

# Supplementary material of “Dealing with heterogeneity in the context of distributed feature selection”

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## 1 Notation

These are the abbreviations that will be used throughout the tables:

- No SMOTE: **S0**
- SMOTE 100%: **S1**
- SMOTE 300%: **S2**
- SMOTE 600%: **S3**
- Automatic SMOTE: **SA**
- Scenario 0: Centralized **C**
- Scenario 1: Random partitioning of the samples **R**
- Scenario 2: Homogeneous partitioning of the samples **H**

## 2 Experimental results

	Connect-4	Isolet	Madelon	MNist	Ozone	Spambase
CFS-C	70.45±0.17 0.278	81.59±0.0 0.808	80.5±0.0 0.608	86.99±0.0 0.739	*95.61±0.46 0.086	91.43±0.65 0.819
CFS-R	72.74±0.21 0.361	81.6±0.46 0.808	80.22±1.9 0.603	88.71±0.34 0.779	95.56±0.48 0.143	91.25±0.56 0.816
CFS-H	72.78±0.14 0.366	80.56±0.0 0.797	79.62±0.0 0.591	*89.2±0.0 0.783	95.59±0.3 0.135	91.73±0.76 0.826
IG-C	71.19±0.78 0.313	81.4±0.0 0.806	72.75±0.0 0.451	87.83±0.0 0.756	*96.06±0.74 0.144	91.18±0.58 0.814
IG-R	72.86±0.29 0.367	81.51±0.19 0.807	79.6±1.7 0.590	89.64±0.2 0.792	95.62±0.73 0.140	90.9±0.55 0.809
IG-H	72.81±0.17 0.374	81.33±0.0 0.805	79.62±0.0 0.591	89.24±0.0 0.784	95.6±0.11 0.145	90.74±0.71 0.805
RelieFF-C	70.96±0.72 0.294	79.54±0.0 0.787	73.87±0.0 0.479	87.34±0.0 0.746	*95.84±0.36 0.111	87.86±1.75 0.742
RelieFF-R	<b>74.12±0.33</b> <b>0.425</b>	<b>82.12±0.62</b> <b>0.814</b>	81.85±1.34 0.636	90±0.32 0.799	95.85±0.5 0.072	90.77±0.92 0.807
RelieFF-H	72.77±0.42 0.399	81.07±1.43 0.803	<b>83.12±0.0</b> <b>0.662</b>	<b>*90.31±0.0</b> <b>0.806</b>	95.4±0.58 0.114	91.01±0.67 0.811
CFS-I-C	73.34±0.40 0.453	78.96±0.0 0.781	80.62±0.0 0.611	87.24±0.0 0.744	*95.69±0.86 0.181	90.88±0.5 0.809
CFS-I-R	72.86±0.30 0.370	80.24±0.95 0.794	80.35±1.53 0.605	88.4±0.29 0.767	95.71±0.84 0.110	91.08±0.63 0.814
CFS-I-H	72.72±0.33 0.375	81.65±0.0 0.809	78.75±0.0 0.573	*89.24±0.0 0.784	95.6±0.15 0.155	90.88±0.45 0.809
Cons-C	73.38±0.48 0.454	56±0.0 0.542	80.62±0.0 0.611	86.99±0.0 0.739	*96.08±0.44 0.105	90.86±0.91 0.807
Con-R	72.84±0.30 0.369	76.39±2.15 0.754	79.37±1.36 0.586	90.16±0.46 0.803	<b>96.18±0.34</b> <b>0.215</b>	90.39±0.81 0.798
Cons-H	72.74±0.3 0.373	75.88±0.0 0.749	78.75±0.0 0.573	*89.75±0.0 0.795	96.04±0.79 0.086	<b>91.29±0.82</b> <b>0.817</b>
Cons-I-C	73.34±0.40 0.453	60.61±0.0 0.590	80.62±0.0 0.611	87.08±0.0 0.741	*95.75±0.0 0.189	90.64±0.44 0.803
Cons-I-R	72.87±0.29 0.369	69.65±2.26 0.684	80.5±2.24 0.609	88.06±0.15 0.761	95.99±0.48 0.154	90.83±0.67 0.807
Cons-I-H	72.74±0.3 0.373	69.98±0.0 0.687	78.75±0.0 0.573	*88.4±0.0 0.767	95.65±0.565 0.130	91.04±0.32 0.812

Table 1: Classification results obtained by C4.5 without SMOTE. In the first line of each result it shows the average classification accuracy and standard deviation. In the second line, the Kappa value.

