Table 1. Information of the data sets

|  |  |  |
| --- | --- | --- |
| Datasets | Number of the Filtereds | dimensionality |
| electrical | 10000 | 14 |
| htru2 | 17898 | 9 |
| magic | 19020 | 11 |
| letter | 20000 | 17 |
| avila | 20867 | 11 |
| default | 30000 | 24 |
| adult | 32562 | 15 |
| nomao | 34465 | 120 |
| susy | 40000 | 19 |
| bank | 45212 | 17 |
| codrna | 59535 | 9 |
| ida2016 | 60000 | 171 |
| poker | 70462 | 11 |
| mocap | 78095 | 34 |
| ijcnn1 | 141691 | 23 |
| skin | 245057 | 4 |

**The experimental results of analysis of compression performance：**

Table 2．Test Accuracy Comparison of BP .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  BP | RSDS-  BP | RD-  BP | Sample  Ratio |
| electrical | **0.985±0.0014** | 0.9798±0.0039 | 0.9805±0.0 | 0.98 |
| htru2 | 0.9743±0.004 | **0.9774±0.0024** | 0.9732±0.0 | 0.4104 |
| magic | 0.8211±0.0084 | **0.8452±0.0007** | 0.8243±0.0125 | 0.9559 |
| letter | 0.9326±0.0097 | 0.9344±0.0009 | **0.9452±0.0025** | 0.9422 |
| avila | 0.8468±0.0008 | **0.8505±0.0088** | 0.847±0.008 | 0.9682 |
| default | 0.6928±0.0451 | 0.7001±0.1109 | **0.7212±0.0721** | 0.9579 |
| adult | 0.792±0.0007 | **0.7954±0.0073** | 0.7463±0.0624 | 0.7285 |
| nomao | **0.9197±0.0194** | 0.8141±0.0052 | 0.817±0.0399 | 0.6253 |
| susy | **0.7959±0.0004** | 0.7869±0.0025 | 0.7947±0.0049 | 0.8758 |
| bank | 0.8546±0.0441 | **0.89±0.0036** | 0.8429±0.0094 | 0.7404 |
| codrna | **0.9574±0.0024** | 0.9553±0.0012 | 0.9557±0.0025 | 0.793 |
| ida2016 | **0.9888±0.0006** | 0.9864±0.0 | 0.9868±0.0002 | 0.1348 |
| poker | 0.8347±0.028 | **0.8734±0.0224** | 0.8467±0.0039 | 0.9684 |
| mocap | **0.987±0.0011** | 0.9848±0.0013 | 0.9859±0.0009 | 0.9676 |
| ijcnn1 | 0.9927±0.0003 | **0.9931±0.0004** | 0.9927±0.0003 | 0.8557 |
| skin | **0.9985±0.0** | 0.9976±0.0009 | 0.9971±0.0001 | 0.2328 |
| Average | **0.8984** | 0.8978 | 0.8911 | 0.7586 |

Table 3．Test Accuracy Comparison of DT .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  DT | RSDS-  DT | RD-  DT | Sample  Ratio |
| electrical | 0.9992±0.0004 | **0.9998±0.0004** | 0.9992±0.0004 | 0.98 |
| htru2 | **0.9669±0.0002** | 0.9641±0.0018 | 0.9612±0.0059 | 0.4104 |
| magic | 0.8172±0.0039 | **0.8254±0.0037** | 0.8091±0.0037 | 0.9559 |
| letter | **0.9299±0.0009** | 0.9231±0.0016 | 0.926±0.0018 | 0.9422 |
| avila | **0.9849±0.0007** | 0.9811±0.002 | 0.9838±0.0008 | 0.9682 |
| default | 0.7268±0.0028 | **0.7387±0.0047** | 0.7267±0.0059 | 0.9579 |
| adult | **0.8135±0.0024** | 0.8125±0.0003 | 0.8114±0.0023 | 0.7285 |
| nomao | 0.9664±0.0007 | **0.972±0.0029** | 0.9636±0.0006 | 0.6253 |
| susy | 0.7051±0.0013 | **0.7294±0.0028** | 0.7037±0.0063 | 0.8758 |
| bank | 0.8706±0.0001 | **0.8753±0.0013** | 0.8718±0.0006 | 0.7404 |
| codrna | **0.9454±0.0001** | 0.9394±0.0031 | 0.9404±0.0021 | 0.793 |
| ida2016 | **0.9898±0.0001** | 0.9845±0.0003 | 0.9844±0.001 | 0.1348 |
| poker | **0.8027±0.0061** | 0.7907±0.0368 | 0.7767±0.0209 | 0.9684 |
| mocap | **0.978±0.0008** | 0.9776±0.0023 | 0.9779±0.001 | 0.9676 |
| ijcnn1 | 0.9792±0.0004 | **0.9809±0.0004** | 0.9786±0.0011 | 0.8557 |
| skin | **0.999±0.0001** | 0.9973±0.0005 | 0.9983±0.0002 | 0.2328 |
| Average | 0.9047 | **0.9057** | 0.9008 | 0.7586 |

Table 4．Test Accuracy Comparison of GBDT .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  GBDT | RSDS-  GBDT | RD-  GBDT | Sample  Ratio |
| electrical | 0.9992±0.0004 | **0.9998±0.0004** | 0.9992±0.0004 | 0.98 |
| htru2 | 0.9764±0.0038 | **0.9786±0.0022** | 0.973±0.0018 | 0.4104 |
| magic | 0.8715±0.0048 | **0.8755±0.0058** | 0.8718±0.0069 | 0.9559 |
| letter | **0.8591±0.0002** | 0.8555±0.0032 | 0.8562±0.0018 | 0.9422 |
| avila | 0.8769±0.0075 | **0.8787±0.0144** | 0.8767±0.0063 | 0.9682 |
| default | 0.8225±0.0002 | **0.8242±0.0002** | 0.8214±0.0006 | 0.9579 |
| adult | **0.8657±0.0012** | 0.8643±0.0034 | 0.865±0.0017 | 0.7285 |
| nomao | 0.9748±0.001 | **0.9786±0.0026** | 0.975±0.0011 | 0.6253 |
| susy | **0.7958±0.0011** | 0.7873±0.0001 | 0.7951±0.0 | 0.8758 |
| bank | 0.9039±0.0 | **0.9059±0.0002** | 0.9025±0.0008 | 0.7404 |
| codrna | 0.9411±0.0018 | **0.9435±0.0033** | 0.9402±0.0029 | 0.793 |
| ida2016 | 0.9922±0.0012 | **0.9928±0.0001** | 0.9882±0.0 | 0.1348 |
| poker | 0.6962±0.003 | **0.6989±0.0008** | 0.6947±0.0016 | 0.9684 |
| mocap | 0.9568±0.0009 | **0.959±0.0018** | 0.9576±0.0007 | 0.9676 |
| ijcnn1 | 0.9718±0.0006 | **0.9722±0.0006** | 0.9718±0.0 | 0.8557 |
| skin | 0.9953±0.0004 | 0.9916±0.0011 | **0.9957±0.0** | 0.2328 |
| Average | 0.9062 | **0.9067** | 0.9053 | 0.7586 |

Table 5．Test Accuracy Comparison of KNN .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  KNN | RSDS-  KNN | RD-  KNN | Sample  Ratio |
| electrical | 0.7842±0.0074 | **0.7932±0.0053** | 0.7845±0.0049 | 0.98 |
| htru2 | 0.9686±0.0014 | **0.9722±0.0034** | 0.9663±0.001 | 0.4104 |
| magic | 0.8002±0.0059 | **0.8081±0.0019** | 0.7999±0.003 | 0.9559 |
| letter | **0.9742±0.0032** | 0.9666±0.0023 | 0.9728±0.0046 | 0.9422 |
| avila | 0.8452±0.0078 | **0.8509±0.0002** | 0.8436±0.0098 | 0.9682 |
| default | **0.7502±0.0029** | 0.7489±0.0015 | 0.7482±0.0044 | 0.9579 |
| adult | **0.7773±0.0051** | 0.7541±0.0012 | 0.7751±0.0045 | 0.7285 |
| nomao | **0.9584±0.0002** | 0.9542±0.0009 | 0.9529±0.0047 | 0.6253 |
| susy | 0.7529±0.0016 | **0.764±0.0004** | 0.7486±0.0025 | 0.8758 |
| bank | 0.8823±0.0022 | **0.8852±0.0025** | 0.8811±0.0025 | 0.7404 |
| codrna | **0.9156±0.0018** | 0.915±0.0003 | 0.9132±0.0014 | 0.793 |
| ida2016 | 0.9879±0.0005 | **0.9885±0.0004** | 0.9846±0.0001 | 0.1348 |
| poker | 0.8077±0.0031 | **0.8094±0.0022** | 0.8076±0.003 | 0.9684 |
| mocap | **0.9722±0.0013** | 0.9713±0.0008 | 0.9716±0.0003 | 0.9676 |
| ijcnn1 | 0.9856±0.0001 | **0.986±0.0002** | 0.9844±0.0003 | 0.8557 |
| skin | **0.9995±0.0** | 0.9972±0.0005 | 0.999±0.0001 | 0.2328 |
| Average | 0.8851 | **0.8853** | 0.8833 | 0.7586 |

Table 6．Test Accuracy Comparison of LightGBM .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LightGBM | RSDS-  LightGBM | RD-  LightGBM | Sample  Ratio |
| electrical | **1.0±0.0** | **1.0±0.0** | **1.0±0.0** | 0.98 |
| htru2 | 0.9767±0.0018 | **0.9813±0.0016** | 0.9771±0.0008 | 0.4104 |
| magic | 0.882±0.0033 | **0.8842±0.0017** | 0.8829±0.0032 | 0.9559 |
| letter | **0.9458±0.0039** | 0.937±0.0042 | 0.9455±0.0014 | 0.9422 |
| avila | **0.9992±0.0002** | 0.9964±0.001 | 0.9989±0.0002 | 0.9682 |
| default | 0.8207±0.0024 | **0.823±0.0** | 0.8213±0.0021 | 0.9579 |
| adult | **0.8724±0.0009** | 0.869±0.0052 | 0.8696±0.0002 | 0.7285 |
| nomao | **0.9806±0.0023** | 0.9799±0.0005 | 0.9793±0.0016 | 0.6253 |
| susy | 0.7957±0.002 | 0.7887±0.0001 | **0.7972±0.0015** | 0.8758 |
| bank | 0.9074±0.002 | **0.9087±0.0015** | 0.905±0.0017 | 0.7404 |
| codrna | **0.959±0.0016** | 0.9552±0.0004 | 0.957±0.0014 | 0.793 |
| ida2016 | 0.9937±0.0001 | **0.9945±0.0005** | 0.9905±0.0002 | 0.1348 |
| poker | 0.8043±0.0005 | **0.8147±0.008** | 0.8056±0.0033 | 0.9684 |
| mocap | **0.992±0.0007** | 0.9906±0.0001 | 0.9915±0.0 | 0.9676 |
| ijcnn1 | 0.9888±0.0003 | **0.9893±0.0002** | 0.9883±0.0002 | 0.8557 |
| skin | **0.9994±0.0001** | 0.9987±0.0006 | 0.999±0.0 | 0.2328 |
| Average | **0.9324** | 0.9319 | 0.9318 | 0.7586 |

