_state: 39, smo_grp: OVER, type: ADASYN}}

| TPE | 59 | SVM | SMOTE | Over resampling | 0.9051 |

{classifier: {C: 66.334450904610852, coef0: -0.006971694377761156, degree: 4, gamma: value, gamma_value: 7.613576658140319, kernel: linear, name: SVM, probability: False, random_state: 59, shrinking: False, tol: 0.07892312451558775}, sub: {k_neighbors: 4, random_state: 59, smo_grp: OVER, type: SMOTE}}

| TPE | 79 | LR | SMOTENC | Over resampling | 0.8812 |

{classifier: {C: 27.139669834484685, l1_ratio: 0.555598734311664, name: LR, penalty_solver: l2+lbfgs, random_state: 79, tol: 0.0015439131805275834}, sub: {categorical_features: True, k_neighbors: 1, random_state: 79, smo_grp: OVER, type: SMOTENC}}

| TPE | 90 | SVM | RandomUnderSampler | Under resampling | 0.8841 |

{classifier: {C: 155.80608628204877, coef0: -0.25839870193143577, degree: 3, gamma: scale, gamma_value: 3.754660435734395, kernel: linear, name: SVM, probability: True, random_state: 90, shrinking: True, tol: 0.047735434282750046}, sub: {random_state: 90, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}

| TPE | 109 | SVM | SMOTENC | Over resampling | 0.9087 |

{classifier: {C: 61.13148904505615, coef0: -0.9043774585172724, degree: 2, gamma: auto, gamma_value: 5.616016029676777, kernel: linear, name: SVM, probability: True, random_state: 109, shrinking: False, tol: 0.027867927887814094}, sub: {categorical_features: True, k_neighbors: 9, random_state: 109, smo_grp: OVER, type: SMOTENC}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	SMOTEENN	Combine resampling	0.9416
Grid	18	DT	Instance HardnessThreshold	Under resampling	0.9289
Grid	27	DT	Instance HardnessThreshold	Under resampling	0.9318
Grid	29	DT	Instance HardnessThreshold	Under resampling	0.9318
Grid	36	RF	CondensedNearest Neighbour	Under resampling	0.9223
Grid	39	DT	Instance HardnessThreshold	Under resampling	0.9318
Grid	59	DT	Instance HardnessThreshold	Under resampling	0.929
Grid	79	DT	NearMiss	Under resampling	0.926
Grid	90	RF	SMOTEENN	Combine resampling	0.9295
Grid	109	DT	Instance HardnessThreshold	Under resampling	0.9318
Random	9	KNN	ADASYN	Over resampling	0.9476
{classifier: {algorithm: brute, n_neighbors: 7, name: KNN, p: 9, random_state: 9, weights: distance}, sub: {n_neighbors: 6, random_state: 9, smo_grp: OVER, type: ADASYN}}					
Random	18	KNN	SMOTEENN	Combine resampling	0.954
{classifier: {algorithm: brute, n_neighbors: 5, name: KNN, p: 11, random_state: 18, weights: distance}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTEENN}}					
Random	27	KNN	SMOTE	Over resampling	0.9511
{classifier: {algorithm: kd_tree, n_neighbors: 8, name: KNN, p: 18, random_state: 27, weights: uniform}, sub: {k_neighbors: 6, random_state: 27, smo_grp: OVER, type: SMOTE}}					
Random	29	RF	BorderlineSMOTE	Over resampling	0.9416
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 8, min_samples_split: 16, n_estimators: 65, name: RF, random_state: 29}, sub: {k_neighbors: 3, kind: borderline-1, m_neighbors: 3, random_state: 29, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	36	DT	SMOTEENN	Combine resampling	0.9528
{classifier: {criterion: gini, max_depth: 8, max_features: 1, min_samples_leaf: 2, min_samples_split: 3, name: DTC, random_state: 36}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTEENN}}					
Random	39	DT	RandomOverSampler	Over resampling	0.9826
{classifier: {criterion: gini, max_depth: 11, max_features: 1, min_samples_leaf: 5, min_samples_split: 13, name: DTC, random_state: 39}, sub: {random_state: 39, smo_grp: OVER, type: RandomOverSampler}}					
Random	59	RF	RandomOverSampler	Over resampling	0.9387
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 6, min_samples_split: 3, n_estimators: 144, name: RF, random_state: 59}, sub: {random_state: 59, smo_grp: OVER, type: RandomOverSampler}}					
Random	79	KNN	ADASYN	Over resampling	0.954
{classifier: {algorithm: ball_tree, n_neighbors: 7, name: KNN, p: 16, random_state: 79, weights: uniform}, sub: {n_neighbors: 5, random_state: 79, smo_grp: OVER, type: ADASYN}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	KNN	SMOTEENN	Combine resampling	0.9569
{classifier: {algorithm: auto, n_neighbors: 1, name: KNN, p: 11, random_state: 90, weights: distance}, sub: {random_state: 90, smo_grp: COMBINE, type: SMOTEENN}}					
Random	109	KNN	SMOTETomek	Combine resampling	0.9511
{classifier: {algorithm: brute, n_neighbors: 6, name: KNN, p: 17, random_state: 109, weights: uniform}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	9	KNN	SMOTETomek	Combine resampling	0.954
{classifier: {algorithm: ball_tree, n_neighbors: 6, name: KNN, p: 9, random_state: 9, weights: distance}, sub: {random_state: 9, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	18	KNN	SMOTEENN	Combine resampling	0.9569
{classifier: {algorithm: brute, n_neighbors: 1, name: KNN, p: 4, random_state: 18, weights: uniform}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	27	RF	AllKNN	Under resampling	0.9913
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 1, min_samples_split: 10, n_estimators: 3, name: RF, random_state: 27}, sub: {allow_minority: False, kind_sel: mode, n_neighbors: 17, smo_grp: UNDER, type: AllKNN}}					
TPE	29	DT	SMOTEENN	Combine resampling	0.9574
{classifier: {criterion: gini, max_depth: 10, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 13, name: DTC, random_state: 29}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	36	RF	SMOTEENN	Combine resampling	0.9564
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 18, n_estimators: 5, name: RF, random_state: 36}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	39	RF	No resampling	No resampling	0.9593
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 2, min_samples_split: 16, n_estimators: 79, name: RF, random_state: 39}, sub: {smo_grp: NO, type: NO}}					
TPE	59	RF	RepeatedEdited NearestNeighbours	Under resampling	0.9445
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 4, min_samples_split: 4, n_estimators: 14, name: RF, random_state: 59}, sub: {kind_sel: all, n_neighbors: 3, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	79	RF	BorderlineSMOTE	Over resampling	0.9511
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 13, min_samples_split: 6, n_estimators: 137, name: RF, random_state: 79}, sub: {k_neighbors: 3, kind: borderline-2, m_neighbors: 5, random_state: 79, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	90	RF	RandomOverSampler	Over resampling	0.9387
{classifier: {bootstrap: False, class_weight: None, criterion: entropy, max_features: sqrt, min_samples_leaf: 8, min_samples_split: 2, n_estimators: 75, name: RF, random_state: 90}, sub: {random_state: 90, smo_grp: OVER, type: RandomOverSampler}}					
TPE	109	KNN	ADASYN	Over resampling	0.9574
{classifier: {algorithm: auto, n_neighbors: 5, name: KNN, p: 13, random_state: 109, weights: uniform}, sub: {n_neighbors: 4, random_state: 109, smo_grp: OVER, type: ADASYN}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	RF	RandomUnderSampler	Under resampling	1.0
Grid	18	RF	NearMiss	Under resampling	1.0
Grid	27	RF	ClusterCentroids	Under resampling	1.0
Grid	29	RF	ClusterCentroids	Under resampling	1.0
Grid	36	RF	NearMiss	Under resampling	1.0
Grid	39	RF	NearMiss	Under resampling	1.0
Grid	59	RF	ClusterCentroids	Under resampling	1.0
Grid	79	RF	NearMiss	Under resampling	1.0
Grid	90	RF	RandomUnderSampler	Under resampling	1.0
Grid	109	RF	ClusterCentroids	Under resampling	1.0
Random	9	DT	BorderlineSMOTE	Over resampling	1.0

{classifier: {criterion: gini, max_depth: 3, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 18, name: DTC, random_state: 9}, sub: {k_neighbors: 2, kind: borderline-2, m_neighbors: 9, random_state: 9, smo_grp: OVER, type: BorderlineSMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	18	RF	Instance HardnessThreshold	Under resampling	1.0

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 14, min_samples_split: 14, n_estimators: 102, name: RF, random_state: 18}, sub: {cv: 6, estimator: adaboost, random_state: 18, smo_grp: UNDER, type: InstanceHardnessThreshold}}

| Random | 27 | RF | TomekLinks | Under resampling | 1.0 |

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 2, n_estimators: 100, name: RF, random_state: 27}, sub: {smo_grp: UNDER, type: TomekLinks}}

| Random | 29 | RF | Instance HardnessThreshold | Under resampling | 1.0 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 8, min_samples_split: 11, n_estimators: 145, name: RF, random_state: 29}, sub: {cv: 6, estimator: knn, random_state: 29, smo_grp: UNDER, type: InstanceHardnessThreshold}}

| Random | 36 | RF | EditedNearest Neighbours | Under resampling | 1.0 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 7, min_samples_split: 6, n_estimators: 119, name: RF, random_state: 36}, sub: {kind_sel: mode, n_neighbors: 4, smo_grp: UNDER, type: EditedNearestNeighbours}}

| Random | 39 | DT | RandomOverSampler | Over resampling | 1.0 |

{classifier: {criterion: gini, max_depth: 18, max_features: log2, min_samples_leaf: 7, min_samples_split: 4, name: DTC, random_state: 39}, sub: {random_state: 39, smo_grp: OVER, type: RandomOverSampler}}

| Random | 59 | RF | RepeatedEdited NearestNeighbours | Under resampling | 1.0 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 7, min_samples_split: 4, n_estimators: 139, name: RF, random_state: 59}, sub: {kind_sel: mode, n_neighbors: 2, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}

| Random | 79 | DT | BorderlineSMOTE | Over resampling | 1.0 |

{classifier: {criterion: entropy, max_depth: 3, max_features: None, min_samples_leaf: 17, min_samples_split: 2, name: DTC, random_state: 79}, sub: {k_neighbors: 2, kind: borderline-2, m_neighbors: 7, random_state: 79, smo_grp: OVER, type: BorderlineSMOTE}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	AllKNN	Under resampling	1.0