	Connect-4	Isolet	Madelon	MNist	Ozone	Spambase
CFS-C	65.84±0.22 0.011	<b>75.05±0.0</b> <b>0.745</b>	<b>71.75±0.0</b> <b>0.436</b>	71.88±0.0 0.433	80.54±1.19 0.139	78.52±0.6 0.584
CFS-R	<b>*66.67±0.311</b> <b>0.074</b>	74.48±0.55 0.734	69.82±0.7 0.397	73.64±0.32 0.469	81.03±2.35 0.156	83.06±4.6 0.665
CFS-H	66.5±0.47 0.068	73.96±0.0 0.729	70.37±0.0 0.408	73.86±0.0 0.473	76.77±2.98 0.114	80.25±0.47 0.615
IG-C	66.01±0.46 0.042	69.33±0.0 0.681	70.37±0.0 0.408	70.73±0.0 0.411	81.18±7.52 0.156	<b>88.718±0.55</b> <b>0.760</b>
IG-R	*66.51±0.3 0.066	66.48±0.17 0.651	70.1±0.69 0.403	69.7±0.22 0.390	76.57±4.57 0.126	87.41±0.7 0.730
IG-H	66.33±0.28 0.087	67.48±0.0 0.661	69.25±0.0 0.386	70.38±0.0 0.404	72.17±3.95 0.094	88.2±0.54 0.747
RelieFF-C	66.09±0.24 0.018	62.67±0.0 0.611	68.62±0.0 0.372	69.82±0.0 0.396	75.14±8.19 0.100	70.77±1.38 0.451
RelieFF-R	*66.53±0.2 0.058	63.55±3.17 0.620	71.15±0.24 0.423	71.73±0.12 0.435	58.02±4.24 0.045	75.15±3.06 0.526
RelieFF-H	66.42±0.2 0.052	62.70±0.0 0.612	71.37±0.0 0.428	71.925±0.0 0.438	59.17±7.41 0.048	77.38±5.36 0.564
CFS-I-C	59.28±0.15 0.155	71.26±0.0 0.701	70±0.0 0.401	70.94±0.0 0.414	80.29±5.68 0.128	80.20±0.42 0.613
CFS-I-R	*66.6±0.4 0.077	71.18±0.86 0.700	70.4±0.85 0.409	71.13±0.37 0.418	80.48±2.85 0.141	81.76±4.23 0.642
CFS-I-H	66.24±0.36 0.09	70.87±0.0 0.697	70.12±0.0 0.404	72.52±0.0 0.446	77.64±2.04 0.121	82.03±0.9 0.646
Cons-C	59.12±0.41 0.155	42.78±0.0 0.404	70.00±0.0 0.401	72.78±0.0 0.454	83.63±8.57 0.113	83.34±4.35 0.650
Con-R	*66.44±0.3 0.069	68.94±1.67 0.677	69.825±0.28 0.397	<b>75.83±0.37</b> <b>0.515</b>	80.83±1.75 0.138	83.26±1.66 0.633
Cons-H	66.22±0.33 0.082	68.18±0.0 0.669	70.12±0.0 0.404	74.28±0.0 0.484	<b>90.79±7.56</b> <b>0.083</b>	86.1±1.76 0.697
Cons-Int-C	59.28±0.15 0.155	44.77±0.0 0.425	70±0.0 0.401	72.77±0.0 0.453	80.70±5.78 0.130	86.96±4.13 0.733
Cons-I-R	*66.57±0.37 0.068	51.52±3.82 0.495	70.1±1.1 0.403	68.485±0.35 0.364	80.62±2.86 0.140	87.4±1.57 0.731
Cons-I-H	66.22±0.33 0.086	52.98±0.0 0.511	70.12±0.0 0.404	68.23±0.0 0.359	77.386±2.41 0.119	86.86±2.55 0.726

Table 2: Classification results obtained by Naive Bayes without SMOTE. In the first line of each result it shows the average classification accuracy and standard deviation. In the second line, the Kappa value.