Table 7．Test Accuracy Comparison of LR .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LR | RSDS-  LR | RD-  LR | Sample  Ratio |
| electrical | 0.9002±0.006 | **0.9045±0.0078** | 0.9002±0.006 | 0.98 |
| htru2 | 0.9771±0.004 | **0.982±0.0018** | 0.9761±0.0034 | 0.4104 |
| magic | 0.7769±0.0013 | **0.7826±0.0041** | 0.7771±0.0011 | 0.9559 |
| letter | 0.7291±0.009 | **0.7328±0.0018** | 0.7289±0.0087 | 0.9422 |
| avila | 0.6338±0.0059 | **0.6576±0.0186** | 0.6327±0.0078 | 0.9682 |
| default | 0.7759±0.0032 | **0.7782±0.0** | 0.7759±0.0032 | 0.9579 |
| adult | **0.8002±0.0008** | 0.7986±0.0012 | 0.7993±0.0002 | 0.7285 |
| nomao | 0.9477±0.0022 | **0.9619±0.0007** | 0.9473±0.0028 | 0.6253 |
| susy | **0.7882±0.002** | 0.7775±0.0005 | 0.7877±0.0027 | 0.8758 |
| bank | 0.8964±0.0002 | **0.8995±0.0024** | 0.8959±0.0003 | 0.7404 |
| codrna | 0.9357±0.0021 | **0.9397±0.0002** | 0.9356±0.0021 | 0.793 |
| ida2016 | 0.9857±0.0031 | **0.9867±0.0006** | 0.9841±0.0021 | 0.1348 |
| poker | 0.6909±0.0023 | **0.6929±0.0006** | 0.6909±0.0023 | 0.9684 |
| mocap | 0.7948±0.0004 | **0.7963±0.0017** | 0.795±0.0013 | 0.9676 |
| ijcnn1 | 0.9203±0.0004 | **0.922±0.0017** | 0.9202±0.0005 | 0.8557 |
| skin | 0.918±0.0005 | **0.9462±0.001** | 0.9174±0.0004 | 0.2328 |
| Average | 0.8419 | **0.8474** | 0.8415 | 0.7586 |

Table 8．Test Accuracy Comparison of SVM .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  SVM | RSDS-  SVM | RD-  SVM | Sample  Ratio |
| electrical | 0.916±0.0014 | **0.9188±0.0011** | 0.9152±0.0018 | 0.98 |
| htru2 | 0.9073±0.0047 | **0.9115±0.0004** | 0.9056±0.0036 | 0.4104 |
| magic | 0.6526±0.0028 | **0.6567±0.0033** | 0.6521±0.0028 | 0.9559 |
| letter | **0.9794±0.003** | 0.9685±0.0035 | 0.9782±0.0025 | 0.9422 |
| avila | 0.8176±0.0005 | **0.8249±0.0125** | 0.8161±0.0022 | 0.9682 |
| default | 0.7763±0.0028 | **0.7784±0.0001** | 0.7765±0.0028 | 0.9579 |
| adult | 0.7622±0.006 | **0.7675±0.0017** | 0.7622±0.0058 | 0.7285 |
| nomao | **0.9605±0.0019** | 0.9568±0.0014 | 0.9546±0.0027 | 0.6253 |
| susy | **0.7968±0.0014** | 0.7908±0.0015 | 0.7964±0.0011 | 0.8758 |
| bank | 0.8808±0.0013 | **0.8832±0.0022** | 0.8808±0.0013 | 0.7404 |
| codrna | 0.9478±0.0018 | **0.9496±0.0008** | 0.9472±0.0015 | 0.793 |
| ida2016 | 0.9839±0.0001 | **0.984±0.0001** | 0.9839±0.0001 | 0.1348 |
| poker | 0.7946±0.0002 | **0.7963±0.0025** | 0.7928±0.0015 | 0.9684 |
| mocap | **0.7152±0.0021** | 0.7137±0.0029 | 0.7132±0.0021 | 0.9676 |
| ijcnn1 | 0.9352±0.0002 | **0.9363±0.0009** | 0.9334±0.0 | 0.8557 |
| skin | **0.9946±0.0004** | 0.9569±0.0012 | 0.9775±0.0003 | 0.2328 |
| Average | **0.8638** | 0.8621 | 0.8616 | 0.7586 |

Table 9．Test Accuracy Comparison of XGBoost .

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  XGBoost | RSDS-  XGBoost | RD-  XGBoost | Sample  Ratio |
| electrical | 0.9992±0.0004 | **0.9998±0.0004** | 0.9992±0.0004 | 0.98 |
| htru2 | 0.9784±0.0022 | **0.9809±0.0018** | 0.9782±0.0024 | 0.4104 |
| magic | 0.8686±0.01 | **0.878±0.0007** | 0.8709±0.0086 | 0.9559 |
| letter | **0.8535±0.0014** | 0.8499±0.0009 | 0.852±0.0021 | 0.9422 |
| avila | 0.8706±0.0125 | **0.8721±0.0085** | 0.8673±0.0091 | 0.9682 |
| default | 0.8226±0.0011 | **0.8248±0.0001** | 0.8222±0.0008 | 0.9579 |
| adult | **0.864±0.0001** | 0.864±0.0008 | 0.8621±0.0026 | 0.7285 |
| nomao | 0.9761±0.0001 | **0.9779±0.0029** | 0.9759±0.0004 | 0.6253 |
| susy | **0.7964±0.0003** | 0.7877±0.0011 | 0.7946±0.0005 | 0.8758 |
| bank | 0.9025±0.0022 | **0.9061±0.0** | 0.9025±0.002 | 0.7404 |
| codrna | 0.9415±0.0005 | **0.9427±0.0022** | 0.9402±0.0015 | 0.793 |
| ida2016 | 0.9929±0.0012 | **0.9936±0.0002** | 0.9911±0.0002 | 0.1348 |
| poker | 0.6952±0.0028 | **0.697±0.0013** | 0.695±0.002 | 0.9684 |
| mocap | 0.9577±0.0005 | **0.9587±0.002** | 0.9582±0.0009 | 0.9676 |
| ijcnn1 | 0.9706±0.0004 | **0.9713±0.0004** | 0.9704±0.0012 | 0.8557 |
| skin | **0.9949±0.0003** | 0.9827±0.0004 | 0.9944±0.0001 | 0.2328 |
| Average | 0.9053 | **0.9054** | 0.9046 | 0.7586 |

Table 10．Test Accuracy Comparison of BP under Noise Rate 5%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  BP | RSDS-  BP | RD-  BP | Sample  Ratio |
| electrical | 0.9662±0.0081 | **0.9772±0.0011** | 0.9708±0.006 | 0.9671 |
| htru2 | 0.9736±0.0014 | **0.9753±0.0006** | 0.9732±0.0036 | 0.8988 |
| magic | 0.808±0.018 | **0.83±0.0106** | 0.8155±0.0019 | 0.9424 |
| letter | **0.9378±0.0021** | 0.921±0.0049 | 0.932±0.006 | 0.9008 |
| avila | 0.8383±0.0034 | **0.8385±0.002** | 0.8299±0.003 | 0.9313 |
| default | **0.7442±0.027** | 0.6888±0.1197 | 0.5426±0.1279 | 0.9623 |
| adult | 0.5102±0.3717 | 0.5241±0.3814 | **0.5302±0.3454** | 0.8242 |
| nomao | 0.7831±0.022 | **0.9126±0.0389** | 0.74±0.226 | 0.7549 |
| susy | **0.7969±0.0004** | 0.7907±0.0029 | 0.7967±0.0006 | 0.8658 |
| bank | 0.77±0.1558 | **0.8475±0.0634** | 0.8056±0.0846 | 0.9344 |
| codrna | **0.9541±0.0004** | 0.9518±0.0006 | 0.9533±0.0017 | 0.7973 |
| ida2016 | 0.9721±0.001 | **0.9749±0.0169** | 0.9546±0.0307 | 0.7968 |
| poker | 0.8427±0.002 | **0.8505±0.0024** | 0.8353±0.0029 | 0.9591 |
| mocap | **0.9751±0.0046** | 0.9745±0.0016 | 0.9706±0.006 | 0.9278 |
| ijcnn1 | 0.99±0.0009 | **0.9908±0.0002** | 0.9902±0.0001 | 0.9833 |
| skin | **0.9978±0.0** | 0.9892±0.006 | 0.9929±0.0007 | 0.1666 |
| Average | 0.8663 | **0.8773** | 0.8521 | 0.8508 |

Table 11．Test Accuracy Comparison of BP under Noise Rate 10%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  BP | RSDS-  BP | RD-  BP | Sample  Ratio |
| electrical | 0.965±0.0014 | **0.9682±0.0046** | 0.9602±0.0025 | 0.9458 |
| htru2 | **0.9791±0.0008** | 0.9765±0.0024 | 0.9771±0.0008 | 0.9486 |
| magic | 0.7997±0.0082 | **0.8243±0.0006** | 0.8088±0.0106 | 0.9344 |
| letter | **0.9222±0.0021** | 0.9182±0.0166 | 0.9145±0.0018 | 0.8643 |
| avila | 0.8289±0.0041 | **0.8383±0.002** | 0.8251±0.003 | 0.9054 |
| default | 0.5575±0.0363 | **0.7722±0.0091** | 0.5474±0.1036 | 0.9602 |
| adult | 0.7796±0.0134 | **0.7827±0.0176** | 0.255±0.0081 | 0.8658 |
| nomao | 0.7047±0.0342 | 0.7775±0.2294 | **0.845±0.1004** | 0.7992 |
| susy | 0.7941±0.0028 | 0.7842±0.0063 | **0.7946±0.001** | 0.8621 |
| bank | 0.7933±0.1005 | **0.8782±0.0089** | 0.8684±0.0188 | 0.9735 |
| codrna | **0.9557±0.0011** | 0.9541±0.0004 | 0.9545±0.0011 | 0.8031 |
| ida2016 | 0.8688±0.052 | **0.9469±0.0044** | 0.8487±0.0306 | 0.8668 |
| poker | 0.821±0.0064 | **0.8277±0.011** | 0.8114±0.0333 | 0.9492 |
| mocap | 0.9705±0.0029 | **0.9753±0.0033** | 0.9697±0.0001 | 0.9095 |
| ijcnn1 | 0.9879±0.0007 | **0.9893±0.0006** | 0.9887±0.0 | 0.9916 |
| skin | **0.9979±0.0001** | 0.9898±0.0016 | 0.9944±0.0013 | 0.1546 |
| Average | 0.8579 | **0.8877** | 0.8352 | 0.8584 |