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 8, min_samples_split: 8, n_estimators: 19, name: RF, random_state: 90}, sub: {allow_minority: False, kind_sel: mode, n_neighbors: 17, smo_grp: UNDER, type: AllKNN}}

| Random | 109 | RF | SMOTE | Over resampling | 1.0 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 6, min_samples_split: 4, n_estimators: 68, name: RF, random_state: 109}, sub: {k_neighbors: 3, random_state: 109, smo_grp: OVER, type: SMOTE}}

| TPE | 9 | DT | BorderlineSMOTE | Over resampling | 1.0 |

{classifier: {criterion: gini, max_depth: 3, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 18, name: DTC, random_state: 9}, sub: {k_neighbors: 2, kind: borderline-2, m_neighbors: 9, random_state: 9, smo_grp: OVER, type: BorderlineSMOTE}}

| TPE | 18 | RF | No resampling | No resampling | 1.0 |

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 4, min_samples_split: 19, n_estimators: 97, name: RF, random_state: 18}, sub: {smo_grp: NO, type: NO}}

| TPE | 27 | RF | TomekLinks | Under resampling | 1.0 |

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 2, n_estimators: 100, name: RF, random_state: 27}, sub: {smo_grp: UNDER, type: TomekLinks}}

| TPE | 29 | RF | BorderlineSMOTE | Over resampling | 1.0 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 9, min_samples_split: 2, n_estimators: 101, name: RF, random_state: 29}, sub: {k_neighbors: 7, kind: borderline-2, m_neighbors: 4, random_state: 29, smo_grp: OVER, type: BorderlineSMOTE}}

| TPE | 36 | RF | AllKNN | Under resampling | 1.0 |

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 15, min_samples_split: 7, n_estimators: 114, name: RF, random_state: 36}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 15, smo_grp: UNDER, type: AllKNN}}

| TPE | 39 | DT | RandomOverSampler | Over resampling | 1.0 |

{classifier: {criterion: gini, max_depth: 4, max_features: None, min_samples_leaf: 14, min_samples_split: 10, name: DTC, random_state: 39}, sub: {random_state: 39, smo_grp: OVER, type: RandomOverSampler}}

| TPE | 59 | RF | RepeatedEdited NearestNeighbours | Under resampling | 1.0 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 7, min_samples_split: 4, n_estimators: 139, name: RF, random_state: 59}, sub: {kind_sel: mode, n_neighbors: 2, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}

| TPE | 79 | DT | BorderlineSMOTE | Over resampling | 1.0 |

{classifier: {criterion: entropy, max_depth: 3, max_features: None, min_samples_leaf: 17, min_samples_split: 2, name: DTC, random_state: 79}, sub: {k_neighbors: 2, kind: borderline-2, m_neighbors: 7, random_state: 79, smo_grp: OVER, type: BorderlineSMOTE}}

| TPE | 90 | RF | ClusterCentroids | Under resampling | 1.0 |

{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 5, n_estimators: 114, name: RF, random_state: 90}, sub: {estimator: MiniBatchKMeans, random_state: 90, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}

| TPE | 109 | RF | CondensedNearest Neighbour | Under resampling | 1.0 |

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 4, min_samples_split: 3, n_estimators: 60, name: RF, random_state: 109}, sub: {n_neighbors: 23, n_seeds_S: 23, random_state: 109, smo_grp: UNDER, type: CondensedNearestNeighbour}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	KNN	SMOTE	Over resampling	0.6696
Grid	18	KNN	SMOTENC	Over resampling	0.6642
Grid	27	KNN	SMOTENC	Over resampling	0.6529
Grid	29	KNN	SMOTENC	Over resampling	0.686
Grid	36	KNN	SMOTE	Over resampling	0.672
Grid	39	KNN	ClusterCentroids	Under resampling	0.6564
Grid	59	KNN	SMOTE	Over resampling	0.6678
Grid	79	DT	Instance HardnessThreshold	Under resampling	0.6523
Grid	90	LR	SMOTENC	Over resampling	0.6684
Grid	109	LR	SMOTENC	Over resampling	0.6604
Random	9	KNN	SMOTE	Over resampling	0.6954
{classifier: {algorithm: brute, n_neighbors: 13, name: KNN, p: 11, random_state: 9, weights: distance}, sub: {k_neighbors: 6, random_state: 9, smo_grp: OVER, type: SMOTE}}					
Random	18	LR	SMOTENC	Over resampling	0.656
{classifier: {C: 60.13019121683219, l1_ratio: 0.399945433726795, name: LR, penalty_solver: none+saga, random_state: 18, tol: 0.00958882001638638}, sub: {categorical_features: True, k_neighbors: 9, random_state: 18, smo_grp: OVER, type: SMOTENC}}					
Random	27	KNN	SMOTE	Over resampling	0.7068
{classifier: {algorithm: auto, n_neighbors: 18, name: KNN, p: 1, random_state: 27, weights: distance}, sub: {k_neighbors: 9, random_state: 27, smo_grp: OVER, type: SMOTE}}					
Random	29	DT	RandomOverSampler	Over resampling	0.6949
{classifier: {criterion: entropy, max_depth: 6, max_features: 1, min_samples_leaf: 7, min_samples_split: 18, name: DTC, random_state: 29}, sub: {random_state: 29, smo_grp: OVER, type: RandomOverSampler}}					
Random	36	KNN	SMOTETomek	Combine resampling	0.6838
{classifier: {algorithm: brute, n_neighbors: 9, name: KNN, p: 13, random_state: 36, weights: uniform}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTETomek}}					
Random	39	KNN	ADASYN	Over resampling	0.7059
{classifier: {algorithm: auto, n_neighbors: 10, name: KNN, p: 17, random_state: 39, weights: distance}, sub: {n_neighbors: 9, random_state: 39, smo_grp: OVER, type: ADASYN}}					
Random	59	KNN	BorderlineSMOTE	Over resampling	0.676
{classifier: {algorithm: auto, n_neighbors: 18, name: KNN, p: 18, random_state: 59, weights: distance}, sub: {k_neighbors: 9, kind: borderline-1, m_neighbors: 8, random_state: 59, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	79	RF	EditedNearest Neighbours	Under resampling	0.6986
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 16, min_samples_split: 2, n_estimators: 115, name: RF, random_state: 79}, sub: {kind_sel: all, n_neighbors: 9, smo_grp: UNDER, type: EditedNearestNeighbours}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	KNN	SMOTETomek	Combine resampling	0.6922
{classifier: {algorithm: auto, n_neighbors: 10, name: KNN, p: 15, random_state: 90, weights: distance}, sub: {random_state: 90, smo_grp: COMBINE, type: SMOTETomek}}					
Random	109	LR	SMOTENC	Over resampling	0.6642
{classifier: {C: 42.52068244078922, l1_ratio: 0.09769004172422886, name: LR, penalty_solver: l2+lbfgs, random_state: 109, tol: 0.02327666564769447}, sub: {categorical_features: True, k_neighbors: 2, random_state: 109, smo_grp: OVER, type: SMOTENC}}					
TPE	9	SVM	Instance HardnessThreshold	Under resampling	0.6742
{classifier: {C: 190.3857211193496, coef0: -0.8455305027943326, degree: 3, gamma: auto, gamma_value: 0.45055916418462727, kernel: sigmoid, name: SVM, probability: False, random_state: 9, shrinking: False, tol: 0.0622905510830619}, sub: {cv: 8, estimator: None, random_state: 9, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
TPE	18	KNN	SMOTETomek	Combine resampling	0.698
{classifier: {algorithm: kd_tree, n_neighbors: 9, name: KNN, p: 17, random_state: 18, weights: distance}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	27	LR	SMOTENC	Over resampling	0.6871
{classifier: {C: 31.77423066673998, l1_ratio: 0.5682482279697166, name: LR, penalty_solver: none+saga, random_state: 27, tol: 0.0748649619630661}, sub: {categorical_features: True, k_neighbors: 7, random_state: 27, smo_grp: OVER, type: SMOTENC}}					
TPE	29	KNN	SMOTE	Over resampling	0.7217
{classifier: {algorithm: ball_tree, n_neighbors: 10, name: KNN, p: 19, random_state: 29, weights: distance}, sub: {k_neighbors: 9, random_state: 29, smo_grp: OVER, type: SMOTE}}					
TPE	36	RF	RepeatedEdited NearestNeighbours	Under resampling	0.7109
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 14, min_samples_split: 18, n_estimators: 49, name: RF, random_state: 36}, sub: {kind_sel: all, n_neighbors: 7, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	39	LR	SMOTENC	Over resampling	0.6853
{classifier: {C: 70.93372840539601, l1_ratio: 0.2115081946371305, name: LR, penalty_solver: l1+saga, random_state: 39, tol: 0.022191687447351116}, sub: {categorical_features: True, k_neighbors: 7, random_state: 39, smo_grp: OVER, type: SMOTENC}}					
TPE	59	RF	SMOTEENN	Combine resampling	0.7
{classifier: {bootstrap: True, class_weight: None, criterion: entropy, max_features: 1, min_samples_leaf: 12, min_samples_split: 3, n_estimators: 74, name: RF, random_state: 59}, sub: {random_state: 59, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	79	KNN	SMOTE	Over resampling	0.707
{classifier: {algorithm: kd_tree, n_neighbors: 10, name: KNN, p: 10, random_state: 79, weights: distance}, sub: {k_neighbors: 8, random_state: 79, smo_grp: OVER, type: SMOTE}}					
TPE	90	KNN	SMOTE	Over resampling	0.7323
{classifier: {algorithm: kd_tree, n_neighbors: 9, name: KNN, p: 16, random_state: 90, weights: uniform}, sub: {k_neighbors: 9, random_state: 90, smo_grp: OVER, type: SMOTE}}					
TPE	109	KNN	BorderlineSMOTE	Over resampling	0.7181
{classifier: {algorithm: kd_tree, n_neighbors: 10, name: KNN, p: 7, random_state: 109, weights: distance}, sub: {k_neighbors: 7, kind: borderline-1, m_neighbors: 5, random_state: 109, smo_grp: OVER, type: BorderlineSMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	DT	Instance HardnessThreshold	Under resampling	0.9438
Grid	18	DT	CondensedNearest Neighbour	Under resampling	0.9463
Grid	27	DT	Instance HardnessThreshold	Under resampling	0.9438
Grid	29	DT	CondensedNearest Neighbour	Under resampling	0.9438
Grid	36	RF	Instance HardnessThreshold	Under resampling	0.9438
Grid	39	DT	Instance HardnessThreshold	Under resampling	0.9438
Grid	59	DT	CondensedNearest Neighbour	Under resampling	0.9438
Grid	79	DT	Instance HardnessThreshold	Under resampling	0.9414
Grid	90	DT	CondensedNearest Neighbour	Under resampling	0.9438
Grid	109	DT	Instance HardnessThreshold	Under resampling	0.9438
Random	9	RF	RandomOverSampler	Over resampling	0.9488