	Connect-4	Isolet	Madelon	MNist	Ozone	Spambase
CFS-C	60.13±2.45 0.178	56±0.0 0.542	*85.63±0.0 0.712	87.93±0.0 0.758	*94.92±0.44 0.134	89.44±0.5 0.778
CFS-R	63.58±0.83 0.271	55.17±1.12 0.533	69.32±2.96 0.386	91.78±0.21 0.835	95.23±0.36 0.147	89.83±1.09 0.788
CFS-H	*64.51±1.08 0.281	54.65±2.1 0.528	#82.25±0.0 0.64	*92.01±0.0 0.840	95.46±0.61 0.165	<b>89.61±0.93</b> <b>0.782</b>
IG-C	60.50±1.61 0.201	<b>64.78±0.0</b> <b>0.529</b>	*74.25±0.0 0.484	89.63±0.0 0.792	*95.41±0.39 0.187	87.74±0.35 0.741
IG-R	64.12±1.36 0.278	56.25±1.29 0.545	69.57±2.62 0.391	94.27±0.28 0.885	95.25±0.7 0.183	87.63±0.17 0.739
IG-H	*64.89±1.64 0.290	51.57±0.0 0.496	#83.125±0.0 0.662	*94.66±0.0 0.893	95.17±0.35 0.182	87.92±0.66 0.744
RelieFF-C	59.27±2.81 0.200	59.14±0.0 0.575	*75.25±0.0 0.505	89.96±0.0 0.799	*94.96±0.4 0.122	85.35±2.2 0.692
RelieFF-R	<b>67.6±1.54</b> <b>0.347</b>	58.17±0.49 0.656	76.62±5.73 0.532	95.32±0.25 0.906	94.78±0.58 0.076	87.34±0.88 0.735
RelieFF-H	*66.56±1.66 0.329	56.88±0.54 0.551	# <b>89.625±0.0</b> <b>0.792</b>	*95.83±0.0 0.916	94.84±0.54 0.085	87.98±0.78 0.748
CFS-I-C	64.57±0.29 0.285	52.92±0.0 0.510	*88.75±0.0 0.774	86.87±0.0 0.737	*95.12±0.16 0.146	88.38±0.84 0.756
CFS-I-R	64.86±1.48 0.290	47.92±0.82 0.458	73.17±3.94 0.463	91.73±0.13 0.834	<b>95.68±0.43</b> <b>0.150</b>	88.14±0.78 0.752
CFS-I-H	*64.91±1.53 0.293	46.69±0.0 0.445	#83.25±0.0 0.665	*92.12±0.0 0.842	95.40±0.66 0.172	88.18±0.58 0.752
Cons-C	64.48±0.25 0.283	49.90±0.0 0.479	*88.75±0.0 0.774	87.35±0.0 0.747	*95.66±1.26 0.119	87.25±0.56 0.731
Con-R	64.08±0.55 0.281	54.86±3.21 0.530	70.87±1.61 0.417	<b>96.338±0.25</b> <b>0.926</b>	94.97±0.35 0.115	86.77±0.48 0.720
Cons-H	*65.40±1.05 0.301	52.72±0.0 0.508	#83.25±0.0 0.665	*95.34±0.0 0.906	95.02±0.72 0.111	87.25±0.54 0.731
Cons-Int-C	64.57±0.29 0.285	55.29±0.0 0.535	*88.75±0.0 0.774	86.65±0.0 0.732	*94.96±0.45 0.137	88.1±0.52 0.749
Cons-I-R	63.45±0.84 0.270	58.21±2.34 0.565	71.07±2.57 0.421	91.4±0.21 0.829	95.28±0.39 0.171	87.05±0.67 0.728
Cons-I-H	*64.81±0.97 0.288	58.37±0.0 0.567	#83.25±0.0 0.665	*91.70±0.0 0.834	95.12±0.67 0.151	87.22±0.71 0.731