Table 12．Test Accuracy Comparison of BP under Noise Rate 15%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  BP | RSDS-  BP | RD-  BP | Sample  Ratio |
| electrical | 0.958±0.0071 | **0.9645±0.0021** | 0.9528±0.0088 | 0.9345 |
| htru2 | 0.9594±0.018 | **0.9742±0.0014** | 0.9728±0.0018 | 0.9583 |
| magic | 0.7989±0.0007 | **0.8053±0.0251** | 0.796±0.0037 | 0.924 |
| letter | 0.8982±0.0103 | 0.8818±0.0021 | **0.8986±0.0072** | 0.8308 |
| avila | 0.8304±0.0054 | **0.8413±0.0049** | 0.8253±0.0007 | 0.8824 |
| default | 0.6632±0.0161 | 0.4586±0.0968 | **0.715±0.0761** | 0.9589 |
| adult | 0.2784±0.0224 | 0.5365±0.3512 | **0.7695±0.0153** | 0.874 |
| nomao | 0.7215±0.0012 | **0.779±0.0801** | 0.738±0.1215 | 0.8222 |
| susy | 0.7828±0.0066 | 0.7716±0.0033 | **0.7834±0.0016** | 0.8591 |
| bank | 0.8864±0.0009 | **0.8911±0.0007** | 0.8411±0.0334 | 0.9772 |
| codrna | **0.9535±0.0002** | 0.9515±0.0014 | 0.9528±0.0001 | 0.8052 |
| ida2016 | 0.6262±0.0322 | **0.9627±0.0171** | 0.7491±0.0831 | 0.9008 |
| poker | 0.7988±0.0128 | **0.8118±0.0085** | 0.8027±0.0107 | 0.9359 |
| mocap | 0.964±0.0031 | **0.9706±0.0035** | 0.9617±0.0035 | 0.8907 |
| ijcnn1 | 0.9884±0.0001 | **0.9894±0.0001** | 0.9878±0.0007 | 0.9901 |
| skin | **0.9943±0.0022** | 0.9926±0.0022 | 0.9915±0.0018 | 0.1609 |
| Average | 0.8189 | 0.8489 | **0.8586** | 0.8566 |

Table 13．Test Accuracy Comparison of BP under Noise Rate 20%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  BP | RSDS-  BP | RD-  BP | Sample  Ratio |
| electrical | 0.9332±0.011 | **0.9495±0.0** | 0.9368±0.011 | 0.9184 |
| htru2 | **0.9792±0.0002** | 0.977±0.0038 | 0.9736±0.0014 | 0.9643 |
| magic | 0.7362±0.0522 | **0.8024±0.0206** | 0.7696±0.0099 | 0.9114 |
| letter | **0.8928±0.0018** | 0.8565±0.0085 | 0.8719±0.0232 | 0.8067 |
| avila | **0.8194±0.0007** | 0.816±0.002 | 0.8091±0.0024 | 0.8519 |
| default | **0.6652±0.0302** | 0.6487±0.1038 | 0.5001±0.188 | 0.9571 |
| adult | **0.7761±0.0128** | 0.525±0.3776 | 0.4919±0.3279 | 0.8761 |
| nomao | 0.7196±0.0017 | **0.8601±0.0089** | 0.5992±0.1965 | 0.8372 |
| susy | **0.7799±0.0** | 0.7785±0.0018 | 0.7761±0.0064 | 0.8537 |
| bank | 0.8557±0.0303 | **0.8635±0.0387** | 0.8504±0.0562 | 0.9751 |
| codrna | 0.9481±0.0005 | 0.9484±0.0008 | **0.9486±0.0009** | 0.799 |
| ida2016 | 0.8042±0.1889 | 0.78±0.2523 | **0.8589±0.1126** | 0.9274 |
| poker | **0.7932±0.0154** | 0.7779±0.0234 | 0.7705±0.0153 | 0.9205 |
| mocap | 0.933±0.0127 | **0.9358±0.0146** | 0.9199±0.0053 | 0.8728 |
| ijcnn1 | 0.9844±0.0007 | **0.9865±0.0002** | 0.9836±0.0005 | 0.9872 |
| skin | **0.9973±0.0002** | 0.9907±0.0058 | 0.8211±0.2428 | 0.1595 |
| Average | **0.8511** | 0.8435 | 0.8051 | 0.8511 |

Table 14．Test Accuracy Comparison of DT under Noise Rate 5%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  DT | RSDS-  DT | RD-  DT | Sample  Ratio |
| electrical | 0.9445±0.0021 | **0.9598±0.0018** | 0.9392±0.0046 | 0.9671 |
| htru2 | 0.9177±0.0002 | **0.9203±0.0049** | 0.9068±0.0022 | 0.8988 |
| magic | 0.7734±0.0052 | **0.7947±0.0056** | 0.7766±0.0007 | 0.9424 |
| letter | 0.8778±0.0035 | **0.8958±0.0064** | 0.8738±0.0018 | 0.9008 |
| avila | 0.9255±0.0014 | **0.9417±0.0049** | 0.9253±0.001 | 0.9313 |
| default | 0.6992±0.0006 | 0.7019±0.0018 | **0.7034±0.0025** | 0.9623 |
| adult | 0.772±0.0013 | **0.7764±0.0015** | 0.7679±0.0005 | 0.8242 |
| nomao | 0.9106±0.0007 | **0.9196±0.0041** | 0.9062±0.004 | 0.7549 |
| susy | 0.6826±0.0015 | **0.7133±0.0008** | 0.6896±0.0016 | 0.8658 |
| bank | 0.8223±0.0016 | **0.8239±0.0004** | 0.8218±0.0012 | 0.9344 |
| codrna | 0.8945±0.0014 | **0.9093±0.0037** | 0.8882±0.003 | 0.7973 |
| ida2016 | **0.9289±0.0008** | 0.9192±0.0042 | 0.9268±0.0002 | 0.7968 |
| poker | 0.7418±0.0006 | 0.7331±0.0015 | **0.744±0.0103** | 0.9591 |
| mocap | 0.9183±0.001 | **0.9406±0.0016** | 0.915±0.0026 | 0.9278 |
| ijcnn1 | 0.9238±0.0001 | **0.9248±0.0** | 0.9204±0.0015 | 0.9833 |
| skin | **0.9863±0.0** | 0.9486±0.003 | 0.972±0.001 | 0.1666 |
| Average | 0.8575 | **0.8639** | 0.8548 | 0.8508 |

Table 15．Test Accuracy Comparison of DT under Noise Rate 10%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  DT | RSDS-  DT | RD-  DT | Sample  Ratio |
| electrical | 0.8922±0.0025 | **0.9155±0.0042** | 0.8705±0.0035 | 0.9458 |
| htru2 | 0.8637±0.0004 | **0.8662±0.0024** | 0.8624±0.0002 | 0.9486 |
| magic | 0.7466±0.0011 | **0.7743±0.0028** | 0.7467±0.002 | 0.9344 |
| letter | 0.826±0.0028 | **0.8576±0.0019** | 0.8202±0.0032 | 0.8643 |
| avila | 0.8656±0.0007 | **0.9115±0.0002** | 0.862±0.0119 | 0.9054 |
| default | 0.6752±0.0004 | **0.6799±0.0015** | 0.6745±0.0021 | 0.9602 |
| adult | 0.7387±0.0004 | **0.7476±0.0013** | 0.7346±0.0047 | 0.8658 |
| nomao | 0.8528±0.0007 | **0.8778±0.0039** | 0.851±0.0 | 0.7992 |
| susy | 0.6642±0.0019 | **0.704±0.0039** | 0.6624±0.0051 | 0.8621 |
| bank | 0.7869±0.0009 | **0.7889±0.0017** | 0.7783±0.0037 | 0.9735 |
| codrna | 0.8471±0.0017 | **0.8867±0.0033** | 0.8476±0.0001 | 0.8031 |
| ida2016 | **0.8785±0.0009** | 0.8612±0.0013 | 0.8732±0.0031 | 0.8668 |
| poker | **0.7424±0.0013** | 0.7243±0.0016 | 0.7281±0.0002 | 0.9492 |
| mocap | 0.8651±0.0011 | **0.9046±0.0002** | 0.8665±0.0047 | 0.9095 |
| ijcnn1 | 0.862±0.0008 | **0.8718±0.0013** | 0.8626±0.0 | 0.9916 |
| skin | **0.9721±0.0001** | 0.9182±0.0191 | 0.9473±0.0003 | 0.1546 |
| Average | 0.8174 | **0.8306** | 0.8117 | 0.8584 |

Table 16．Test Accuracy Comparison of DT under Noise Rate 15%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  DT | RSDS-  DT | RD-  DT | Sample  Ratio |
| electrical | 0.8358±0.0039 | **0.897±0.0071** | 0.8302±0.0081 | 0.9345 |
| htru2 | 0.8017±0.002 | **0.8183±0.0022** | 0.806±0.0038 | 0.9583 |
| magic | 0.715±0.0007 | **0.7462±0.0002** | 0.7061±0.0093 | 0.924 |
| letter | 0.782±0.0039 | **0.8208±0.0018** | 0.7721±0.0034 | 0.8308 |
| avila | 0.8155±0.002 | **0.8875±0.0036** | 0.8154±0.0002 | 0.8824 |
| default | 0.6541±0.0004 | **0.6619±0.0027** | 0.6601±0.0029 | 0.9589 |
| adult | 0.7087±0.0004 | **0.7192±0.0026** | 0.7022±0.0025 | 0.874 |
| nomao | 0.8099±0.0001 | **0.8396±0.0003** | 0.8076±0.0041 | 0.8222 |
| susy | 0.6391±0.0022 | **0.6888±0.0011** | 0.6348±0.0019 | 0.8591 |
| bank | **0.7505±0.0007** | 0.7485±0.0008 | 0.7467±0.0085 | 0.9772 |
| codrna | 0.8077±0.0007 | **0.8533±0.0004** | 0.8013±0.0014 | 0.8052 |
| ida2016 | 0.8247±0.0027 | 0.8112±0.0013 | **0.8269±0.0009** | 0.9008 |
| poker | **0.6558±0.0009** | 0.6424±0.0019 | 0.6506±0.0155 | 0.9359 |
| mocap | 0.8207±0.0002 | **0.8755±0.0022** | 0.811±0.0008 | 0.8907 |
| ijcnn1 | 0.8167±0.001 | **0.8231±0.0009** | 0.8145±0.0002 | 0.9901 |
| skin | **0.9562±0.0003** | 0.8671±0.0161 | 0.9175±0.0012 | 0.1609 |
| Average | 0.7746 | **0.7938** | 0.7689 | 0.8566 |