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 8, min_samples_split: 9, n_estimators: 137, name: RF, random_state: 9}, sub: {random_state: 9, smo_grp: OVER, type: RandomOverSampler}}

Random	18	RF	RandomOverSampler	Over resampling	0.9488

{classifier: {bootstrap: True, class_weight: None, criterion: gini, max_features: sqrt, min_samples_leaf: 10, min_samples_split: 12, n_estimators: 120, name: RF, random_state: 18}, sub: {random_state: 18, smo_grp: OVER, type: RandomOverSampler}}

Random	27	RF	Instance HardnessThreshold	Under resampling	0.9598

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 3, min_samples_split: 17, n_estimators: 67, name: RF, random_state: 27}, sub: {cv: 4, estimator: decision-tree, random_state: 27, smo_grp: UNDER, type: InstanceHardnessThreshold}}

Random	29	RF	Instance HardnessThreshold	Under resampling	0.9537

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 8, min_samples_split: 11, n_estimators: 145, name: RF, random_state: 29}, sub: {cv: 6, estimator: knn, random_state: 29, smo_grp: UNDER, type: InstanceHardnessThreshold}}

Random	36	DT	SMOTEENN	Combine resampling	0.9529

{classifier: {criterion: gini, max_depth: 15, max_features: 1, min_samples_leaf: 16, min_samples_split: 5, name: DTC, random_state: 36}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTEENN}}

Random	39	DT	RandomOverSampler	Over resampling	0.9826

{classifier: {criterion: gini, max_depth: 11, max_features: 1, min_samples_leaf: 5, min_samples_split: 13, name: DTC, random_state: 39}, sub: {random_state: 39, smo_grp: OVER, type: RandomOverSampler}}

Random	59	RF	RandomOverSampler	Over resampling	0.9512

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 6, min_samples_split: 3, n_estimators: 144, name: RF, random_state: 59}, sub: {random_state: 59, smo_grp: OVER, type: RandomOverSampler}}

Random	79	RF	EditedNearest Neighbours	Under resampling	0.9488

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 3, min_samples_split: 17, n_estimators: 78, name: RF, random_state: 79}, sub: {kind_sel: all, n_neighbors: 18, smo_grp: UNDER, type: EditedNearestNeighbours}}

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Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	RandomOverSampler	Over resampling	0.9512

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 5, min_samples_split: 15, n_estimators: 143, name: RF, random_state: 90}, sub: {random_state: 90, smo_grp: OVER, type: RandomOverSampler}}

Random	109	DT	RandomOverSampler	Over resampling	0.9568

{classifier: {criterion: gini, max_depth: 11, max_features: sqrt, min_samples_leaf: 2, min_samples_split: 9, name: DTC, random_state: 109}, sub: {random_state: 109, smo_grp: OVER, type: RandomOverSampler}}

TPE	9	RF	EditedNearest Neighbours	Under resampling	0.9628

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 5, min_samples_split: 4, n_estimators: 134, name: RF, random_state: 9}, sub: {kind_sel: mode, n_neighbors: 7, smo_grp: UNDER, type: EditedNearestNeighbours}}

TPE	18	RF	AllKNN	Under resampling	0.9628

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 5, min_samples_split: 8, n_estimators: 121, name: RF, random_state: 18}, sub: {allow_minority: True, kind_sel: mode, n_neighbors: 10, smo_grp: UNDER, type: AllKNN}}

TPE	27	RF	OneSidedSelection	Under resampling	0.9686

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 13, n_estimators: 118, name: RF, random_state: 27}, sub: {n_neighbors: 8, n_seeds_S: 1, random_state: 27, smo_grp: UNDER, type: OneSidedSelection}}

TPE	29	RF	Instance HardnessThreshold	Under resampling	0.9628

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 4, min_samples_split: 8, n_estimators: 137, name: RF, random_state: 29}, sub: {cv: 2, estimator: decision-tree, random_state: 29, smo_grp: UNDER, type: InstanceHardnessThreshold}}

TPE	36	DT	SMOTEENN	Combine resampling	0.9529

{classifier: {criterion: gini, max_depth: 15, max_features: 1, min_samples_leaf: 16, min_samples_split: 5, name: DTC, random_state: 36}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTEENN}}

TPE	39	RF	OneSidedSelection	Under resampling	0.9876

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 3, min_samples_split: 13, n_estimators: 22, name: RF, random_state: 39}, sub: {n_neighbors: 10, n_seeds_S: 4, random_state: 39, smo_grp: UNDER, type: OneSidedSelection}}

TPE	59	DT	Instance HardnessThreshold	Under resampling	0.9568

{classifier: {criterion: entropy, max_depth: 12, max_features: None, min_samples_leaf: 2, min_samples_split: 8, name: DTC, random_state: 59}, sub: {cv: 7, estimator: knn, random_state: 59, smo_grp: UNDER, type: InstanceHardnessThreshold}}

TPE	79	RF	TomekLinks	Under resampling	0.9628

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 4, min_samples_split: 10, n_estimators: 100, name: RF, random_state: 79}, sub: {smo_grp: UNDER, type: TomekLinks}}

TPE	90	RF	No resampling	No resampling	0.9568

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: 1, min_samples_leaf: 4, min_samples_split: 15, n_estimators: 66, name: RF, random_state: 90}, sub: {smo_grp: NO, type: NO}}

TPE	109	RF	RepeatedEdited NearestNeighbours	Under resampling	0.9628

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 2, min_samples_split: 19, n_estimators: 107, name: RF, random_state: 109}, sub: {kind_sel: all, n_neighbors: 1, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	DT	Instance HardnessThreshold	Under resampling	0.8216
Grid	18	KNN	SVMSMOTE	Over resampling	0.7927
Grid	27	DT	SMOTEENN	Combine resampling	0.7818
Grid	29	RF	RandomUnderSampler	Under resampling	0.8171
Grid	36	DT	SMOTEENN	Combine resampling	0.7864
Grid	39	KNN	RandomOverSampler	Over resampling	0.7704
Grid	59	KNN	BorderlineSMOTE	Over resampling	0.7859
Grid	79	DT	Instance HardnessThreshold	Under resampling	0.8069
Grid	90	KNN	BorderlineSMOTE	Over resampling	0.787
Grid	109	RF	RandomUnderSampler	Under resampling	0.7956
Random	9	RF	Neighbourhood CleaningRule	Under resampling	0.8341
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 7, min_samples_split: 5, n_estimators: 94, name: RF, random_state: 9}, sub: {n_neighbors: 16, smo_grp: UNDER, threshold_cleaning: 0.8559640363807882, type: NeighbourhoodCleaningRule}}					
Random	18	KNN	RandomOverSampler	Over resampling	0.8022
{classifier: {algorithm: brute, n_neighbors: 21, name: KNN, p: 1, random_state: 18, weights: uniform}, sub: {random_state: 18, smo_grp: OVER, type: RandomOverSampler}}					
Random	27	KNN	SMOTE	Over resampling	0.8055
{classifier: {algorithm: auto, n_neighbors: 18, name: KNN, p: 1, random_state: 27, weights: distance}, sub: {k_neighbors: 9, random_state: 27, smo_grp: OVER, type: SMOTE}}					
Random	29	RF	ClusterCentroids	Under resampling	0.7908
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 7, min_samples_split: 16, n_estimators: 142, name: RF, random_state: 29}, sub: {estimator: MiniBatchKMeans, random_state: 29, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	36	KNN	SMOTENC	Over resampling	0.7979
{classifier: {algorithm: kd_tree, n_neighbors: 17, name: KNN, p: 12, random_state: 36, weights: uniform}, sub: {categorical_features: True, k_neighbors: 1, random_state: 36, smo_grp: OVER, type: SMOTENC}}					
Random	39	KNN	RandomOverSampler	Over resampling	0.8115
{classifier: {algorithm: auto, n_neighbors: 31, name: KNN, p: 3, random_state: 39, weights: distance}, sub: {random_state: 39, smo_grp: OVER, type: RandomOverSampler}}					
Random	59	KNN	ClusterCentroids	Under resampling	0.7936
{classifier: {algorithm: auto, n_neighbors: 1, name: KNN, p: 2, random_state: 59, weights: uniform}, sub: {estimator: KMeans, random_state: 59, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
Random	79	SVM	CondensedNearest Neighbour	Under resampling	0.8009
{classifier: {C: 100.74844366989657, coef0: -0.42117710498134464, degree: 2, gamma: scale, gamma_value: 6.791626003158912, kernel: linear, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.013067102760301 76}, sub: {n_neighbors: 13, n_seeds_S: 34, random_state: 79, smo_grp: UNDER, type: CondensedNearestNeighbour}}					