Table 3: Classification results obtained by IB1 without SMOTE. In the first line of each result it shows the average classification accuracy and standard deviation. In the second line, the Kappa value.

	Connect-4	Isolet	Madelon	MNist	Ozone	Spambase
CFS-C	<b>*65.93±0.12</b> 0	83.45±0.0 0.827	66.5±0.0 0.329	79.57±0.0 0.591	<b>*97.12±0.37</b> 0	87.69±1.47 0.734
CFS-R	65.9±0.27 0	82.41±0.25 0.817	67.12±0.74 0.341	81.73±0.25 0.634	96.99±0.54 0	87.48±1.46 0.731
CFS-H	65.83±0.21 0	82.89±0.02 0.821	67.22±0.05 0.343	<b>*82.29±0.01</b> <b>0.645</b>	96.97±0.21 0	87.67±0.79 0.733
IG-C	<b>*65.93±0.12</b> 0	82.93±0.0 0.822	67.12±0.0 0.341	78.28±0.0 0.565	<b>*97.12±0.37</b>	87.28±1.27 0.725
IG-R	65.9±0.27 0	82.46±0.26 0.817	66.37±0.83 0.326	80.56±0.1 0.611	96.99±0.54 0	87.55±0.72 0.733
IG-H	65.83±0.21 0	81.48±0.07 0.807	67.05±0.18 0.339	*80.62±0.01 0.612	96.97±0.21 0	<b>88.79±0.77</b> <b>0.744</b>
RelieFF-C	<b>*65.93±0.12</b> 0	84.60±0.0 0.839	<b>67.5±0.0</b> <b>0.349</b>	75.42±0.0 0.509	<b>*97.12±0.37</b> 0	83.92±2.99 0.649
RelieFF-R	65.9±0.27 0	<b>85.51±0.36</b> <b>0.849</b>	66±0.53 0.318	77.75±0.11 0.555	96.99±0.54 0	86.98±1.41 0.721
RelieFF-H	65.83±0.21 0	83.87±0.91 0.832	67.45±0.06 0.348	*78.10 0.562	96.97±0.21 0	87.75±1.01 0.736
CFS-I-C	<b>*65.93±0.12</b> 0	73.82±0.0 0.727	66.37±0.0 0.326	78.54±0.0 0.570	<b>*97.12±0.37</b> 0	88.54±1.36 0.754
CFS-I-R	65.9±0.27 0	77.99±0.72 0.771	67.27±0.5 0.344	80.92±0.15 0.618	96.99±0.54 0	87.58±1.22 0.734
CFS-I-H	65.83±0.21 0	80.59±0.07 0.798	67.1±0.22 0.340	*81.67 0.633	96.97±0.21 0	88.72±0.91 0.757
Cons-C	<b>*65.93±0.12</b> 0	31.17±0.0 0.284	66.37±0.0 0.326	75.13±0.0 0.502	<b>*97.12±0.37</b> 0	86.92±2.32 0.717
Con-R	65.9±0.27 0	69.86±2.65 0.686	66.8±0.67 0.344	81.45±0.35 0.629	96.99±0.54 0	86.46±0.96 0.709
Cons-H	65.83±0.21 0	65.59±0.03 0.642	67.15±0.16 0.340	*80.6 0.612	96.97±0.21 0	87.58±1.39 0.732
Cons-Int-C	<b>*65.93±0.12</b> 0	46.24±0.0 0.441	66.37±0.0 0.326	77.45±0.0 0.549	<b>*97.12±0.37</b> 0	87.9±1.78 0.739
Cons-I-R	65.9±0.27 0	62.42±2.33 0.609	66.55±1.02 0.329	79.56±0.14 0.591	96.99±0.54 0	86.28±0.92 0.706
Cons-I-H	65.83±0.21 0	65.47±0.05 0.640	67.17±0.11 0.342	*79.63±0.01 0.592	96.97±0.21 0	87.69±0.79 0.735

