## Table 1:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| LR | 70.22 | 78.40 | 56.20 | 65.40 | 40.51 | 70.27 |
| LR-GS | 69.75 | 78.40 | 54.80 | 64.50 | 39.55 | 69.79 |
| LR-RS | 70.03 | 79.30 | 54.40 | 64.60 | 40.12 | 70.08 |
| SVC | 65.73 | 90.50 | 34.20 | 49.60 | 30.91 | 65.33 |
| SVC-GS | 50.45 | 49.90 | 99.00 | 69.80 | 04.35 | 52.45 |
| SVC-RS | 50.48 | 49.90 | 100.00 | 66.60 | 02.20 | 51.11 |
| DT | 99.65 | 99.80 | 99.50 | 99.70 | 99.31 | 99.65 |
| DT-GS | 99.58 | 99.70 | 99.50 | 99.60 | 99.17 | 99.58 |
| DT-RS | 99.68 | 99.80 | 99.50 | 99.70 | 99.36 | 99.68 |
| RF | 99.82 | 99.80 | 99.80 | 99.80 | 99.65 | 99.82 |
| RF-GS | 99.84 | 99.80 | 99.90 | 99.80 | 99.68 | 99.84 |
| RF-RS | 99.84 | 99.90 | 99.80 | 99.80 | 99.68 | 99.83 |

## Table 2

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| LR | 70.22 | 78.40 | 56.20 | 65.40 | 40.51 | 70.27 |
| SVC | 65.73 | 90.50 | 34.20 | 49.60 | 30.91 | 65.33 |
| DT | 99.65 | 99.80 | 99.50 | 99.70 | 99.31 | 99.65 |
| RF | 99.82 | 99.80 | 99.80 | 99.80 | 99.65 | 99.82 |

## Table 3:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| LR-GS | 69.75 | 78.40 | 54.80 | 64.50 | 39.55 | 69.79 |
| SVC-GS | 65.73 | 90.50 | 34.20 | 49.60 | 30.91 | 65.33 |
| DT-GS | 99.58 | 99.70 | 99.50 | 99.60 | 99.17 | 99.58 |
| RF-GS | 99.84 | 99.80 | 99.90 | 99.80 | 99.68 | 99.84 |

(LR-(LR-RS))/LR

## Table 4:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| LR-GS | +0.0066 | 0 | +0.0249 | +0.0137 | +0.0236 | +0.0068 |
| SVC-GS | 0 | 0 | 0 | 0 | 0 | 0 |
| DT-GS | +0.0007 | +0.0010 | 0 | +0.0010 | +0.0014 | +0.0007 |
| RF-GS | -0.0002 | 0 | -0.0010 | 0 | -0.0003 | -0.0002 |

Table 5:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| LR-RS | 70.03 | 79.30 | 54.40 | 64.60 | 40.12 | 70.08 |
| SVC-RS | 50.48 | 49.90 | 100.00 | 66.60 | 02.20 | 51.11 |
| DT-RS | 99.68 | 99.80 | 99.50 | 99.70 | 99.36 | 99.68 |
| RF-RS | 99.84 | 99.90 | 99.80 | 99.80 | 99.68 | 99.83 |

Table 6

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| LR-RS | +0.0027 | -0.0114 | +0.0320 | +0.0122 | +0.0096 | +0.0027 |
| SVC-RS | 0.2320 | 0.44865 | -1.9239 | -0.3427 | 0.9288 | +0.2176 |
| DT-RS | -0.0003 | 0 | 0 | 0 | -0.0005 | -0.0003 |
| RF-RS | -0.0002 | -0.0010 | 0 | 0 | -0.0003 | -0.0001 |