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Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	KNN	SMOTEENN	Combine resampling	0.7858
{classifier: {algorithm: auto, n_neighbors: 1, name: KNN, p: 11, random_state: 90, weights: distance}, sub: {random_state: 90, smo_grp: COMBINE, type: SMOTEENN}}					
Random	109	KNN	SMOTEENN	Combine resampling	0.8093
{classifier: {algorithm: brute, n_neighbors: 13, name: KNN, p: 2, random_state: 109, weights: distance}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	9	DT	Instance HardnessThreshold	Under resampling	0.823
{classifier: {criterion: gini, max_depth: 15, max_features: None, min_samples_leaf: 1, min_samples_split: 7, name: DTC, random_state: 9}, sub: {cv: 5, estimator: None, random_state: 9, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
TPE	18	DT	RandomOverSampler	Over resampling	0.837
{classifier: {criterion: gini, max_depth: 19, max_features: sqrt, min_samples_leaf: 17, min_samples_split: 19, name: DTC, random_state: 18}, sub: {random_state: 18, smo_grp: OVER, type: RandomOverSampler}}					
TPE	27	RF	Neighbourhood CleaningRule	Under resampling	0.8751
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: None, min_samples_leaf: 5, min_samples_split: 6, n_estimators: 135, name: RF, random_state: 27}, sub: {n_neighbors: 17, smo_grp: UNDER, threshold_cleaning: 0.27218865887963245, type: NeighbourhoodCleaningRule}}					
TPE	29	KNN	SMOTE	Over resampling	0.8189
{classifier: {algorithm: auto, n_neighbors: 22, name: KNN, p: 1, random_state: 29, weights: uniform}, sub: {k_neighbors: 6, random_state: 29, smo_grp: OVER, type: SMOTE}}					
TPE	36	KNN	RandomOverSampler	Over resampling	0.8114
{classifier: {algorithm: ball_tree, n_neighbors: 20, name: KNN, p: 3, random_state: 36, weights: uniform}, sub: {random_state: 36, smo_grp: OVER, type: RandomOverSampler}}					
TPE	39	DT	SMOTENC	Over resampling	0.7985
{classifier: {criterion: gini, max_depth: 7, max_features: None, min_samples_leaf: 10, min_samples_split: 9, name: DTC, random_state: 39}, sub: {categorical_features: True, k_neighbors: 3, random_state: 39, smo_grp: OVER, type: SMOTENC}}					
TPE	59	KNN	RandomOverSampler	Over resampling	0.8294
{classifier: {algorithm: kd_tree, n_neighbors: 19, name: KNN, p: 1, random_state: 59, weights: distance}, sub: {random_state: 59, smo_grp: OVER, type: RandomOverSampler}}					
TPE	79	KNN	RandomOverSampler	Over resampling	0.8294
{classifier: {algorithm: kd_tree, n_neighbors: 18, name: KNN, p: 1, random_state: 79, weights: distance}, sub: {random_state: 79, smo_grp: OVER, type: RandomOverSampler}}					
TPE	90	DT	SMOTE	Over resampling	0.8081
{classifier: {criterion: entropy, max_depth: 10, max_features: None, min_samples_leaf: 4, min_samples_split: 15, name: DTC, random_state: 90}, sub: {k_neighbors: 9, random_state: 90, smo_grp: OVER, type: SMOTE}}					
TPE	109	KNN	RandomOverSampler	Over resampling	0.8005
{classifier: {algorithm: ball_tree, n_neighbors: 22, name: KNN, p: 4, random_state: 109, weights: uniform}, sub: {random_state: 109, smo_grp: OVER, type: RandomOverSampler}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	SVM	ClusterCentroids	Under resampling	0.8374
Grid	18	RF	RandomUnderSampler	Under resampling	0.8782
Grid	27	SVM	ClusterCentroids	Under resampling	0.8484
Grid	29	RF	RandomUnderSampler	Under resampling	0.8677
Grid	36	RF	Instance HardnessThreshold	Under resampling	0.8555
Grid	39	SVM	ClusterCentroids	Under resampling	0.8598
Grid	59	SVM	ClusterCentroids	Under resampling	0.8468
Grid	79	RF	RandomUnderSampler	Under resampling	0.8609
Grid	90	SVM	ClusterCentroids	Under resampling	0.8485
Grid	109	RF	RandomUnderSampler	Under resampling	0.8817
Random	9	RF	Neighbourhood CleaningRule	Under resampling	0.8522
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 14, min_samples_split: 19, n_estimators: 134, name: RF, random_state: 9}, sub: {n_neighbors: 13, smo_grp: UNDER, threshold_cleaning: 0.4342236592917519, type: NeighbourhoodCleaningRule}}					
Random	18	KNN	ClusterCentroids	Under resampling	0.8719
{classifier: {algorithm: auto, n_neighbors: 9, name: KNN, p: 1, random_state: 18, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 18, smo_grp: UNDER, type: ClusterCentroids, voting: soft}}					
Random	27	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8801
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: None, min_samples_leaf: 14, min_samples_split: 17, n_estimators: 25, name: RF, random_state: 27}, sub: {kind_sel: all, n_neighbors: 16, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	29	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8682
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 14, min_samples_split: 11, n_estimators: 70, name: RF, random_state: 29}, sub: {kind_sel: all, n_neighbors: 10, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	36	DT	Instance HardnessThreshold	Under resampling	0.8627
{classifier: {criterion: entropy, max_depth: 11, max_features: log2, min_samples_leaf: 8, min_samples_split: 4, name: DTC, random_state: 36}, sub: {cv: 3, estimator: None, random_state: 36, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
Random	39	KNN	SMOTEENN	Combine resampling	0.8601
{classifier: {algorithm: brute, n_neighbors: 47, name: KNN, p: 1, random_state: 39, weights: uniform}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTEENN}}					
Random	59	RF	EditedNearest Neighbours	Under resampling	0.8613
{classifier: {bootstrap: True, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 8, min_samples_split: 6, n_estimators: 70, name: RF, random_state: 59}, sub: {kind_sel: all, n_neighbors: 19, smo_grp: UNDER, type: EditedNearestNeighbours}}					
Random	79	RF	AllKNN	Under resampling	0.8767
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 19, min_samples_split: 13, n_estimators: 129, name: RF, random_state: 79}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 10, smo_grp: UNDER, type: AllKNN}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8692
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 4, min_samples_split: 2, n_estimators: 90, name: RF, random_state: 90}, sub: {kind_sel: all, n_neighbors: 16, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
Random	109	RF	AllKNN	Under resampling	0.8616
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: None, min_samples_leaf: 1, min_samples_split: 12, n_estimators: 64, name: RF, random_state: 109}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 18, smo_grp: UNDER, type: AllKNN}}					
TPE	9	RF	AllKNN	Under resampling	0.8861
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 18, min_samples_split: 17, n_estimators: 142, name: RF, random_state: 9}, sub: {allow_minority: True, kind_sel: all, n_neighbors: 11, smo_grp: UNDER, type: AllKNN}}					
TPE	18	RF	AllKNN	Under resampling	0.8818
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 6, min_samples_split: 15, n_estimators: 140, name: RF, random_state: 18}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 12, smo_grp: UNDER, type: AllKNN}}					
TPE	27	RF	ClusterCentroids	Under resampling	0.8875
{classifier: {bootstrap: False, class_weight: None, criterion: gini, max_features: log2, min_samples_leaf: 5, min_samples_split: 8, n_estimators: 78, name: RF, random_state: 27}, sub: {estimator: MiniBatchKMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	29	KNN	SMOTETomek	Combine resampling	0.8581
{classifier: {algorithm: ball_tree, n_neighbors: 44, name: KNN, p: 3, random_state: 29, weights: distance}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	36	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8816
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: sqrt, min_samples_leaf: 15, min_samples_split: 4, n_estimators: 15, name: RF, random_state: 36}, sub: {kind_sel: all, n_neighbors: 13, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	39	RF	Instance HardnessThreshold	Under resampling	0.8818
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: sqrt, min_samples_leaf: 7, min_samples_split: 7, n_estimators: 28, name: RF, random_state: 39}, sub: {cv: 8, estimator: None, random_state: 39, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
TPE	59	RF	EditedNearest Neighbours	Under resampling	0.8976
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: log2, min_samples_leaf: 18, min_samples_split: 16, n_estimators: 116, name: RF, random_state: 59}, sub: {kind_sel: all, n_neighbors: 12, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	79	RF	RepeatedEdited NearestNeighbours	Under resampling	0.8745
{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: None, min_samples_leaf: 19, min_samples_split: 5, n_estimators: 120, name: RF, random_state: 79}, sub: {kind_sel: all, n_neighbors: 13, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	90	RF	Instance HardnessThreshold	Under resampling	0.8856
{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: gini, max_features: log2, min_samples_leaf: 6, min_samples_split: 5, n_estimators: 16, name: RF, random_state: 90}, sub: {cv: 2, estimator: None, random_state: 90, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
TPE	109	RF	Instance HardnessThreshold	Under resampling	0.8686
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 1, min_samples_split: 14, n_estimators: 2, name: RF, random_state: 109}, sub: {cv: 4, estimator: None, random_state: 109, smo_grp: UNDER, type: InstanceHardnessThreshold}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	KNN	SMOTENC	Over resampling	0.7232
Grid	18	LR	RandomUnderSampler	Under resampling	0.7288
Grid	27	LR	SMOTENC	Over resampling	0.7301
Grid	29	LR	RandomOverSampler	Over resampling	0.7209
Grid	36	LR	SMOTENC	Over resampling	0.7296
Grid	39	SVM	RandomUnderSampler	Under resampling	0.7262
Grid	59	KNN	RandomUnderSampler	Under resampling	0.7219
Grid	79	KNN	ClusterCentroids	Under resampling	0.743
Grid	90	LR	SMOTENC	Over resampling	0.7295
Grid	109	KNN	RandomUnderSampler	Under resampling	0.7352
Random	9	KNN	ClusterCentroids	Under resampling	0.7464
{classifier: {algorithm: ball_tree, n_neighbors: 32, name: KNN, p: 3, random_state: 9, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 9, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
Random	18	RF	Instance HardnessThreshold	Under resampling	0.7516
{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: None, min_samples_leaf: 12, min_samples_split: 5, n_estimators: 74, name: RF, random_state: 18}, sub: {cv: 8, estimator: decision-tree, random_state: 18, smo_grp: UNDER, type: InstanceHardnessThreshold}}					
Random	27	LR	SMOTENC	Over resampling	0.7317
{classifier: {C: 67.19209483025746, l1_ratio: 0.6325978150136796, name: LR, penalty_solver: none+newton-cg, random_state: 27, tol: 0.08816884672975193}, sub: {categorical_features: True, k_neighbors: 3, random_state: 27, smo_grp: OVER, type: SMOTENC}}					
Random	29	LR	BorderlineSMOTE	Over resampling	0.733
{classifier: {C: 94.15868217005479, l1_ratio: 0.15711138813481137, name: LR, penalty_solver: none+saga, random_state: 29, tol: 0.07331878551360455}, sub: {k_neighbors: 7, kind: borderline-1, m_neighbors: 8, random_state: 29, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	36	LR	SMOTETomek	Combine resampling	0.7237
{classifier: {C: 54.99542948902379, l1_ratio: 0.4324815573520132, name: LR, penalty_solver: l2+sag, random_state: 36, tol: 0.0463630156021399}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTETomek}}					
Random	39	KNN	SMOTENC	Over resampling	0.7414
{classifier: {algorithm: auto, n_neighbors: 39, name: KNN, p: 17, random_state: 39, weights: distance}, sub: {categorical_features: True, k_neighbors: 6, random_state: 39, smo_grp: OVER, type: SMOTENC}}					
Random	59	KNN	SMOTENC	Over resampling	0.7349
{classifier: {algorithm: auto, n_neighbors: 30, name: KNN, p: 15, random_state: 59, weights: distance}, sub: {categorical_features: True, k_neighbors: 6, random_state: 59, smo_grp: OVER, type: SMOTENC}}					
Random	79	SVM	NearMiss	Under resampling	0.7542
{classifier: {C: 145.43923105808813, coef0: -0.028436683097273097, degree: 3, gamma: value, gamma_value: 0.9006163514445386, kernel: poly, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.008889748156938979}, sub: {n_neighbors: 11, n_neighbors_ver3: 16, smo_grp: UNDER, type: NearMiss, version: 1}}					