Table 17．Test Accuracy Comparison of DT under Noise Rate 20%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  DT | RSDS-  DT | RD-  DT | Sample  Ratio |
| electrical | 0.7675±0.0042 | **0.842±0.0021** | 0.7748±0.0011 | 0.9184 |
| htru2 | 0.7598±0.0004 | **0.7821±0.0024** | 0.7677±0.0022 | 0.9643 |
| magic | 0.6614±0.0007 | **0.7196±0.0106** | 0.67±0.0069 | 0.9114 |
| letter | 0.7435±0.0004 | **0.7914±0.0012** | 0.7255±0.006 | 0.8067 |
| avila | 0.7579±0.0039 | **0.8493±0.0017** | 0.7592±0.0014 | 0.8519 |
| default | **0.6427±0.0039** | 0.6392±0.0081 | 0.6313±0.0045 | 0.9571 |
| adult | 0.6642±0.0033 | **0.6811±0.0072** | 0.673±0.0017 | 0.8761 |
| nomao | 0.7618±0.0035 | **0.7987±0.0007** | 0.7591±0.0015 | 0.8372 |
| susy | 0.6236±0.0017 | **0.6814±0.0033** | 0.6071±0.0036 | 0.8537 |
| bank | 0.7097±0.001 | **0.7127±0.0044** | 0.7061±0.0021 | 0.9751 |
| codrna | 0.7584±0.0001 | **0.8118±0.0027** | 0.7552±0.0011 | 0.799 |
| ida2016 | **0.7818±0.0015** | 0.7607±0.0005 | 0.7772±0.0 | 0.9274 |
| poker | **0.6501±0.0007** | 0.6416±0.0087 | 0.6356±0.0077 | 0.9205 |
| mocap | 0.7664±0.0012 | **0.8452±0.0011** | 0.7629±0.0017 | 0.8728 |
| ijcnn1 | 0.7729±0.001 | **0.7838±0.0009** | 0.7676±0.002 | 0.9872 |
| skin | **0.9394±0.0002** | 0.816±0.0073 | 0.8898±0.0023 | 0.1595 |
| Average | 0.7351 | **0.7598** | 0.7289 | 0.8511 |

Table 18．Test Accuracy Comparison of GBDT under Noise Rate 5%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  GBDT | RSDS-  GBDT | RD-  GBDT | Sample  Ratio |
| electrical | **0.9995±0.0** | 0.999±0.0 | 0.999±0.0 | 0.9671 |
| htru2 | 0.9784±0.0002 | **0.9785±0.0** | 0.9772±0.0006 | 0.8988 |
| magic | 0.863±0.0 | **0.8637±0.0002** | 0.8625±0.0011 | 0.9424 |
| letter | 0.858±0.0 | 0.8504±0.0034 | **0.8581±0.0005** | 0.9008 |
| avila | 0.8826±0.0 | 0.8707±0.0008 | **0.8828±0.0003** | 0.9313 |
| default | 0.8232±0.0 | 0.8216±0.0008 | **0.8236±0.0006** | 0.9623 |
| adult | 0.8614±0.0 | 0.8603±0.0002 | **0.8622±0.001** | 0.8242 |
| nomao | 0.9735±0.0 | 0.9732±0.0 | **0.9737±0.0012** | 0.7549 |
| susy | 0.7968±0.0 | 0.7829±0.001 | **0.7979±0.0009** | 0.8658 |
| bank | 0.9043±0.0 | **0.9045±0.0005** | 0.9041±0.0005 | 0.9344 |
| codrna | **0.9426±0.0** | 0.942±0.0003 | 0.9422±0.0005 | 0.7973 |
| ida2016 | 0.9915±0.0001 | **0.9917±0.0001** | 0.9915±0.0001 | 0.7968 |
| poker | 0.7108±0.0 | **0.7111±0.0003** | 0.7067±0.0003 | 0.9591 |
| mocap | 0.9552±0.0 | **0.9594±0.0004** | 0.9574±0.0009 | 0.9278 |
| ijcnn1 | **0.972±0.0** | 0.9719±0.0 | 0.9719±0.0 | 0.9833 |
| skin | **0.994±0.0** | 0.9895±0.0014 | 0.9927±0.0004 | 0.1666 |
| Average | **0.9067** | 0.9044 | 0.9065 | 0.8508 |

Table 19．Test Accuracy Comparison of GBDT under Noise Rate 10%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  GBDT | RSDS-  GBDT | RD-  GBDT | Sample  Ratio |
| electrical | **0.999±0.0** | 0.998±0.0007 | 0.9988±0.0004 | 0.9458 |
| htru2 | **0.9814±0.0002** | 0.9813±0.0 | 0.9813±0.0 | 0.9486 |
| magic | **0.8701±0.0** | 0.8661±0.0006 | 0.8695±0.0002 | 0.9344 |
| letter | **0.8505±0.0** | 0.8374±0.0016 | 0.8476±0.0009 | 0.8643 |
| avila | 0.8745±0.0 | 0.8674±0.0005 | **0.8773±0.0014** | 0.9054 |
| default | **0.8238±0.0** | 0.8215±0.0009 | 0.8232±0.0009 | 0.9602 |
| adult | **0.8586±0.0** | 0.8571±0.0001 | 0.8582±0.0008 | 0.8658 |
| nomao | **0.9692±0.0** | 0.9672±0.0006 | 0.9684±0.0004 | 0.7992 |
| susy | **0.7988±0.0001** | 0.7817±0.0009 | 0.7956±0.0012 | 0.8621 |
| bank | 0.9027±0.0 | **0.9036±0.0007** | 0.9021±0.0002 | 0.9735 |
| codrna | **0.9447±0.0** | 0.943±0.0004 | 0.9432±0.0001 | 0.8031 |
| ida2016 | 0.9911±0.0001 | **0.9917±0.0** | 0.991±0.0002 | 0.8668 |
| poker | 0.6961±0.0 | **0.698±0.0018** | 0.6951±0.0004 | 0.9492 |
| mocap | 0.955±0.0 | **0.9554±0.0011** | 0.9542±0.0009 | 0.9095 |
| ijcnn1 | 0.9694±0.0 | **0.9698±0.0001** | 0.9695±0.0002 | 0.9916 |
| skin | **0.9928±0.0** | 0.9874±0.0007 | 0.9906±0.0025 | 0.1546 |
| Average | **0.9049** | 0.9017 | 0.9041 | 0.8584 |

Table 20．Test Accuracy Comparison of GBDT under Noise Rate 15%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  GBDT | RSDS-  GBDT | RD-  GBDT | Sample  Ratio |
| electrical | 0.9988±0.0004 | **0.9992±0.0004** | 0.9982±0.0004 | 0.9345 |
| htru2 | **0.9786±0.0002** | 0.9768±0.0 | 0.9777±0.0004 | 0.9583 |
| magic | 0.8571±0.0002 | **0.8615±0.0019** | 0.8561±0.0006 | 0.924 |
| letter | **0.8438±0.0** | 0.825±0.0018 | 0.8428±0.0011 | 0.8308 |
| avila | **0.8764±0.0** | 0.8654±0.0003 | 0.8672±0.0036 | 0.8824 |
| default | 0.8238±0.0 | 0.8216±0.0001 | **0.824±0.0005** | 0.9589 |
| adult | **0.8523±0.0** | 0.8475±0.0005 | 0.8513±0.0001 | 0.874 |
| nomao | **0.9743±0.0** | 0.9706±0.0009 | 0.9741±0.0013 | 0.8222 |
| susy | **0.7914±0.0** | 0.772±0.0 | 0.7889±0.002 | 0.8591 |
| bank | 0.9049±0.0 | **0.9055±0.0003** | 0.9052±0.0001 | 0.9772 |
| codrna | 0.9408±0.0 | **0.9409±0.0006** | 0.9405±0.0006 | 0.8052 |
| ida2016 | 0.9908±0.0 | **0.991±0.0001** | 0.9903±0.0002 | 0.9008 |
| poker | 0.7021±0.0 | **0.7043±0.0001** | 0.7012±0.0004 | 0.9359 |
| mocap | 0.9558±0.0 | 0.9541±0.0013 | **0.956±0.0001** | 0.8907 |
| ijcnn1 | 0.9701±0.0 | **0.9706±0.0004** | 0.9696±0.0005 | 0.9901 |
| skin | **0.9922±0.0** | 0.9918±0.0003 | 0.9897±0.0004 | 0.1609 |
| Average | **0.9033** | 0.8999 | 0.9021 | 0.8566 |

Table 21．Test Accuracy Comparison of GBDT under Noise Rate 20%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  GBDT | RSDS-  GBDT | RD-  GBDT | Sample  Ratio |
| electrical | 0.994±0.0 | 0.994±0.0007 | **0.9942±0.0018** | 0.9184 |
| htru2 | 0.982±0.0002 | **0.9831±0.0006** | 0.9824±0.0004 | 0.9643 |
| magic | 0.853±0.0 | **0.8532±0.0028** | 0.8528±0.0007 | 0.9114 |
| letter | **0.8472±0.0** | 0.8112±0.0004 | 0.8412±0.0004 | 0.8067 |
| avila | **0.8651±0.0** | 0.8493±0.0003 | 0.8601±0.0003 | 0.8519 |
| default | **0.8236±0.0001** | 0.8188±0.0007 | 0.8208±0.0001 | 0.9571 |
| adult | **0.8563±0.0** | 0.8445±0.0003 | 0.8538±0.0002 | 0.8761 |
| nomao | 0.9671±0.0 | 0.9616±0.0003 | **0.9679±0.0005** | 0.8372 |
| susy | **0.7905±0.0** | 0.7748±0.0002 | 0.7899±0.0003 | 0.8537 |
| bank | 0.9051±0.0 | **0.9053±0.0008** | 0.9048±0.0006 | 0.9751 |
| codrna | **0.9363±0.0** | 0.936±0.0008 | 0.935±0.0004 | 0.799 |
| ida2016 | **0.9914±0.0** | 0.9912±0.0 | 0.9913±0.0005 | 0.9274 |
| poker | 0.6992±0.0 | **0.7017±0.0036** | 0.7007±0.0003 | 0.9205 |
| mocap | **0.9553±0.0** | 0.9451±0.0009 | 0.9523±0.0005 | 0.8728 |
| ijcnn1 | 0.968±0.0 | **0.9687±0.0006** | 0.9681±0.0003 | 0.9872 |
| skin | **0.9914±0.0** | 0.9884±0.0016 | 0.9886±0.0006 | 0.1595 |
| Average | **0.9016** | 0.8954 | 0.9002 | 0.8511 |