Table 4: Classification results obtained by SVM without SMOTE. In the first line of each result it shows the average classification accuracy and standard deviation. In the second line, the Kappa value.

	Connect-4		Isolet		Ozone		Spambase	
	S0	S1	S0	SA	S0	S3	S0	S2
CFS-R	*72.74±0.21 0.361	70.87±0.30 0.379	81.6±0.46 0.808	81.43±0.56 0.806	*95.56±0.48 0.143	92.84±1.60 0.180	91.25±0.56 0.816	91.00±1.22 0.813
CFS-H	*72.78±0.14 0.366	70.98±0.21 0.383	80.56 0.797	X	*95.59±0.3 0.135	93.51±0.50 0.190	<b>91.73±0.76</b> <b>0.826</b>	91.17±0.46 0.816
IG-R	*72.86±0.29 0.367	70.91±0.23 0.380	81.51±0.19 0.807	81.53±0.37 0.808	*95.62±0.73 0.140	93.58±1.01 0.198	90.9±0.55 0.809	91.03±0.99 0.814
IG-H	*72.81±0.17 0.374	71.06±0.15 0.377	81.33 0.805	X	*95.6±0.11 0.145	93.33±0.70 0.196	90.74±0.71 0.805	90.67±0.59 0.806
RelieFF-R	<b>*74.12±0.33</b> <b>0.425</b>	<b>72.90±0.36</b> <b>0.442</b>	<b>82.12±0.62</b> <b>0.814</b>	<b>82.70±0.83</b> <b>0.820</b>	*95.85±0.5 0.072	93.23±0.968 0.166	90.77±0.92 0.807	89.75±0.38 0.786
RelieFF-H	*72.77±0.42 0.399	71.26±0.67 0.405	81.07±1.43 0.803	X	*95.4±0.58 0.114	94.15±0.58 0.195	91.01±0.67 0.811	88.47±0.36 0.762
CFS-I-R	*72.86±0.30 0.370	70.78±0.31 0.374	80.24±0.95 0.794	80.55±0.70 0.797	*95.71±0.84 0.110	93.00±0.979 0.154	91.08±0.63 0.814	91.38±0.67 0.82
CFS-I-H	*72.72±0.33 0.375	70.77±0.04 0.379	81.65 0.809	X	*95.6±0.15 0.155	<b>94.22±0.38</b> <b>0.191</b>	90.88±0.45 0.809	<b>91.68±0.74</b> <b>0.827</b>
Con-R	*72.84±0.30 0.369	70.84±0.24 0.377	76.39±2.15 0.754	76.94±1.91 0.760	<b>*96.18±0.34</b> <b>0.215</b>	93.17±1.06 0.143	90.39±0.81 0.798	90.53±0.95 0.803
Cons-H	*72.74±0.3 0.373	70.83±0.25 0.382	75.88 0.749	X	*96.04±0.79 0.086	93.22±0.637 0.175	91.29±0.82 0.817	89.96±0.83 0.791
Cons-I-R	*72.87±0.29 0.369	70.95±0.19 0.375	69.65±2.26 0.684	70.81±1.70 0.696	*95.99±0.48 0.154	93.16±0.81 0.207	90.83±0.67 0.807	90.31±0.43 0.799
Cons-I-H	*72.74±0.3 0.373	70.86±0.14 0.379	69.98 0.687	X	*95.65±0.565 0.130	93.51±0.83 0.180	91.04±0.32 0.812	91.15±0.74 0.816

Table 5: Classification results obtained by C4.5 with SMOTE. In the first line of each result it shows the average classification accuracy and standard deviation. In the second line, the Kappa value.