continued on the next column

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	SVM	RandomOverSampler	Over resampling	0.7482
{classifier: {C: 3.8764512682459036, coef0: 0.1819434251769192, degree: 4, gamma: value, gamma_value: 7.272635530822155, kernel: linear, name: SVM, probability: False, random_state: 90, shrinking: False, tol: 0.015324630153515258}, sub: {random_state: 90, smo_grp: OVER, type: RandomOverSampler}}					
Random	109	KNN	SMOTENC	Over resampling	0.7374
{classifier: {algorithm: ball_tree, n_neighbors: 13, name: KNN, p: 12, random_state: 109, weights: uniform}, sub: {categorical_features: True, k_neighbors: 8, random_state: 109, smo_grp: OVER, type: SMOTENC}}					
TPE	9	KNN	SMOTENC	Over resampling	0.7557
{classifier: {algorithm: brute, n_neighbors: 7, name: KNN, p: 14, random_state: 9, weights: uniform}, sub: {categorical_features: True, k_neighbors: 6, random_state: 9, smo_grp: OVER, type: SMOTENC}}					
TPE	18	LR	SMOTENC	Over resampling	0.7306
{classifier: {C: 77.1884987326045, l1_ratio: 0.7568212332845851, name: LR, penalty_solver: none+sag, random_state: 18, tol: 0.032621237299782044}, sub: {categorical_features: True, k_neighbors: 3, random_state: 18, smo_grp: OVER, type: SMOTENC}}					
TPE	27	KNN	ClusterCentroids	Under resampling	0.774
{classifier: {algorithm: auto, n_neighbors: 13, name: KNN, p: 7, random_state: 27, weights: distance}, sub: {estimator: MiniBatchKMeans, random_state: 27, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	29	LR	SMOTENC	Over resampling	0.7295
{classifier: {C: 57.65343614912621, l1_ratio: 0.3655704252310516, name: LR, penalty_solver: l2+newton-cg, random_state: 29, tol: 0.0847390587703897}, sub: {categorical_features: True, k_neighbors: 4, random_state: 29, smo_grp: OVER, type: SMOTENC}}					
TPE	36	LR	SMOTENC	Over resampling	0.7296
{classifier: {C: 29.111674058104157, l1_ratio: 0.32735644577518447, name: LR, penalty_solver: none+sag, random_state: 36, tol: 0.010129663030223873}, sub: {categorical_features: True, k_neighbors: 5, random_state: 36, smo_grp: OVER, type: SMOTENC}}					
TPE	39	KNN	SMOTENC	Over resampling	0.7431
{classifier: {algorithm: auto, n_neighbors: 40, name: KNN, p: 17, random_state: 39, weights: distance}, sub: {categorical_features: True, k_neighbors: 6, random_state: 39, smo_grp: OVER, type: SMOTENC}}					
TPE	59	RF	RandomUnderSampler	Under resampling	0.7745
{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 18, n_estimators: 45, name: RF, random_state: 59}, sub: {random_state: 59, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
TPE	79	SVM	NearMiss	Under resampling	0.7542
{classifier: {C: 145.43923105808813, coef0: -0.028436683097273097, degree: 3, gamma: value, gamma_value: 0.9006163514445386, kernel: poly, name: SVM, probability: True, random_state: 79, shrinking: False, tol: 0.008889748156938979}, sub: {n_neighbors: 11, n_neighbors_ver3: 16, smo_grp: UNDER, type: NearMiss, version: 1}}					
TPE	90	KNN	SMOTENC	Over resampling	0.7353
{classifier: {algorithm: ball_tree, n_neighbors: 16, name: KNN, p: 15, random_state: 90, weights: uniform}, sub: {categorical_features: True, k_neighbors: 9, random_state: 90, smo_grp: OVER, type: SMOTENC}}					
TPE	109	LR	SMOTENC	Over resampling	0.7322
{classifier: {C: 19.191938468441293, l1_ratio: 0.89771782600455, name: LR, penalty_solver: l2+newton-cg, random_state: 109, tol: 0.05530806284401652}, sub: {categorical_features: True, k_neighbors: 4, random_state: 109, smo_grp: OVER, type: SMOTENC}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	LR	SMOTE	Over resampling	0.9786
Grid	18	LR	SVMSMOTE	Over resampling	0.9796
Grid	27	LR	SMOTE	Over resampling	0.9786
Grid	29	LR	SVMSMOTE	Over resampling	0.9786
Grid	36	LR	SVMSMOTE	Over resampling	0.9782
Grid	39	LR	SMOTE	Over resampling	0.9786
Grid	59	LR	SVMSMOTE	Over resampling	0.9803
Grid	79	LR	SMOTE	Over resampling	0.9786
Grid	90	LR	SVMSMOTE	Over resampling	0.9786
Grid	109	LR	SVMSMOTE	Over resampling	0.9786
Random	9	LR	RandomOverSampler	Over resampling	0.9786
{classifier: {C: 56.30823672597898, l1_ratio: 0.78381808591105, name: LR, penalty_solver: l2+lbfgs, random_state: 9, tol: 0.038436263626536744}, sub: {random_state: 9, smo_grp: OVER, type: RandomOverSampler}}					
Random	18	SVM	ADASYN	Over resampling	0.9786
{classifier: {C: 14.151080339490203, coef0: -0.8685407844322504, degree: 3, gamma: scale, gamma_value: 2.3654532965967405, kernel: linear, name: SVM, probability: True, random_state: 18, shrinking: False, tol: 0.01821011037665051}, sub: {n_neighbors: 3, random_state: 18, smo_grp: OVER, type: ADASYN}}					
Random	27	SVM	SMOTE	Over resampling	0.9796
{classifier: {C: 38.62160818287828, coef0: -0.2598375815643692, degree: 3, gamma: scale, gamma_value: 4.1016700933682735, kernel: linear, name: SVM, probability: True, random_state: 27, shrinking: True, tol: 0.09349146191881122}, sub: {k_neighbors: 9, random_state: 27, smo_grp: OVER, type: SMOTE}}					
Random	29	LR	SVMSMOTE	Over resampling	0.9793
{classifier: {C: 12.179162806100543, l1_ratio: 0.7628295763929194, name: LR, penalty_solver: none+lbfgs, random_state: 29, tol: 0.05738948713828962}, sub: {k_neighbors: 7, m_neighbors: 8, out_step: 0.5832672472216172, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}					
Random	36	LR	RandomOverSampler	Over resampling	0.9772
{classifier: {C: 66.41225329820318, l1_ratio: 0.43194655533119786, name: LR, penalty_solver: none+lbfgs, random_state: 36, tol: 0.04931194444057016}, sub: {random_state: 36, smo_grp: OVER, type: RandomOverSampler}}					
Random	39	SVM	SMOTETomek	Combine resampling	0.9789
{classifier: {C: 44.2961530578357, coef0: 0.9448310667122928, degree: 2, gamma: value, gamma_value: 6.023327941324469, kernel: linear, name: SVM, probability: True, random_state: 39, shrinking: False, tol: 0.051698135912362685}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTETomek}}					
Random	59	SVM	ADASYN	Over resampling	0.9796
{classifier: {C: 45.11574393213028, coef0: -0.08412776813298128, degree: 2, gamma: scale, gamma_value: 3.0844517060163317, kernel: linear, name: SVM, probability: True, random_state: 59, shrinking: True, tol: 0.027635446466349512}, sub: {n_neighbors: 3, random_state: 59, smo_grp: OVER, type: ADASYN}}					
Random	79	LR	SMOTETomek	Combine resampling	0.98
{classifier: {C: 83.42468220807449, l1_ratio: 0.3055090044623807, name: LR, penalty_solver: none+lbfgs, random_state: 79, tol: 0.023904006667503627}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	LR	EditedNearest Neighbours	Under resampling	0.9796
{classifier: {C: 22.844430841631382, l1_ratio: 0.3644547907673444, name: LR, penalty_solver: none+newton-cg, random_state: 90, tol: 0.08375610966871594}, sub: {kind_sel: all, n_neighbors: 15, smo_grp: UNDER, type: EditedNearestNeighbours}}					