Table 22．Test Accuracy Comparison of KNN under Noise Rate 5%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  KNN | RSDS-  KNN | RD-  KNN | Sample  Ratio |
| electrical | 0.7855±0.0 | **0.7862±0.0004** | 0.7835±0.0007 | 0.9671 |
| htru2 | 0.9709±0.0 | **0.9714±0.0002** | 0.9705±0.0002 | 0.8988 |
| magic | 0.7957±0.0 | **0.7964±0.0002** | 0.7963±0.0015 | 0.9424 |
| letter | **0.9759±0.0005** | 0.9602±0.0004 | 0.9724±0.0002 | 0.9008 |
| avila | 0.8323±0.0 | **0.8368±0.001** | 0.8241±0.0017 | 0.9313 |
| default | **0.7502±0.0001** | 0.7468±0.0007 | 0.7472±0.0007 | 0.9623 |
| adult | **0.7628±0.0** | 0.7462±0.0009 | 0.7605±0.0033 | 0.8242 |
| nomao | **0.9558±0.0** | 0.9527±0.0018 | 0.9516±0.0005 | 0.7549 |
| susy | 0.7426±0.0 | **0.7517±0.0008** | 0.7403±0.0024 | 0.8658 |
| bank | **0.8719±0.0** | 0.8708±0.0002 | 0.8705±0.0001 | 0.9344 |
| codrna | 0.9099±0.0001 | **0.9118±0.0008** | 0.9068±0.0001 | 0.7973 |
| ida2016 | **0.9847±0.0** | 0.9837±0.0004 | 0.984±0.0001 | 0.7968 |
| poker | **0.8023±0.0009** | 0.801±0.0001 | 0.8007±0.0012 | 0.9591 |
| mocap | **0.9657±0.0** | 0.9644±0.0 | 0.9652±0.0005 | 0.9278 |
| ijcnn1 | 0.9839±0.0 | **0.984±0.0** | 0.9837±0.0001 | 0.9833 |
| skin | **0.9979±0.0003** | 0.9975±0.0007 | 0.9973±0.0003 | 0.1666 |
| Average | **0.8805** | 0.8789 | 0.8784 | 0.8508 |

Table 23．Test Accuracy Comparison of KNN under Noise Rate 10%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  KNN | RSDS-  KNN | RD-  KNN | Sample  Ratio |
| electrical | 0.76±0.0 | **0.763±0.0014** | 0.7577±0.0018 | 0.9458 |
| htru2 | 0.9623±0.0 | **0.9641±0.0002** | 0.9605±0.0002 | 0.9486 |
| magic | 0.7854±0.0002 | **0.7953±0.0002** | 0.7825±0.0013 | 0.9344 |
| letter | **0.9591±0.0005** | 0.9524±0.0005 | 0.9555±0.0007 | 0.8643 |
| avila | 0.8253±0.0 | **0.834±0.0007** | 0.8179±0.0037 | 0.9054 |
| default | **0.7181±0.0001** | 0.7157±0.0005 | 0.7158±0.0002 | 0.9602 |
| adult | **0.7407±0.0** | 0.7302±0.0008 | 0.7352±0.001 | 0.8658 |
| nomao | **0.9463±0.0** | 0.9445±0.0003 | 0.9412±0.0014 | 0.7992 |
| susy | 0.7252±0.0 | **0.7372±0.0007** | 0.7229±0.0017 | 0.8621 |
| bank | 0.8616±0.0001 | 0.8619±0.0005 | **0.8624±0.0007** | 0.9735 |
| codrna | 0.8995±0.0001 | **0.9082±0.0002** | 0.8973±0.0014 | 0.8031 |
| ida2016 | **0.9758±0.0** | 0.9694±0.0006 | 0.975±0.0001 | 0.8668 |
| poker | **0.7908±0.0003** | 0.785±0.0008 | 0.789±0.0004 | 0.9492 |
| mocap | **0.9618±0.0** | 0.9608±0.0007 | 0.9601±0.0 | 0.9095 |
| ijcnn1 | 0.9757±0.0 | **0.9767±0.0** | 0.9756±0.0001 | 0.9916 |
| skin | 0.99±0.0029 | 0.9821±0.0042 | **0.9918±0.0006** | 0.1546 |
| Average | 0.8673 | **0.8675** | 0.865 | 0.8584 |

Table 24．Test Accuracy Comparison of KNN under Noise Rate 15%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  KNN | RSDS-  KNN | RD-  KNN | Sample  Ratio |
| electrical | 0.733±0.0 | **0.7385±0.0014** | 0.7312±0.0004 | 0.9345 |
| htru2 | 0.9416±0.0 | **0.9444±0.0004** | 0.9406±0.0022 | 0.9583 |
| magic | 0.77±0.0 | **0.7748±0.0002** | 0.7679±0.0011 | 0.924 |
| letter | **0.9416±0.0002** | 0.9318±0.0007 | 0.9384±0.0009 | 0.8308 |
| avila | 0.8107±0.0 | **0.82±0.0008** | 0.8065±0.0039 | 0.8824 |
| default | 0.7116±0.0004 | 0.7062±0.0013 | **0.7118±0.0015** | 0.9589 |
| adult | **0.7285±0.0001** | 0.7148±0.0014 | 0.7245±0.0012 | 0.874 |
| nomao | **0.9299±0.0** | 0.9298±0.0006 | 0.9262±0.0004 | 0.8222 |
| susy | 0.7159±0.0 | **0.7329±0.0008** | 0.7104±0.0027 | 0.8591 |
| bank | 0.8517±0.0001 | **0.8522±0.0005** | 0.8516±0.0002 | 0.9772 |
| codrna | 0.8791±0.0 | **0.8926±0.0004** | 0.8757±0.0029 | 0.8052 |
| ida2016 | 0.9548±0.0 | 0.9437±0.0006 | **0.9552±0.0001** | 0.9008 |
| poker | **0.7752±0.0006** | 0.7671±0.0004 | 0.7709±0.0004 | 0.9359 |
| mocap | 0.9409±0.0 | **0.9442±0.0002** | 0.9394±0.002 | 0.8907 |
| ijcnn1 | 0.9572±0.0 | **0.9591±0.0** | 0.957±0.0 | 0.9901 |
| skin | 0.9674±0.0062 | **0.9745±0.0055** | 0.9729±0.0007 | 0.1609 |
| Average | 0.8506 | **0.8517** | 0.8488 | 0.8566 |

Table 25．Test Accuracy Comparison of KNN under Noise Rate 20%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  KNN | RSDS-  KNN | RD-  KNN | Sample  Ratio |
| electrical | 0.7115±0.0 | **0.719±0.0014** | 0.7098±0.0025 | 0.9184 |
| htru2 | 0.9145±0.0 | **0.9179±0.0004** | 0.9154±0.0024 | 0.9643 |
| magic | 0.7379±0.0 | **0.7547±0.003** | 0.7366±0.0007 | 0.9114 |
| letter | **0.9038±0.0007** | 0.9008±0.0007 | 0.9009±0.0002 | 0.8067 |
| avila | 0.7758±0.0 | **0.7941±0.0008** | 0.759±0.0034 | 0.8519 |
| default | 0.6922±0.0001 | 0.6882±0.0002 | **0.6933±0.0002** | 0.9571 |
| adult | **0.7085±0.0001** | 0.6892±0.0008 | 0.7043±0.0017 | 0.8761 |
| nomao | 0.896±0.0 | **0.9024±0.0008** | 0.8931±0.0008 | 0.8372 |
| susy | 0.6842±0.0 | **0.7138±0.0007** | 0.6839±0.0011 | 0.8537 |
| bank | **0.8245±0.0** | 0.8215±0.0001 | 0.8226±0.0001 | 0.9751 |
| codrna | 0.8479±0.0004 | **0.8649±0.0012** | 0.8435±0.0013 | 0.799 |
| ida2016 | **0.9297±0.0** | 0.913±0.0002 | 0.9296±0.0005 | 0.9274 |
| poker | **0.7392±0.0005** | 0.7281±0.0002 | 0.737±0.0001 | 0.9205 |
| mocap | 0.9102±0.0 | **0.9193±0.0004** | 0.9092±0.0006 | 0.8728 |
| ijcnn1 | 0.9285±0.0 | **0.9319±0.0001** | 0.928±0.0 | 0.9872 |
| skin | **0.9383±0.0098** | 0.9215±0.0036 | 0.9356±0.0075 | 0.1595 |
| Average | 0.8214 | **0.8238** | 0.8189 | 0.8511 |

Table 26．Test Accuracy Comparison of LightGBM under Noise Rate 5%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LightGBM | RSDS-  LightGBM | RD-  LightGBM | Sample  Ratio |
| electrical | **1.0±0.0** | **1.0±0.0** | 0.9998±0.0004 | 0.9671 |
| htru2 | 0.9788±0.0 | **0.9791±0.0008** | 0.9779±0.0008 | 0.8988 |
| magic | 0.8699±0.0 | **0.8711±0.0006** | 0.8692±0.0009 | 0.9424 |
| letter | **0.9388±0.0** | 0.9329±0.0012 | 0.9368±0.0 | 0.9008 |
| avila | **0.9954±0.0** | 0.9915±0.0005 | 0.9948±0.0008 | 0.9313 |
| default | **0.8255±0.0** | 0.8224±0.0004 | 0.8236±0.0006 | 0.9623 |
| adult | **0.8666±0.0** | 0.8603±0.0 | 0.865±0.0009 | 0.8242 |
| nomao | **0.9771±0.0** | 0.9765±0.0008 | 0.9759±0.0004 | 0.7549 |
| susy | **0.7982±0.0** | 0.7899±0.0004 | 0.797±0.0004 | 0.8658 |
| bank | 0.9082±0.0 | **0.9092±0.0015** | 0.9079±0.0014 | 0.9344 |
| codrna | **0.9542±0.0** | 0.9516±0.0007 | 0.9529±0.0001 | 0.7973 |
| ida2016 | 0.9917±0.0 | **0.9918±0.0003** | 0.9905±0.0004 | 0.7968 |
| poker | 0.7988±0.0 | **0.8157±0.0068** | 0.7885±0.0083 | 0.9591 |
| mocap | **0.9872±0.0** | 0.9857±0.0004 | 0.9871±0.0003 | 0.9278 |
| ijcnn1 | 0.9864±0.0 | **0.9868±0.0001** | 0.9861±0.0001 | 0.9833 |
| skin | **0.9992±0.0** | 0.9967±0.0004 | 0.9982±0.0004 | 0.1666 |
| Average | **0.9297** | 0.9288 | 0.9282 | 0.8508 |

Table 27．Test Accuracy Comparison of LightGBM under Noise Rate 10%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LightGBM | RSDS-  LightGBM | RD-  LightGBM | Sample  Ratio |
| electrical | **0.9995±0.0** | 0.999±0.0 | 0.9992±0.0004 | 0.9458 |
| htru2 | **0.9835±0.0** | 0.9814±0.0002 | 0.9827±0.0 | 0.9486 |
| magic | **0.8749±0.0** | 0.8746±0.003 | 0.8724±0.0013 | 0.9344 |
| letter | **0.9332±0.0** | 0.917±0.0004 | 0.9299±0.0012 | 0.8643 |
| avila | **0.9919±0.0** | 0.9818±0.0044 | 0.9885±0.0024 | 0.9054 |
| default | 0.8207±0.0 | 0.8206±0.0008 | **0.8228±0.0011** | 0.9602 |
| adult | **0.8687±0.0** | 0.8616±0.001 | 0.8665±0.0023 | 0.8658 |
| nomao | **0.9739±0.0** | 0.9713±0.0003 | 0.9729±0.0 | 0.7992 |
| susy | 0.7938±0.0 | 0.7863±0.002 | **0.7951±0.0009** | 0.8621 |
| bank | 0.9059±0.0 | **0.9065±0.0015** | 0.9044±0.0004 | 0.9735 |
| codrna | 0.9526±0.0 | 0.9512±0.0004 | **0.9537±0.0005** | 0.8031 |
| ida2016 | **0.9924±0.0** | 0.9924±0.0001 | 0.9917±0.0002 | 0.8668 |
| poker | 0.8081±0.0 | **0.8239±0.0071** | 0.7989±0.0061 | 0.9492 |
| mocap | 0.9857±0.0 | **0.986±0.0004** | 0.9847±0.0005 | 0.9095 |
| ijcnn1 | 0.9838±0.0 | **0.9849±0.0001** | 0.9837±0.0001 | 0.9916 |
| skin | **0.9988±0.0** | 0.9955±0.0011 | 0.9977±0.0001 | 0.1546 |
| Average | **0.9292** | 0.9271 | 0.9278 | 0.8584 |