	Connect-4		Isolet		Ozone		Spambase	
	S0	S1	S0	SA	S0	S3	S0	S2
CFS-R	<b>*66.67±4.0.311</b> <b>0.074</b>	59.58±0.12 0.098	74.48±0.55 0.734	<b>74.27±0.50</b> <b>0.732</b>	81.03±2.35 0.156	79.18±4.66 0.127	83.06±4.6 0.665	79.50±1.07 0.600
CFS-H	*66.5±0.47 0.068	60.47±0.71 0.105	73.96 0.729	X	76.77±2.98 0.114	<b>83.80±1.97</b> <b>0.155</b>	80.25±0.47 0.615	78.17±0.69 0.579
IG-R	*66.51±0.3 0.066	59.24±0.61 0.099	66.48±0.17 0.651	67.05±0.41 0.657	76.57±4.57 0.126	70.03±2.77 0.133	87.41±0.7 0.730	<b>88.92±1.41</b> <b>0.770</b>
IG-H	*66.33±0.28 0.087	60.98±1.06 0.096	67.48 0.661	X	72.17±3.95 0.094	79.49±3.42 0.128	<b>88.2±0.54</b> <b>0.747</b>	88.85±0.87 0.767
RelieFF-R	*66.53±0.2 0.058	60.15±0.41 0.096	63.55±3.17 0.620	66.60±2.52 0.652	58.02±4.24 0.045	69.82±0.602 0.090	75.15±3.06 0.526	86.27±0.98 0.704
RelieFF-H	*66.42±0.2 0.052	<b>64.44±2.65</b> <b>0.106</b>	62.70 0.612	X	59.17±7.41 0.048	76.21±2.65 0.114	77.38±5.36 0.564	83.70±0.63 0.646
CFS-I-R	*66.6±0.4 0.077	59.56±0.15 0.100	71.18±0.86 0.700	70.51±1.52 0.693	80.48±2.85 0.141	80.10±3.17 0.139	81.76±4.23 0.642	78.90±0.59 0.590
CFS-I-H	*66.24±0.36 0.09	59.89±0.85 0.126	70.87 0.697	X	77.64±2.04 0.121	83.03±1.62 0.145	82.03±0.9 0.646	79.31±2.80 0.599
Con-R	*66.44±0.3 0.069	59.59±0.16 0.096	68.94±1.67 0.677	68.60±1.47 0.673	80.83±1.75 0.138	75.56±7.66 0.112	83.26±1.66 0.633	84.87±3.44 0.685
Cons-H	*66.22±0.33 0.082	59.68±0.70 0.136	68.18 0.669	X	<b>90.79±7.56</b> <b>0.083</b>	81.86±1.88 0.137	86.1±1.76 0.697	85.24±4.16 0.691
Cons-I-R	*66.57±0.37 0.068	59.52±0.15 0.097	51.52±3.82 0.495	53.12±2.44 0.512	80.62±2.86 0.140	79.70±2.65 0.144	87.4±1.57 0.731	87.78±1.32 0.74
Cons-I-H	*66.22±0.33 0.086	59.82±0.06 0.126	52.98 0.511	X	77.386±2.41 0.119	82.719±2.37 0.145	86.86±2.55 0.726	85.57±7.40 0.708

Table 6: Classification results obtained by Naive Bayes with SMOTE. In the first line of each result it shows the average classification accuracy and standard deviation. In the second line, the Kappa value.