Random	109	SVM	ADASYN	Over resampling	0.9786
{classifier: {C: 9.310684219167205, coef0: -0.38483402342618933, degree: 4, gamma: scale, gamma_value: 4.558174324508815, kernel: linear, name: SVM, probability: True, random_state: 109, shrinking: True, tol: 0.08346833868658345}, sub: {n_neighbors: 9, random_state: 109, smo_grp: OVER, type: ADASYN}}					
TPE	9	LR	BorderlineSMOTE	Over resampling	0.9793
{classifier: {C: 93.68174890542157, l1_ratio: 0.045131779595933284, name: LR, penalty_solver: l2+lbfgs, random_state: 9, tol: 0.01355261104312317}, sub: {k_neighbors: 6, kind: borderline-1, m_neighbors: 6, random_state: 9, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	18	LR	EditedNearest Neighbours	Under resampling	0.9821
{classifier: {C: 59.78842814632694, l1_ratio: 0.9324810799202226, name: LR, penalty_solver: l2+newton-cg, random_state: 18, tol: 0.029387138904490646}, sub: {kind_sel: all, n_neighbors: 12, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	27	LR	ADASYN	Over resampling	0.9793
{classifier: {C: 99.63552868672464, l1_ratio: 0.12570030532196466, name: LR, penalty_solver: none+lbfgs, random_state: 27, tol: 0.028071875425909214}, sub: {n_neighbors: 8, random_state: 27, smo_grp: OVER, type: ADASYN}}					
TPE	29	LR	EditedNearest Neighbours	Under resampling	0.9803
{classifier: {C: 97.30748748000742, l1_ratio: 0.08999792273088673, name: LR, penalty_solver: l2+lbfgs, random_state: 29, tol: 0.09719445186160945}, sub: {kind_sel: all, n_neighbors: 15, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	36	LR	EditedNearest Neighbours	Under resampling	0.9832
{classifier: {C: 87.15095383628726, l1_ratio: 0.7912778724433138, name: LR, penalty_solver: l2+lbfgs, random_state: 36, tol: 0.048684272342157046}, sub: {kind_sel: all, n_neighbors: 12, smo_grp: UNDER, type: EditedNearestNeighbours}}					
TPE	39	LR	ADASYN	Over resampling	0.9796
{classifier: {C: 4.416995778305846, l1_ratio: 0.9733385665411982, name: LR, penalty_solver: none+newton-cg, random_state: 39, tol: 0.07187533458169462}, sub: {n_neighbors: 8, random_state: 39, smo_grp: OVER, type: ADASYN}}					
TPE	59	LR	RepeatedEdited NearestNeighbours	Under resampling	0.9786
{classifier: {C: 1.817145268194869, l1_ratio: 0.04218272991483685, name: LR, penalty_solver: l2+lbfgs, random_state: 59, tol: 0.02047264275750121}, sub: {kind_sel: all, n_neighbors: 12, smo_grp: UNDER, type: RepeatedEditedNearestNeighbours}}					
TPE	79	LR	SMOTETomek	Combine resampling	0.98
{classifier: {C: 68.45888573320447, l1_ratio: 0.20882907121472044, name: LR, penalty_solver: none+newton-cg, random_state: 79, tol: 0.06119023966911605}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}					
TPE	90	LR	SVMSMOTE	Over resampling	0.9803
{classifier: {C: 42.48470572998375, l1_ratio: 0.6956297991769814, name: LR, penalty_solver: none+lbfgs, random_state: 90, tol: 0.07435108079539507}, sub: {k_neighbors: 9, m_neighbors: 8, out_step: 0.24436681305421262, random_state: 90, smo_grp: OVER, type: SVMSMOTE}}					
TPE	109	SVM	SMOTE	Over resampling	0.98
{classifier: {C: 32.820620983961334, coef0: 0.5261112605055644, degree: 4, gamma: value, gamma_value: 3.3366761545835684, kernel: linear, name: SVM, probability: True, random_state: 109, shrinking: False, tol: 0.07739543826430684}, sub: {k_neighbors: 4, random_state: 109, smo_grp: OVER, type: SMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	KNN	CondensedNearest Neighbour	Under resampling	0.8839
Grid	18	KNN	CondensedNearest Neighbour	Under resampling	0.8797
Grid	27	LR	CondensedNearest Neighbour	Under resampling	0.9383
Grid	29	KNN	CondensedNearest Neighbour	Under resampling	0.8797
Grid	36	LR	OneSidedSelection	Under resampling	0.9383
Grid	39	LR	OneSidedSelection	Under resampling	0.9383
Grid	59	KNN	CondensedNearest Neighbour	Under resampling	0.8797
Grid	79	LR	CondensedNearest Neighbour	Under resampling	0.9383
Grid	90	LR	CondensedNearest Neighbour	Under resampling	0.9356
Grid	109	KNN	CondensedNearest Neighbour	Under resampling	0.8797
Random	9	LR	NearMiss	Under resampling	0.8637

{classifier: {C: 24.44264829175935, l1_ratio: 0.9462412040479198, name: LR, penalty_solver: elasticnet+saga, random_state: 9, tol: 0.09056277061134074}, sub: {n_neighbors: 6, n_neighbors_ver3: 13, smo_grp: UNDER, type: NearMiss, version: 2}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	18	RF	CondensedNearest Neighbour	Under resampling	0.9345

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 10, min_samples_split: 11, n_estimators: 78, name: RF, random_state: 18}, sub: {n_neighbors: 8, n_seeds_S: 22, random_state: 18, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| Random | 27 | LR | NearMiss | Under resampling | 0.8691 |

{classifier: {C: 69.95818298016538, l1_ratio: 0.8908686367314232, name: LR, penalty_solver: l1+saga, random_state: 27, tol: 0.08903291537495629}, sub: {n_neighbors: 12, n_neighbors_ver3: 8, smo_grp: UNDER, type: NearMiss, version: 2}}

| Random | 29 | RF | Instance HardnessThreshold | Under resampling | 0.8567 |

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: sqrt, min_samples_leaf: 9, min_samples_split: 2, n_estimators: 126, name: RF, random_state: 29}, sub: {cv: 3, estimator: gradient-boosting, random_state: 29, smo_grp: UNDER, type: InstanceHardnessThreshold}}

| Random | 36 | LR | Instance HardnessThreshold | Under resampling | 0.8518 |

{classifier: {C: 95.35746898743417, l1_ratio: 0.8113177823276707, name: LR, penalty_solver: l2+lbfgs, random_state: 36, tol: 0.028555717506901637}, sub: {cv: 5, estimator: adaboost, random_state: 36, smo_grp: UNDER, type: InstanceHardnessThreshold}}

| Random | 39 | RF | CondensedNearest Neighbour | Under resampling | 0.859 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 9, min_samples_split: 4, n_estimators: 37, name: RF, random_state: 39}, sub: {n_neighbors: 36, n_seeds_S: 39, random_state: 39, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| Random | 59 | RF | CondensedNearest Neighbour | Under resampling | 0.8792 |

{classifier: {bootstrap: False, class_weight: balanced, criterion: gini, max_features: log2, min_samples_leaf: 10, min_samples_split: 12, n_estimators: 83, name: RF, random_state: 59}, sub: {n_neighbors: 6, n_seeds_S: 19, random_state: 59, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| Random | 79 | LR | OneSidedSelection | Under resampling | 0.9031 |

{classifier: {C: 24.33887231948954, l1_ratio: 0.724356894202118, name: LR, penalty_solver: none+newton-cg, random_state: 79, tol: 0.07029516959305777}, sub: {n_neighbors: 3, n_seeds_S: 2, random_state: 79, smo_grp: UNDER, type: OneSidedSelection}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	RF	AllKNN	Under resampling	0.8743