Table 28．Test Accuracy Comparison of LightGBM under Noise Rate 15%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LightGBM | RSDS-  LightGBM | RD-  LightGBM | Sample  Ratio |
| electrical | **0.999±0.0** | 0.9985±0.0007 | 0.9988±0.0004 | 0.9345 |
| htru2 | 0.9754±0.0 | 0.9763±0.0008 | **0.9771±0.0016** | 0.9583 |
| magic | 0.8651±0.0 | **0.867±0.0007** | 0.8655±0.0006 | 0.924 |
| letter | **0.9252±0.0** | 0.9015±0.0004 | 0.9168±0.0046 | 0.8308 |
| avila | **0.977±0.0** | 0.973±0.0002 | 0.9701±0.002 | 0.8824 |
| default | **0.8222±0.0** | 0.8212±0.0008 | 0.8212±0.0004 | 0.9589 |
| adult | **0.8598±0.0** | 0.8507±0.001 | 0.8584±0.003 | 0.874 |
| nomao | **0.9768±0.0** | 0.9724±0.0004 | 0.976±0.0005 | 0.8222 |
| susy | **0.79±0.0** | 0.7749±0.0002 | 0.7886±0.0011 | 0.8591 |
| bank | 0.9056±0.0 | **0.909±0.0002** | 0.9067±0.0001 | 0.9772 |
| codrna | **0.9535±0.0** | 0.9498±0.0012 | 0.9515±0.0013 | 0.8052 |
| ida2016 | **0.991±0.0** | 0.9908±0.0 | 0.9905±0.0002 | 0.9008 |
| poker | 0.8072±0.0 | **0.8145±0.0107** | 0.7985±0.0032 | 0.9359 |
| mocap | **0.9852±0.0** | 0.983±0.0001 | 0.9845±0.0005 | 0.8907 |
| ijcnn1 | 0.9839±0.0 | **0.9843±0.0005** | 0.9834±0.0003 | 0.9901 |
| skin | **0.9988±0.0** | 0.9965±0.0001 | 0.997±0.0 | 0.1609 |
| Average | **0.926** | 0.9227 | 0.924 | 0.8566 |

Table 29．Test Accuracy Comparison of LightGBM under Noise Rate 20%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LightGBM | RSDS-  LightGBM | RD-  LightGBM | Sample  Ratio |
| electrical | 0.9915±0.0 | **0.9918±0.0011** | 0.9918±0.0032 | 0.9184 |
| htru2 | 0.9821±0.0 | **0.983±0.0004** | 0.9813±0.0008 | 0.9643 |
| magic | 0.8544±0.0 | 0.8576±0.0028 | **0.8578±0.0** | 0.9114 |
| letter | **0.9115±0.0** | 0.8881±0.0012 | 0.908±0.0035 | 0.8067 |
| avila | **0.9638±0.0** | 0.9478±0.0027 | 0.9566±0.0047 | 0.8519 |
| default | **0.8177±0.0** | 0.8166±0.0006 | 0.8164±0.0001 | 0.9571 |
| adult | **0.8581±0.0** | 0.8415±0.0005 | 0.857±0.001 | 0.8761 |
| nomao | 0.9708±0.0 | 0.9686±0.0009 | **0.9709±0.0005** | 0.8372 |
| susy | **0.7904±0.0** | 0.7757±0.0026 | 0.7867±0.0006 | 0.8537 |
| bank | **0.9084±0.0** | 0.9074±0.0009 | 0.9048±0.0019 | 0.9751 |
| codrna | **0.9476±0.0** | 0.9467±0.0007 | 0.9468±0.0003 | 0.799 |
| ida2016 | 0.9912±0.0 | **0.9913±0.0002** | 0.9907±0.0005 | 0.9274 |
| poker | 0.7728±0.0 | **0.7988±0.006** | 0.7719±0.0005 | 0.9205 |
| mocap | **0.9793±0.0** | 0.9776±0.0004 | 0.9782±0.0001 | 0.8728 |
| ijcnn1 | 0.9813±0.0 | **0.9834±0.0005** | 0.9815±0.0001 | 0.9872 |
| skin | **0.9982±0.0** | 0.9956±0.0007 | 0.9963±0.0001 | 0.1595 |
| Average | **0.9199** | 0.917 | 0.9185 | 0.8511 |

Table 30．Test Accuracy Comparison of LR under Noise Rate 5%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LR | RSDS-  LR | RD-  LR | Sample  Ratio |
| electrical | **0.903±0.0** | 0.9015±0.0 | 0.9008±0.0018 | 0.9671 |
| htru2 | 0.9729±0.0 | **0.9768±0.0** | 0.9735±0.0004 | 0.8988 |
| magic | 0.7802±0.0 | **0.7842±0.0007** | 0.78±0.0004 | 0.9424 |
| letter | **0.732±0.0** | 0.722±0.0018 | 0.7314±0.0002 | 0.9008 |
| avila | 0.6318±0.0 | **0.6475±0.0005** | 0.6312±0.0015 | 0.9313 |
| default | **0.7875±0.0** | **0.7875±0.0** | **0.7875±0.0** | 0.9623 |
| adult | 0.7996±0.0016 | 0.7967±0.0002 | **0.8002±0.0014** | 0.8242 |
| nomao | 0.9462±0.0 | **0.9527±0.0002** | 0.9457±0.0006 | 0.7549 |
| susy | 0.786±0.0 | 0.7667±0.0003 | **0.7862±0.0004** | 0.8658 |
| bank | 0.8988±0.0003 | **0.9012±0.0002** | 0.8989±0.0002 | 0.9344 |
| codrna | 0.9368±0.0 | 0.9353±0.0 | **0.9369±0.0** | 0.7973 |
| ida2016 | 0.9852±0.0009 | 0.9857±0.0024 | **0.9866±0.0006** | 0.7968 |
| poker | **0.705±0.0** | **0.705±0.0** | **0.705±0.0** | 0.9591 |
| mocap | 0.7928±0.0 | 0.7913±0.001 | **0.7934±0.0004** | 0.9278 |
| ijcnn1 | 0.9152±0.0 | **0.9161±0.0** | 0.9152±0.0 | 0.9833 |
| skin | 0.9219±0.0 | **0.9388±0.0033** | 0.9214±0.0008 | 0.1666 |
| Average | 0.8434 | **0.8443** | 0.8434 | 0.8508 |

Table 31．Test Accuracy Comparison of LR under Noise Rate 10%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LR | RSDS-  LR | RD-  LR | Sample  Ratio |
| electrical | **0.9185±0.0** | 0.8922±0.0011 | 0.916±0.0 | 0.9458 |
| htru2 | 0.9804±0.0 | **0.9814±0.0002** | 0.9803±0.0002 | 0.9486 |
| magic | 0.7842±0.0007 | 0.7839±0.0 | **0.7843±0.0009** | 0.9344 |
| letter | **0.7245±0.0** | 0.7148±0.0004 | 0.7245±0.0004 | 0.8643 |
| avila | 0.6306±0.0 | **0.6449±0.0** | 0.6288±0.0008 | 0.9054 |
| default | **0.779±0.0** | **0.779±0.0** | **0.779±0.0** | 0.9602 |
| adult | **0.7976±0.0** | 0.7903±0.0002 | 0.7976±0.0009 | 0.8658 |
| nomao | **0.9417±0.0** | 0.9345±0.0005 | 0.9415±0.0002 | 0.7992 |
| susy | **0.7861±0.0** | 0.7689±0.0005 | 0.7849±0.0004 | 0.8621 |
| bank | 0.8957±0.0002 | **0.8982±0.0** | 0.8972±0.0002 | 0.9735 |
| codrna | 0.9391±0.0 | 0.9345±0.0004 | **0.9392±0.0001** | 0.8031 |
| ida2016 | **0.986±0.0001** | 0.9835±0.0001 | 0.9849±0.0001 | 0.8668 |
| poker | **0.6923±0.0** | **0.6923±0.0** | **0.6923±0.0** | 0.9492 |
| mocap | **0.793±0.0001** | 0.7894±0.0008 | 0.7923±0.0011 | 0.9095 |
| ijcnn1 | 0.9129±0.0 | **0.9136±0.0** | 0.9129±0.0001 | 0.9916 |
| skin | 0.927±0.0 | **0.9319±0.0004** | 0.9251±0.0013 | 0.1546 |
| Average | **0.843** | 0.8396 | 0.8425 | 0.8584 |

Table 32．Test Accuracy Comparison of LR under Noise Rate 15%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LR | RSDS-  LR | RD-  LR | Sample  Ratio |
| electrical | **0.916±0.0** | 0.8995±0.0028 | 0.9132±0.0011 | 0.9345 |
| htru2 | 0.9712±0.0 | **0.9771±0.0** | 0.9709±0.0 | 0.9583 |
| magic | 0.7846±0.0002 | **0.7921±0.0004** | 0.785±0.0007 | 0.924 |
| letter | **0.7209±0.0002** | 0.7032±0.0004 | 0.7198±0.0004 | 0.8308 |
| avila | 0.6241±0.0 | **0.6362±0.0008** | 0.6237±0.0019 | 0.8824 |
| default | 0.789±0.0 | **0.7907±0.0021** | 0.789±0.0 | 0.9589 |
| adult | **0.791±0.0001** | 0.7884±0.0002 | 0.79±0.0009 | 0.874 |
| nomao | **0.9486±0.0** | 0.9293±0.0 | 0.9481±0.0004 | 0.8222 |
| susy | **0.7725±0.0** | 0.7577±0.0004 | 0.7712±0.0001 | 0.8591 |
| bank | 0.8987±0.0001 | **0.9035±0.0002** | 0.8987±0.0002 | 0.9772 |
| codrna | **0.939±0.0** | 0.9314±0.0 | 0.9387±0.0001 | 0.8052 |
| ida2016 | **0.9871±0.0001** | 0.9848±0.0001 | 0.9856±0.0019 | 0.9008 |
| poker | **0.6972±0.0** | **0.6972±0.0** | **0.6972±0.0** | 0.9359 |
| mocap | 0.7918±0.0001 | 0.7917±0.0005 | **0.7925±0.0007** | 0.8907 |
| ijcnn1 | 0.9155±0.0 | **0.9175±0.0** | 0.9153±0.0001 | 0.9901 |
| skin | 0.9259±0.0 | **0.9278±0.0032** | 0.9254±0.0004 | 0.1609 |
| Average | **0.8421** | 0.8393 | 0.8415 | 0.8566 |