	Connect-4		Isolet		Ozone		Spambase	
	S0	S1	S0	SA	S0	S3	S0	S2
CFS-R	63.58±0.83 0.271	65.01±0.93 0.303	55.17±1.12 0.533	56.26±1.77 0.545	*95.23±0.36 0.147	91.85±0.97 0.238	<b>*89.83±1.09</b> <b>0.788</b>	<b>88.19±1.12</b> <b>0.757</b>
CFS-H	64.51±1.08 0.281	*65.79±0.37 0.306	54.65±2.1 0.528	X	95.46±0.61 0.165	92.16±0.23 0.222	89.61±0.93 0.782	87.89±0.61 0.751
IG-R	64.12±1.36 0.278	65.44±0.56 0.302	56.25±1.29 0.545	55.92±0.83 0.541	*95.25±0.7 0.183	92.06±1.18 0.212	*87.63±0.17 0.739	86.16±0.93 0.717
IG-H	64.89±1.64 0.290	*65.17±0.40 0.298	51.57 0.496	X	95.17±0.35 0.182	92.74±1.33 0.227	87.92±0.66 0.744	86.86±0.23 0.730
RelieFF-R	<b>67.6±1.54</b> <b>0.347</b>	<b>68.46±0.33</b> <b>0.368</b>	58.17±0.49 0.656	<b>58.53±0.87</b> <b>0.568</b>	*94.78±0.58 0.076	<b>93.30±0.74</b> <b>0.197</b>	*87.34±0.88 0.735	85.71±0.82 0.707
RelieFF-H	66.56±1.66 0.329	*66.77±0.79 0.338	56.88±0.54 0.551	X	94.84±0.54 0.085	92.81±0.56 0.155	87.98±0.78 0.748	86.05±0.45 0.714
CFS-I-R	64.86±1.48 0.290	64.43±0.67 0.285	47.92±0.82 0.458	49.53±2.13 0.475	<b>*95.68±0.43</b> <b>0.150</b>	91.99±1.70 0.223	*88.14±0.78 0.752	86.27±1.39 0.721
CFS-I-H	64.91±1.53 0.293	*65.47±1.15 0.303	46.69 0.445	X	95.40±0.66 0.172	91.66±0.19 0.203	88.18±0.58 0.752	86.84±0.88 0.732
Con-R	64.08±0.55 0.281	64.84±0.90 0.287	54.86±3.21 0.530	53.06±1.31 0.511	*94.97±0.35 0.115	92.06±1.47 0.198	*86.77±0.48 0.720	84.68±0.91 0.688
Cons-H	65.40±1.05 0.301	*65.72±0.84 0.312	52.72 0.508	X	95.02±0.72 0.111	92.28±0.49 0.199	87.25±0.54 0.731	85.24±0.93 0.700
Cons-I-R	63.45±0.84 0.270	64.21±1.15 0.284	58.21±2.34 0.565	57.74±1.89 0.560	*95.28±0.39 0.171	91.49±0.70 0.189	*87.05±0.67 0.728	85.93±0.09 0.713
Cons-I-H	64.81±0.97 0.288	*65.60±0.82 0.306	58.37 0.567	X	95.12±0.67 0.151	91.97±0.67 0.193	87.22±0.71 0.731	86.28±1.37 0.720

Table 7: Classification results obtained by IB1 with SMOTE. In the first line of each result it shows the average classification accuracy and standard deviation. In the second line, the Kappa value.