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: log2, min_samples_leaf: 13, min_samples_split: 3, n_estimators: 19, name: RF, random_state: 90}, sub: {allow_minority: False, kind_sel: all, n_neighbors: 11, smo_grp: UNDER, type: AllKNN}}

| Random | 109 | RF | CondensedNearest Neighbour | Under resampling | 0.8782 |

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 1, min_samples_split: 8, n_estimators: 62, name: RF, random_state: 109}, sub: {n_neighbors: 22, n_seeds_S: 27, random_state: 109, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 9 | RF | CondensedNearest Neighbour | Under resampling | 0.9316 |

{classifier: {bootstrap: False, class_weight: balanced, criterion: entropy, max_features: 1, min_samples_leaf: 18, min_samples_split: 16, n_estimators: 93, name: RF, random_state: 9}, sub: {n_neighbors: 9, n_seeds_S: 45, random_state: 9, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 18 | LR | Instance HardnessThreshold | Under resampling | 0.8601 |

{classifier: {C: 63.29148544305559, l1_ratio: 0.5918856281507359, name: LR, penalty_solver: none+lbfgs, random_state: 18, tol: 0.05664869124051686}, sub: {cv: 4, estimator: adaboost, random_state: 18, smo_grp: UNDER, type: InstanceHardnessThreshold}}

| TPE | 27 | SVM | OneSidedSelection | Under resampling | 0.9326 |

{classifier: {C: 43.005767328002065, coef0: -0.6840060385572275, degree: 3, gamma: scale, gamma_value: 3.0608596811271687, kernel: linear, name: SVM, probability: False, random_state: 27, shrinking: False, tol: 0.0730444533188278}, sub: {n_neighbors: 1, n_seeds_S: 12, random_state: 27, smo_grp: UNDER, type: OneSidedSelection}}

| TPE | 29 | RF | CondensedNearest Neighbour | Under resampling | 0.9417 |

{classifier: {bootstrap: True, class_weight: balanced_subsample, criterion: gini, max_features: 1, min_samples_leaf: 13, min_samples_split: 14, n_estimators: 36, name: RF, random_state: 29}, sub: {n_neighbors: 20, n_seeds_S: 42, random_state: 29, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 36 | RF | Instance HardnessThreshold | Under resampling | 0.8795 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: sqrt, min_samples_leaf: 15, min_samples_split: 16, n_estimators: 3, name: RF, random_state: 36}, sub: {cv: 9, estimator: decision-tree, random_state: 36, smo_grp: UNDER, type: InstanceHardnessThreshold}}

| TPE | 39 | LR | OneSidedSelection | Under resampling | 0.9338 |

{classifier: {C: 14.945698564068522, l1_ratio: 0.6933839636217887, name: LR, penalty_solver: l2+sag, random_state: 39, tol: 0.0033601843838050012}, sub: {n_neighbors: 1, n_seeds_S: 11, random_state: 39, smo_grp: UNDER, type: OneSidedSelection}}

| TPE | 59 | SVM | NearMiss | Under resampling | 0.8734 |

{classifier: {C: 62.472118482038404, coef0: -0.3714854425965618, degree: 4, gamma: auto, gamma_value: 7.317374476588613, kernel: sigmoid, name: SVM, probability: True, random_state: 59, shrinking: False, tol: 0.056664323419143}, sub: {n_neighbors: 15, n_neighbors_ver3: 6, smo_grp: UNDER, type: NearMiss, version: 2}}

| TPE | 79 | RF | TomekLinks | Under resampling | 0.8987 |

{classifier: {bootstrap: False, class_weight: balanced_subsample, criterion: entropy, max_features: 1, min_samples_leaf: 11, min_samples_split: 2, n_estimators: 120, name: RF, random_state: 79}, sub: {smo_grp: UNDER, type: TomekLinks}}

| TPE | 90 | LR | CondensedNearest Neighbour | Under resampling | 0.8986 |

{classifier: {C: 25.00055949876554, l1_ratio: 0.08117639449687715, name: LR, penalty_solver: none+sag, random_state: 90, tol: 0.05758173861536812}, sub: {n_neighbors: 1, n_seeds_S: 12, random_state: 90, smo_grp: UNDER, type: CondensedNearestNeighbour}}

| TPE | 109 | DT | OneSidedSelection | Under resampling | 0.9446 |

{classifier: {criterion: gini, max_depth: 4, max_features: None, min_samples_leaf: 5, min_samples_split: 3, name: DTC, random_state: 109}, sub: {n_neighbors: 1, n_seeds_S: 2, random_state: 109, smo_grp: UNDER, type: OneSidedSelection}}