Table 33．Test Accuracy Comparison of LR under Noise Rate 20%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  LR | RSDS-  LR | RD-  LR | Sample  Ratio |
| electrical | **0.912±0.0** | 0.8715±0.0021 | 0.9078±0.0004 | 0.9184 |
| htru2 | 0.9771±0.0 | **0.9827±0.0004** | 0.9757±0.0004 | 0.9643 |
| magic | 0.7829±0.0 | 0.7802±0.0007 | **0.784±0.0013** | 0.9114 |
| letter | **0.7272±0.0** | 0.6966±0.0009 | 0.7216±0.0002 | 0.8067 |
| avila | 0.6198±0.0 | **0.6236±0.0007** | 0.6188±0.0027 | 0.8519 |
| default | **0.7857±0.0** | 0.7855±0.0002 | **0.7857±0.0** | 0.9571 |
| adult | **0.7915±0.0002** | 0.7854±0.0001 | 0.79±0.0009 | 0.8761 |
| nomao | **0.9415±0.0** | 0.918±0.0009 | 0.9408±0.0008 | 0.8372 |
| susy | **0.7706±0.0** | 0.7579±0.0007 | 0.7706±0.0003 | 0.8537 |
| bank | **0.9033±0.0001** | 0.9016±0.0008 | 0.9032±0.0006 | 0.9751 |
| codrna | **0.9368±0.0** | 0.9226±0.0001 | 0.9366±0.0001 | 0.799 |
| ida2016 | 0.9843±0.0002 | **0.9847±0.0005** | 0.9843±0.0002 | 0.9274 |
| poker | **0.6925±0.0** | **0.6925±0.0** | **0.6925±0.0** | 0.9205 |
| mocap | 0.7856±0.0 | 0.7657±0.0005 | **0.786±0.0008** | 0.8728 |
| ijcnn1 | 0.9107±0.0 | **0.9135±0.0** | 0.9106±0.0 | 0.9872 |
| skin | 0.9227±0.0 | **0.9228±0.0007** | 0.9227±0.0009 | 0.1595 |
| Average | **0.8403** | 0.8316 | 0.8394 | 0.8511 |

Table 34．Test Accuracy Comparison of SVM under Noise Rate 5%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  SVM | RSDS-  SVM | RD-  SVM | Sample  Ratio |
| electrical | 0.908±0.0 | **0.9158±0.0011** | 0.904±0.0021 | 0.9671 |
| htru2 | **0.9056±0.0** | 0.9035±0.0002 | 0.905±0.0004 | 0.8988 |
| magic | **0.6606±0.0** | 0.6598±0.0004 | 0.6596±0.0004 | 0.9424 |
| letter | **0.9808±0.0** | 0.9632±0.0 | 0.98±0.0007 | 0.9008 |
| avila | **0.8135±0.0002** | 0.8135±0.0008 | 0.8121±0.0012 | 0.9313 |
| default | **0.7885±0.0** | 0.7882±0.0001 | 0.788±0.0 | 0.9623 |
| adult | **0.7574±0.0** | 0.7573±0.0 | 0.7573±0.0001 | 0.8242 |
| nomao | **0.9563±0.0** | 0.9544±0.0027 | 0.9539±0.0003 | 0.7549 |
| susy | **0.7978±0.0** | 0.7924±0.0004 | 0.7966±0.0001 | 0.8658 |
| bank | **0.882±0.0** | **0.882±0.0** | **0.882±0.0** | 0.9344 |
| codrna | **0.9473±0.0** | 0.9466±0.0001 | 0.9468±0.0001 | 0.7973 |
| ida2016 | **0.9812±0.0** | **0.9812±0.0** | **0.9812±0.0** | 0.7968 |
| poker | 0.7944±0.0 | **0.7962±0.0001** | 0.7938±0.0004 | 0.9591 |
| mocap | **0.7099±0.0** | 0.7069±0.0002 | 0.7073±0.0002 | 0.9278 |
| ijcnn1 | 0.9274±0.0 | **0.9291±0.0001** | 0.9273±0.0 | 0.9833 |
| skin | **0.9933±0.0** | 0.9604±0.0008 | 0.9662±0.0008 | 0.1666 |
| Average | **0.8627** | 0.8594 | 0.8601 | 0.8508 |

Table 35．Test Accuracy Comparison of SVM under Noise Rate 10%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  SVM | RSDS-  SVM | RD-  SVM | Sample  Ratio |
| electrical | 0.897±0.0 | **0.898±0.0007** | 0.8892±0.0025 | 0.9458 |
| htru2 | **0.9159±0.0** | 0.9151±0.0 | 0.9155±0.0006 | 0.9486 |
| magic | **0.6475±0.0** | 0.6456±0.0 | 0.6468±0.0002 | 0.9344 |
| letter | **0.9742±0.0** | 0.957±0.0004 | 0.9736±0.0012 | 0.8643 |
| avila | 0.8076±0.0 | **0.8105±0.0003** | 0.8057±0.0007 | 0.9054 |
| default | **0.7785±0.0** | 0.7785±0.0002 | 0.7783±0.0002 | 0.9602 |
| adult | 0.7543±0.0 | 0.7538±0.0001 | **0.7546±0.0001** | 0.8658 |
| nomao | 0.9524±0.0 | **0.9525±0.0001** | 0.9496±0.0001 | 0.7992 |
| susy | **0.7966±0.0** | 0.7904±0.0007 | 0.7942±0.0001 | 0.8621 |
| bank | **0.8795±0.0** | **0.8795±0.0** | **0.8795±0.0** | 0.9735 |
| codrna | **0.9516±0.0** | 0.9505±0.0001 | 0.9509±0.0004 | 0.8031 |
| ida2016 | **0.9819±0.0** | **0.9819±0.0** | **0.9819±0.0** | 0.8668 |
| poker | **0.7886±0.0** | 0.7879±0.0003 | 0.7876±0.0004 | 0.9492 |
| mocap | **0.7068±0.0** | 0.7054±0.0005 | 0.7032±0.0004 | 0.9095 |
| ijcnn1 | 0.9093±0.0 | **0.9186±0.0001** | 0.9092±0.0001 | 0.9916 |
| skin | **0.9908±0.0** | 0.9386±0.003 | 0.96±0.0005 | 0.1546 |
| Average | **0.8583** | 0.854 | 0.855 | 0.8584 |

Table 36．Test Accuracy Comparison of SVM under Noise Rate 15%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  SVM | RSDS-  SVM | RD-  SVM | Sample  Ratio |
| electrical | 0.8705±0.0 | **0.8782±0.0011** | 0.8682±0.0011 | 0.9345 |
| htru2 | **0.9047±0.0** | **0.9047±0.0** | 0.9043±0.0006 | 0.9583 |
| magic | **0.6519±0.0** | 0.6513±0.0002 | 0.651±0.0002 | 0.924 |
| letter | **0.9695±0.0** | 0.9396±0.0016 | 0.9659±0.0005 | 0.8308 |
| avila | **0.821±0.0** | 0.8146±0.0003 | 0.8164±0.0002 | 0.8824 |
| default | **0.7885±0.0** | 0.7876±0.0001 | 0.7883±0.0 | 0.9589 |
| adult | **0.7511±0.0** | 0.7503±0.0001 | 0.751±0.0002 | 0.874 |
| nomao | 0.9549±0.0 | **0.9561±0.0005** | 0.9506±0.0017 | 0.8222 |
| susy | 0.7867±0.0 | 0.7801±0.0005 | **0.7872±0.0003** | 0.8591 |
| bank | **0.8855±0.0** | **0.8855±0.0** | **0.8855±0.0** | 0.9772 |
| codrna | **0.9531±0.0** | 0.9489±0.0003 | 0.9525±0.0001 | 0.8052 |
| ida2016 | **0.9808±0.0** | **0.9808±0.0** | **0.9808±0.0** | 0.9008 |
| poker | **0.784±0.0001** | 0.7771±0.0004 | 0.7814±0.0004 | 0.9359 |
| mocap | 0.6968±0.0 | **0.7007±0.0003** | 0.6931±0.0 | 0.8907 |
| ijcnn1 | 0.9081±0.0 | **0.9117±0.0001** | 0.9081±0.0 | 0.9901 |
| skin | **0.9869±0.0** | 0.9307±0.012 | 0.9517±0.001 | 0.1609 |
| Average | **0.8559** | 0.8499 | 0.8522 | 0.8566 |

Table 37．Test Accuracy Comparison of SVM under Noise Rate 20%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  SVM | RSDS-  SVM | RD-  SVM | Sample  Ratio |
| electrical | 0.852±0.0 | **0.8615±0.0021** | 0.8465±0.0014 | 0.9184 |
| htru2 | 0.8933±0.0 | **0.8944±0.0004** | 0.8925±0.0 | 0.9643 |
| magic | **0.6598±0.0** | 0.6586±0.0002 | 0.6596±0.0 | 0.9114 |
| letter | **0.9562±0.0** | 0.9261±0.0034 | 0.9484±0.0012 | 0.8067 |
| avila | **0.8047±0.0** | 0.794±0.0007 | 0.8006±0.0015 | 0.8519 |
| default | **0.7855±0.0** | 0.7845±0.0002 | 0.7852±0.0004 | 0.9571 |
| adult | 0.7605±0.0 | 0.7594±0.0 | **0.7608±0.0002** | 0.8761 |
| nomao | **0.9479±0.0** | 0.9452±0.0007 | 0.9399±0.0017 | 0.8372 |
| susy | **0.7842±0.0** | 0.7808±0.0004 | 0.7839±0.0004 | 0.8537 |
| bank | **0.8883±0.0** | 0.8882±0.0 | **0.8883±0.0** | 0.9751 |
| codrna | **0.9467±0.0** | 0.9452±0.0003 | 0.9467±0.0002 | 0.799 |
| ida2016 | **0.9824±0.0** | **0.9824±0.0** | **0.9824±0.0** | 0.9274 |
| poker | **0.7635±0.0001** | 0.7539±0.0 | 0.7592±0.0011 | 0.9205 |
| mocap | 0.6922±0.0 | **0.7019±0.0003** | 0.6878±0.0 | 0.8728 |
| ijcnn1 | 0.9051±0.0 | **0.9053±0.0** | 0.9051±0.0 | 0.9872 |
| skin | **0.9815±0.0** | 0.9186±0.0052 | 0.9393±0.0011 | 0.1595 |
| Average | **0.8502** | 0.8438 | 0.8454 | 0.8511 |