	Connect-4		Isolet		Ozone		Spambase	
	S0	S1	S0	SA	S0	S3	S0	S2
CFS-R	<b>65.9±0.27</b> <b>0</b>	65.77±0.220	82.41±0.25 0.817	82.48±0.30 0.817	<b>96.99±0.54</b> <b>0</b>	93.20±1.32 0.281	87.48±1.46 0.731	79.49±4.97 0.605
CFS-H	65.83±0.21 0	<b>65.85±0.10</b> <b>0</b>	82.89±0.02 0.821	X	96.97±0.21 0	93.69±1.00 0.286	87.67±0.79 0.733	82.72±5.72 0.662
IG-R	<b>65.9±0.27</b> <b>0</b>	65.77±0.22 0	82.46±0.26 0.817	82.95±1.48 0.822	<b>96.99±0.54</b> <b>0</b>	93.07±1.46 0.286	87.55±0.72 0.733	<b>88.11±0.54</b> <b>0.756</b>
IG-H	65.83±0.21 0	<b>65.85±0.10</b> <b>0</b>	81.48±0.07 0.807	X	96.97±0.21 0	93.69±0.88 0.299	<b>88.79±0.77</b> <b>0.744</b>	87.095±0.63 0.753
RelieFF-R	<b>65.9±0.27</b> <b>0</b>	65.77±0.22 0	<b>85.51±0.36</b> <b>0.849</b>	<b>85.68±0.34</b> <b>0.751</b>	<b>96.99±0.54</b> <b>0</b>	93.43±2.11 0.274	86.98±1.41 0.721	87.64±1.18 0.746
RelieFF-H	65.83±0.21 0	<b>65.85±0.10</b> <b>0</b>	83.87±0.91 0.832	X	96.97±0.21 0	93.91±1.35 0.302	87.75±1.01 0.736	86.83±0.53 0.730
CFS-I-R	<b>65.9±0.27</b> <b>0</b>	65.77±0.22 0	77.99±0.72 0.771	78.02±0.61 0.771	<b>96.99±0.54</b> <b>0</b>	92.96±1.45 0.261	87.58±1.22 0.734	86.43±2.07 0.727
CFS-I-H	65.83±0.21 0	<b>65.85±0.10</b> <b>0</b>	80.59±0.07 0.798	X	96.97±0.21 0	<b>94.89±1.93</b> <b>0.176</b>	88.72±0.91 0.757	86.66±1.09 0.730
Con-R	<b>65.9±0.27</b> <b>0</b>	65.77±0.22 0	69.86±2.65 0.686	69.18±2.12 0.679	<b>96.99±0.54</b> <b>0</b>	94.26±2.05 0.145	86.46±0.96 0.709	85.57±1.51 0.707
Cons-H	65.83±0.21 0	<b>65.85±0.10</b> <b>0</b>	65.59±0.03 0.642	X	96.97±0.21 0	93.71±0.76 0.272	87.58±1.39 0.732	84.50±0.83 0.687
Cons-I-R	<b>65.9±0.27</b> <b>0</b>	65.77±0.22 0	62.42±2.33 0.609	62.29±1.33 0.607	<b>96.99±0.54</b> <b>0</b>	93.36±1.94 0.216	86.28±0.92 0.706	85.75±1.25 0.710
Cons-I-H	65.83±0.21 0	<b>65.85±0.10</b> <b>0</b>	65.47±0.05 0.640	X	96.97±0.21 0	94.56±1.33 0.25	87.69±0.79 0.735	85.05±2.03 0.698

Table 8: Classification results obtained by SVM with SMOTE. In the first line of each result it shows the average classification accuracy and standard deviation. In the second line, the Kappa value.

	Connect-4	Isolet	Madelon	MNist	Ozone	Spambase
CFS-C	2.41	74.48	1.54	209.17	0.48	0.48
CFS-H	0.42	9.69	0.63	37.43	0.36	0.32
IG-C	1.78	9.67	0.86	27.69	0.40	0.42
IG-H	<b>0.31</b>	<b>2.04</b>	<b>0.49</b>	<b>3.84</b>	<b>0.34</b>	<b>0.28</b>
RelieFF-C	820.46	191.12	10.43	9036.22	2.20	4.93
RelieFF-H	0.83	10.33	1.55	445.19	0.49	0.46
CFS-I-C	11.04	34.78	1.43	169.66	0.61	0.66
CFS-I-H	0.45	6.39	1.22	30.76	0.47	0.39
Cons-C	185.54	97.80	4.10	3196.21	1.02	1.56
Cons-H	0.56	10.11	1.24	168.75	0.41	0.52
Cons-I-C	10.93	26.86	1.54	146.78	0.65	0.59
Cons-I-H	0.42	5.60	1.22	29.17	0.46	0.40

Table 9: Average running times in seconds for the different feature selection methods in centralized scenario and homogeneous partitioning. Best results are marked in bold face.