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	LR	SMOTENC	Over resampling	0.8827
Grid	18	LR	SMOTENC	Over resampling	0.8827
Grid	27	KNN	RandomUnderSampler	Under resampling	0.8835
Grid	29	LR	SMOTENC	Over resampling	0.8824
Grid	36	LR	SMOTENC	Over resampling	0.8821
Grid	39	LR	SMOTENC	Over resampling	0.8833
Grid	59	RF	RandomUnderSampler	Under resampling	0.8848
Grid	79	LR	SMOTENC	Over resampling	0.881
Grid	90	SVM	RandomUnderSampler	Under resampling	0.8927
Grid	109	SVM	RandomUnderSampler	Under resampling	0.8843
Random	9	KNN	SVMSMOTE	Over resampling	0.8909
{classifier: {algorithm: brute, n_neighbors: 48, name: KNN, p: 3, random_state: 9, weights: uniform}, sub: {k_neighbors: 1, m_neighbors: 4, out_step: 0.8140323547789731, random_state: 9, smo_grp: OVER, type: SVMSMOTE}}					
Random	18	KNN	SVMSMOTE	Over resampling	0.8917
{classifier: {algorithm: kd_tree, n_neighbors: 47, name: KNN, p: 1, random_state: 18, weights: distance}, sub: {k_neighbors: 6, m_neighbors: 4, out_step: 0.9093372234676081, random_state: 18, smo_grp: OVER, type: SVMSMOTE}}					
Random	27	KNN	SVMSMOTE	Over resampling	0.8868
{classifier: {algorithm: ball_tree, n_neighbors: 48, name: KNN, p: 4, random_state: 27, weights: uniform}, sub: {k_neighbors: 8, m_neighbors: 5, out_step: 0.27684315819122396, random_state: 27, smo_grp: OVER, type: SVMSMOTE}}					
Random	29	LR	BorderlineSMOTE	Over resampling	0.8879
{classifier: {C: 94.15868217005479, l1_ratio: 0.15711138813481137, name: LR, penalty_solver: none+saga, random_state: 29, tol: 0.07331878551360455}, sub: {k_neighbors: 7, kind: borderline-1, m_neighbors: 8, random_state: 29, smo_grp: OVER, type: BorderlineSMOTE}}					
Random	36	KNN	SVMSMOTE	Over resampling	0.8943
{classifier: {algorithm: auto, n_neighbors: 47, name: KNN, p: 2, random_state: 36, weights: uniform}, sub: {k_neighbors: 1, m_neighbors: 2, out_step: 0.5970378606490194, random_state: 36, smo_grp: OVER, type: SVMSMOTE}}					
Random	39	KNN	NearMiss	Under resampling	0.8935
{classifier: {algorithm: ball_tree, n_neighbors: 17, name: KNN, p: 2, random_state: 39, weights: distance}, sub: {n_neighbors: 1, n_neighbors_ver3: 1, smo_grp: UNDER, type: NearMiss, version: 1}}					
Random	59	DT	RandomUnderSampler	Under resampling	0.8871
{classifier: {criterion: entropy, max_depth: 7, max_features: log2, min_samples_leaf: 13, min_samples_split: 13, name: DTC, random_state: 59}, sub: {random_state: 59, replacement: True, smo_grp: UNDER, type: RandomUnderSampler}}					
Random	79	LR	BorderlineSMOTE	Over resampling	0.8886
{classifier: {C: 25.823119473623144, l1_ratio: 0.3380342940327316, name: LR, penalty_solver: l1+saga, random_state: 79, tol: 0.08973020495697571}, sub: {k_neighbors: 4, kind: borderline-2, m_neighbors: 2, random_state: 79, smo_grp: OVER, type: BorderlineSMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	DT	RandomOverSampler	Over resampling	0.8925
{classifier: {criterion: gini, max_depth: 5, max_features: sqrt, min_samples_leaf: 4, min_samples_split: 12, name: DTC, random_state: 90}, sub: {random_state: 90, smo_grp: OVER, type: RandomOverSampler}}					
Random	109	LR	KMeansSMOTE	Over resampling	0.892
{classifier: {C: 78.83103297050489, l1_ratio: 0.9018451004626153, name: LR, penalty_solver: l1+liblinear, random_state: 109, tol: 0.03178014475286107}, sub: {cluster_balance_threshold: 0.039411685372900754, k_neighbors: 1, random_state: 109, smo_grp: OVER, type: KMeansSMOTE}}					
TPE	9	KNN	SVMSMOTE	Over resampling	0.8924
{classifier: {algorithm: ball_tree, n_neighbors: 25, name: KNN, p: 1, random_state: 9, weights: distance}, sub: {k_neighbors: 5, m_neighbors: 6, out_step: 0.9389332158042056, random_state: 9, smo_grp: OVER, type: SVMSMOTE}}					
TPE	18	KNN	BorderlineSMOTE	Over resampling	0.9014
{classifier: {algorithm: kd_tree, n_neighbors: 36, name: KNN, p: 1, random_state: 18, weights: uniform}, sub: {k_neighbors: 4, kind: borderline-1, m_neighbors: 8, random_state: 18, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	27	LR	BorderlineSMOTE	Over resampling	0.8951
{classifier: {C: 48.825676405126735, l1_ratio: 0.2898999532745359, name: LR, penalty_solver: none+lbfgs, random_state: 27, tol: 0.08358562213210127}, sub: {k_neighbors: 6, kind: borderline-2, m_neighbors: 7, random_state: 27, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	29	KNN	SVMSMOTE	Over resampling	0.9018
{classifier: {algorithm: auto, n_neighbors: 46, name: KNN, p: 1, random_state: 29, weights: uniform}, sub: {k_neighbors: 5, m_neighbors: 6, out_step: 0.5814368138937205, random_state: 29, smo_grp: OVER, type: SVMSMOTE}}					
TPE	36	KNN	SVMSMOTE	Over resampling	0.8984
{classifier: {algorithm: kd_tree, n_neighbors: 20, name: KNN, p: 2, random_state: 36, weights: uniform}, sub: {k_neighbors: 5, m_neighbors: 4, out_step: 0.6357493779931562, random_state: 36, smo_grp: OVER, type: SVMSMOTE}}					
TPE	39	LR	BorderlineSMOTE	Over resampling	0.8955
{classifier: {C: 77.36887810903208, l1_ratio: 0.6766218078189983, name: LR, penalty_solver: l2+sag, random_state: 39, tol: 0.04349974187324592}, sub: {k_neighbors: 9, kind: borderline-2, m_neighbors: 7, random_state: 39, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	59	LR	KMeansSMOTE	Over resampling	0.8956
{classifier: {C: 11.631020114648761, l1_ratio: 0.7000798419690593, name: LR, penalty_solver: none+saga, random_state: 59, tol: 0.023293881871298334}, sub: {cluster_balance_threshold: 0.040461446709676184, k_neighbors: 9, random_state: 59, smo_grp: OVER, type: KMeansSMOTE}}					
TPE	79	KNN	BorderlineSMOTE	Over resampling	0.9037
{classifier: {algorithm: brute, n_neighbors: 41, name: KNN, p: 1, random_state: 79, weights: uniform}, sub: {k_neighbors: 4, kind: borderline-1, m_neighbors: 5, random_state: 79, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	90	LR	BorderlineSMOTE	Over resampling	0.8929
{classifier: {C: 36.16981826496571, l1_ratio: 0.1798964663404972, name: LR, penalty_solver: l2+sag, random_state: 90, tol: 0.030474171345408103}, sub: {k_neighbors: 9, kind: borderline-2, m_neighbors: 7, random_state: 90, smo_grp: OVER, type: BorderlineSMOTE}}					
TPE	109	KNN	SVMSMOTE	Over resampling	0.895
{classifier: {algorithm: ball_tree, n_neighbors: 47, name: KNN, p: 2, random_state: 109, weights: distance}, sub: {k_neighbors: 4, m_neighbors: 4, out_step: 0.5339218995926579, random_state: 109, smo_grp: OVER, type: SVMSMOTE}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Grid	9	LR	RandomUnderSampler	Under resampling	0.7677
Grid	18	LR	SMOTEENN	Combine resampling	0.767
Grid	27	LR	SMOTEENN	Combine resampling	0.7529
Grid	29	LR	ClusterCentroids	Under resampling	0.7646
Grid	36	LR	RandomOverSampler	Over resampling	0.7416
Grid	39	LR	ClusterCentroids	Under resampling	0.7489
Grid	59	LR	SMOTEENN	Combine resampling	0.7668
Grid	79	LR	ClusterCentroids	Under resampling	0.7615
Grid	90	LR	SMOTEENN	Combine resampling	0.7524
Grid	109	LR	ClusterCentroids	Under resampling	0.7556
Random	9	LR	SMOTEENN	Combine resampling	0.7987
{classifier: {C: 25.399515971427235, l1_ratio: 0.5996318070166743, name: LR, penalty_solver: none+sag, random_state: 9, tol: 0.09447223893003173}, sub: {random_state: 9, smo_grp: COMBINE, type: SMOTEENN}}					
Random	18	LR	SMOTEENN	Combine resampling	0.7923
{classifier: {C: 34.14152887704115, l1_ratio: 0.7421461694849721, name: LR, penalty_solver: none+saga, random_state: 18, tol: 0.07270394803750176}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTEENN}}					
Random	27	LR	SMOTETomek	Combine resampling	0.7935
{classifier: {C: 88.21699520459886, l1_ratio: 0.7748742364481063, name: LR, penalty_solver: elasticnet+saga, random_state: 27, tol: 0.08226754395926442}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTETomek}}					
Random	29	LR	SMOTEENN	Combine resampling	0.7923
{classifier: {C: 68.51034745198227, l1_ratio: 0.871683210121036, name: LR, penalty_solver: elasticnet+saga, random_state: 29, tol: 0.08017221203572462}, sub: {random_state: 29, smo_grp: COMBINE, type: SMOTEENN}}					
Random	36	LR	ADASYN	Over resampling	0.7939
{classifier: {C: 31.458993887996385, l1_ratio: 0.9544067609597835, name: LR, penalty_solver: l2+saga, random_state: 36, tol: 0.0912067932124652}, sub: {n_neighbors: 6, random_state: 36, smo_grp: OVER, type: ADASYN}}					
Random	39	LR	SMOTEENN	Combine resampling	0.7918
{classifier: {C: 99.4225026636818, l1_ratio: 0.5309165233012556, name: LR, penalty_solver: none+saga, random_state: 39, tol: 0.09258267375097592}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTEENN}}					
Random	59	LR	SMOTEENN	Combine resampling	0.7958
{classifier: {C: 91.18717875354713, l1_ratio: 0.7596188339301652, name: LR, penalty_solver: elasticnet+saga, random_state: 59, tol: 0.0410419875323525}, sub: {random_state: 59, smo_grp: COMBINE, type: SMOTEENN}}					
Random	79	LR	SMOTETomek	Combine resampling	0.7944
{classifier: {C: 53.005965866039425, l1_ratio: 0.6268539324991445, name: LR, penalty_solver: elasticnet+saga, random_state: 79, tol: 0.09647039445155825}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTETomek}}					

Method	Seed	Classifier	Resampler	Res.Group	GM
Random	90	LR	SMOTEENN	Combine resampling	0.7956
{classifier: {C: 46.88344001719481, l1_ratio: 0.28628840443143255, name: LR, penalty_solver: l1+saga, random_state: 90, tol: 0.04007946308631622}, sub: {random_state: 90, smo_grp: COMBINE, type: SMOTEENN}}					
Random	109	LR	SMOTE	Over resampling	0.7931
{classifier: {C: 28.558005403591107, l1_ratio: 0.8585679765289007, name: LR, penalty_solver: none+saga, random_state: 109, tol: 0.09718562940008248}, sub: {k_neighbors: 7, random_state: 109, smo_grp: OVER, type: SMOTE}}					
TPE	9	LR	SMOTEENN	Combine resampling	0.7958
{classifier: {C: 0.26984516958797355, l1_ratio: 0.06084943157431675, name: LR, penalty_solver: l1+saga, random_state: 9, tol: 0.02818603120572681}, sub: {random_state: 9, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	18	LR	SMOTEENN	Combine resampling	0.7973
{classifier: {C: 84.46067987455616, l1_ratio: 0.063196059851535, name: LR, penalty_solver: l2+saga, random_state: 18, tol: 0.03376222010568636}, sub: {random_state: 18, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	27	LR	SMOTEENN	Combine resampling	0.7957
{classifier: {C: 71.65785729540411, l1_ratio: 0.9304248966271177, name: LR, penalty_solver: l1+saga, random_state: 27, tol: 0.044764999442214924}, sub: {random_state: 27, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	29	LR	ClusterCentroids	Under resampling	0.8028
{classifier: {C: 3.4507660769369033, l1_ratio: 0.5030123518179233, name: LR, penalty_solver: l2+lbfgs, random_state: 29, tol: 7.296627957681169e-05}, sub: {estimator: KMeans, random_state: 29, smo_grp: UNDER, type: ClusterCentroids, voting: hard}}					
TPE	36	LR	SMOTEENN	Combine resampling	0.7956
{classifier: {C: 87.28075558540876, l1_ratio: 0.18144806172270672, name: LR, penalty_solver: none+saga, random_state: 36, tol: 0.03814095551688663}, sub: {random_state: 36, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	39	LR	SMOTEENN	Combine resampling	0.7947
{classifier: {C: 95.89439931283047, l1_ratio: 0.2625083098386465, name: LR, penalty_solver: elasticnet+saga, random_state: 39, tol: 0.07616947205027612}, sub: {random_state: 39, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	59	LR	SMOTEENN	Combine resampling	0.7965
{classifier: {C: 95.38750121907572, l1_ratio: 0.533680162781599, name: LR, penalty_solver: l2+saga, random_state: 59, tol: 0.03421148031291313}, sub: {random_state: 59, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	79	LR	SMOTEENN	Combine resampling	0.795
{classifier: {C: 38.17343761528682, l1_ratio: 0.17085960157213426, name: LR, penalty_solver: elasticnet+saga, random_state: 79, tol: 0.07125033972192531}, sub: {random_state: 79, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	90	LR	SMOTEENN	Combine resampling	0.7967
{classifier: {C: 64.06420523460119, l1_ratio: 0.07582741335426772, name: LR, penalty_solver: l1+saga, random_state: 90, tol: 0.03139313457251261}, sub: {random_state: 90, smo_grp: COMBINE, type: SMOTEENN}}					
TPE	109	LR	SMOTEENN	Combine resampling	0.7968
{classifier: {C: 72.14330086883979, l1_ratio: 0.9165275302194933, name: LR, penalty_solver: elasticnet+saga, random_state: 109, tol: 0.03673299880141663}, sub: {random_state: 109, smo_grp: COMBINE, type: SMOTEENN}}					

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