Table 38．Test Accuracy Comparison of XGBoost under Noise Rate 5%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  XGBoost | RSDS-  XGBoost | RD-  XGBoost | Sample  Ratio |
| electrical | **0.9995±0.0** | **0.9995±0.0** | **0.9995±0.0** | 0.9671 |
| htru2 | 0.9785±0.0 | **0.9792±0.0002** | 0.9785±0.0004 | 0.8988 |
| magic | 0.8636±0.0 | **0.8637±0.0002** | 0.8625±0.0004 | 0.9424 |
| letter | 0.8532±0.0 | 0.8447±0.0007 | **0.8559±0.0005** | 0.9008 |
| avila | **0.8797±0.0** | 0.867±0.0024 | 0.8739±0.0008 | 0.9313 |
| default | 0.8223±0.0 | 0.8222±0.0008 | **0.8231±0.0004** | 0.9623 |
| adult | **0.8614±0.0** | 0.8587±0.001 | 0.8603±0.0011 | 0.8242 |
| nomao | **0.9735±0.0** | 0.9734±0.0007 | 0.9732±0.0012 | 0.7549 |
| susy | 0.7965±0.0 | 0.7832±0.0004 | **0.7974±0.0007** | 0.8658 |
| bank | **0.9059±0.0** | 0.905±0.0001 | 0.9047±0.001 | 0.9344 |
| codrna | **0.9424±0.0** | 0.9415±0.0008 | 0.9419±0.0011 | 0.7973 |
| ida2016 | 0.9919±0.0 | 0.9918±0.0001 | **0.992±0.0003** | 0.7968 |
| poker | 0.7067±0.0 | **0.7103±0.0017** | 0.7045±0.0004 | 0.9591 |
| mocap | 0.9563±0.0 | **0.9583±0.0021** | 0.958±0.0004 | 0.9278 |
| ijcnn1 | 0.9714±0.0 | **0.972±0.0** | 0.9715±0.0 | 0.9833 |
| skin | **0.9942±0.0** | 0.9909±0.0004 | 0.9914±0.0003 | 0.1666 |
| Average | **0.9061** | 0.9038 | 0.9055 | 0.8508 |

Table 39．Test Accuracy Comparison of XGBoost under Noise Rate 10%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  XGBoost | RSDS-  XGBoost | RD-  XGBoost | Sample  Ratio |
| electrical | **1.0±0.0** | 0.9995±0.0007 | **1.0±0.0** | 0.9458 |
| htru2 | **0.9821±0.0** | 0.9813±0.0008 | 0.9818±0.0004 | 0.9486 |
| magic | **0.8678±0.0** | 0.8649±0.0015 | 0.8676±0.0006 | 0.9344 |
| letter | 0.843±0.0 | 0.8368±0.0 | **0.8432±0.0011** | 0.8643 |
| avila | 0.8666±0.0 | 0.8609±0.0002 | **0.8673±0.0041** | 0.9054 |
| default | **0.8242±0.0** | 0.8222±0.0002 | 0.8237±0.0002 | 0.9602 |
| adult | **0.8598±0.0** | 0.8561±0.0009 | 0.858±0.0004 | 0.8658 |
| nomao | 0.9685±0.0 | 0.9664±0.0005 | **0.9695±0.0008** | 0.7992 |
| susy | **0.7971±0.0** | 0.7829±0.0007 | 0.7962±0.0006 | 0.8621 |
| bank | 0.9028±0.0 | **0.9045±0.0001** | 0.9024±0.0004 | 0.9735 |
| codrna | 0.9442±0.0 | 0.9438±0.0008 | **0.9443±0.0005** | 0.8031 |
| ida2016 | 0.9911±0.0 | 0.9916±0.0002 | **0.9918±0.0002** | 0.8668 |
| poker | 0.6954±0.0 | **0.6992±0.0028** | 0.6939±0.0017 | 0.9492 |
| mocap | 0.9539±0.0 | **0.9547±0.0012** | 0.9542±0.0008 | 0.9095 |
| ijcnn1 | 0.9689±0.0 | **0.9697±0.0002** | 0.9694±0.0003 | 0.9916 |
| skin | **0.9916±0.0** | 0.989±0.0009 | 0.99±0.0021 | 0.1546 |
| Average | **0.9036** | 0.9015 | 0.9033 | 0.8584 |

Table 40．Test Accuracy Comparison of XGBoost under Noise Rate 15%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  XGBoost | RSDS-  XGBoost | RD-  XGBoost | Sample  Ratio |
| electrical | **1.0±0.0** | 0.9995±0.0 | 0.9995±0.0 | 0.9345 |
| htru2 | **0.9788±0.0** | 0.9764±0.0002 | 0.9782±0.0 | 0.9583 |
| magic | **0.8609±0.0** | 0.8578±0.0026 | 0.8586±0.0015 | 0.924 |
| letter | 0.8418±0.0 | 0.8266±0.0002 | **0.8432±0.0018** | 0.8308 |
| avila | **0.8701±0.0** | 0.8521±0.0008 | 0.8674±0.0025 | 0.8824 |
| default | **0.826±0.0** | 0.8227±0.0002 | 0.8248±0.0002 | 0.9589 |
| adult | **0.8544±0.0** | 0.8465±0.0002 | 0.8528±0.001 | 0.874 |
| nomao | **0.975±0.0** | 0.9698±0.0007 | 0.975±0.0006 | 0.8222 |
| susy | **0.7907±0.0** | 0.7744±0.0001 | 0.7897±0.0027 | 0.8591 |
| bank | 0.9055±0.0 | 0.9057±0.0005 | **0.906±0.0** | 0.9772 |
| codrna | 0.9405±0.0 | **0.941±0.0004** | 0.94±0.0007 | 0.8052 |
| ida2016 | **0.9906±0.0** | **0.9906±0.0** | **0.9906±0.0** | 0.9008 |
| poker | 0.7043±0.0 | **0.7049±0.0028** | 0.7002±0.0006 | 0.9359 |
| mocap | 0.9554±0.0 | 0.9503±0.0024 | **0.9566±0.0016** | 0.8907 |
| ijcnn1 | 0.9701±0.0 | **0.9709±0.0001** | 0.9698±0.0 | 0.9901 |
| skin | 0.9896±0.0 | **0.9898±0.0008** | 0.9879±0.0022 | 0.1609 |
| Average | **0.9034** | 0.8987 | 0.9025 | 0.8566 |

Table 41．Test Accuracy Comparison of XGBoost under Noise Rate 20%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| data set | Original  XGBoost | RSDS-  XGBoost | RD-  XGBoost | Sample  Ratio |
| electrical | 0.999±0.0 | **0.9992±0.0004** | 0.9985±0.0 | 0.9184 |
| htru2 | **0.9832±0.0** | 0.9828±0.0002 | 0.9828±0.0006 | 0.9643 |
| magic | **0.8533±0.0** | 0.8533±0.0022 | 0.8529±0.0006 | 0.9114 |
| letter | 0.837±0.0 | 0.8088±0.0014 | **0.8428±0.0028** | 0.8067 |
| avila | **0.8735±0.0** | 0.8401±0.0049 | 0.8583±0.0002 | 0.8519 |
| default | **0.8233±0.0** | 0.8198±0.0009 | 0.8222±0.0006 | 0.9571 |
| adult | **0.8567±0.0** | 0.8459±0.0005 | 0.8548±0.0001 | 0.8761 |
| nomao | 0.9669±0.0 | 0.9615±0.0005 | **0.9682±0.0006** | 0.8372 |
| susy | **0.7911±0.0** | 0.7769±0.0002 | 0.7891±0.0004 | 0.8537 |
| bank | 0.9046±0.0 | **0.9055±0.0003** | 0.904±0.0005 | 0.9751 |
| codrna | 0.9362±0.0 | **0.9371±0.0002** | 0.935±0.0004 | 0.799 |
| ida2016 | 0.9913±0.0 | **0.9916±0.0002** | 0.9913±0.0003 | 0.9274 |
| poker | 0.697±0.0 | **0.699±0.0018** | 0.699±0.0033 | 0.9205 |
| mocap | 0.9509±0.0 | 0.9439±0.0019 | **0.9518±0.0012** | 0.8728 |
| ijcnn1 | 0.9681±0.0 | **0.9689±0.0004** | 0.9676±0.0002 | 0.9872 |
| skin | **0.991±0.0** | 0.9883±0.0001 | 0.9885±0.0007 | 0.1595 |
| Average | **0.9014** | 0.8952 | 0.9004 | 0.8511 |

Table 42. Average Classification accuracy on datasets with Noise Rate set as 5%

|  |  |  |  |
| --- | --- | --- | --- |
| data set | Original | RSDS | Random |
| electrical | 0.9380 | **0.9426** | 0.9371 |
| htru2 | 0.9596 | **0.9607** | 0.9576 |
| magic | 0.8017 | **0.8080** | 0.8028 |
| letter | 0.8926 | **0.8955** | 0.8873 |
| avila | 0.8499 | **0.8509** | 0.8468 |
| default | 0.7727 | **0.7801** | 0.7546 |
| adult | 0.7736 | **0.7750** | 0.7732 |
| nomao | 0.9343 | **0.9522** | 0.9275 |
| susy | 0.7746 | **0.7796** | 0.7670 |
| bank | 0.8703 | **0.8806** | 0.8744 |
| codrna | 0.9350 | **0.9368** | 0.9332 |
| ida2016 | 0.9781 | **0.9789** | 0.9748 |
| poker | 0.7628 | **0.7667** | 0.7584 |
| mocap | 0.9071 | **0.9109** | 0.9064 |
| ijcnn1 | 0.9588 | **0.9595** | 0.9583 |
| skin | 0.9786 | **0.9864** | 0.9761 |

Table 43. Average Classification accuracy on datasets with Noise Rate set as 10%

|  |  |  |  |
| --- | --- | --- | --- |
| data set | Original | RSDS | Random |
| electrical | 0.9285 | **0.9327** | 0.9208 |
| htru2 | 0.9555 | **0.9567** | 0.9552 |
| magic | 0.7963 | **0.8048** | 0.7969 |
| letter | 0.8728 | **0.8811** | 0.8753 |
| avila | 0.8364 | **0.8437** | 0.8341 |
| default | 0.7468 | **0.7740** | 0.7456 |
| adult | 0.7989 | **0.7999** | 0.7308 |
| nomao | 0.9135 | **0.9337** | 0.9204 |
| susy | 0.7692 | **0.7701** | 0.7654 |
| bank | 0.8660 | **0.8777** | 0.8743 |
| codrna | 0.9290 | **0.9349** | 0.9282 |
| ida2016 | 0.9573 | **0.9681** | 0.9524 |
| poker | 0.7525 | **0.7576** | 0.7486 |
| mocap | 0.8986 | **0.9047** | 0.8977 |
| ijcnn1 | 0.9463 | **0.9493** | 0.9464 |
| skin | 0.9744 | **0.9831** | 0.9663 |