Table 7:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| XGBoost | 86.39 | 95.30 | 76.70 | 85.00 | 72.80 | 86.42 |
| XGB-GS | 99.68 | 99.90 | 99.50 | 99.70 | 99.36 | 99.67 |
| XGB-RS | 99.87 | 99.90 | 99.80 | 99.90 | 99.74 | 99.87 |
| LGBM | 99.57 | 99.70 | 99.40 | 99.60 | 99.15 | 99.57 |
| LGBM-GS | 99.65 | 99.80 | 99.50 | 99.60 | 99.31 | 99.65 |
| LGBM-RS | 99.62 | 99.70 | 99.50 | 99.60 | 99.24 | 99.62 |
| AdaBoost | 78.64 | 85.80 | 68.00 | 75.90 | 57.17 | 78.51 |
| AdaBoost-GS | 91.04 | 96.20 | 85.20 | 90.40 | 82.06 | 90.97 |
| AdaBoost-RS | 91.02 | 96.17 | 85.20 | 90.32 | 82.02 | 90.93 |
| CatBoost | 99.84 | 99.90 | 99.80 | 99.80 | 99.68 | 99.83 |
| CatBoost-GS | 99.89 | 99.90 | 99.90 | 99.90 | 99.79 | 99.89 |
| CatBoost-RS | 99.86 | 99.80 | 99.90 | 99.90 | 99.72 | 99.86 |
| Gradient Boost | 76.49 | 83.20 | 65.60 | 73.40 | 52.84 | 76.35 |
| Gradient Boost-GS | 99.87 | 99.90 | 99.90 | 99.90 | 99.74 | 99.87 |
| Gradient Boost-RS | 99.86 | 99.86 | 99.40 | 99.90 | 99.70 | 99.55 |

Table 8:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| XGBoost | 86.39 | 95.30 | 76.70 | 85.00 | 72.80 | 86.42 |
| LGBM | 99.57 | 99.70 | 99.40 | 99.60 | 99.15 | 99.57 |
| AdaBoost | 78.64 | 85.80 | 68.00 | 75.90 | 57.17 | 78.51 |
| CatBoost | 99.84 | 99.90 | 99.80 | 99.80 | 99.68 | 99.83 |
| Gradient Boost | 76.49 | 83.20 | 65.60 | 73.40 | 52.84 | 76.35 |

Table 9:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| XGB-GS | 99.68 | 99.90 | 99.50 | 99.70 | 99.36 | 99.67 |
| LGBM-GS | 99.65 | 99.80 | 99.50 | 99.60 | 99.31 | 99.65 |
| AdaBoost-GS | 91.04 | 96.20 | 85.20 | 90.40 | 82.06 | 90.97 |
| CatBoost-GS | 99.89 | 99.90 | 99.90 | 99.90 | 99.79 | 99.89 |
| Gradient Boost-GS | 99.87 | 99.90 | 99.90 | 99.90 | 99.74 | 99.87 |

Table 10:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| XGB-GS | +0.1538 | +0.0482 | +0.2972 | +0.1729 | +0.3648 | +0.1533 |
| LGBM-GS | +0.0008 | +0.0010 | +0.0010 | 0 | +0.0016 | +0.0008 |
| AdaBoost-GS | +0.1576 | +0.1212 | +0.2529 | +0.1910 | +0.4353 | +0.1587 |
| CatBoost-GS | +0.0005 | 0 | +0.0010 | +0.0010 | +0.0011 | +0.0006 |
| Gradient Boost-GS | +0.3056 | +0.2007 | +0.5228 | +0.3610 | +0.8875 | +0.3080 |

Table 11:

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| XGB-RS | 99.87 | 99.90 | 99.80 | 99.90 | 99.74 | 99.87 |
| LGBM-RS | 99.62 | 99.70 | 99.50 | 99.60 | 99.24 | 99.62 |

| | | | | | | |
|---|---|---|---|---|---|---|
| AdaBoost-RS | 91.02 | 96.17 | 85.20 | 90.32 | 82.02 | 90.93 |
| CatBoost-RS | 99.86 | 99.80 | 99.90 | 99.90 | 99.72 | 99.86 |
| Gradient Boost-RS | 99.86 | 99.86 | 99.40 | 99.90 | 99.70 | 99.55 |

# Table 12

| Model | Accuracy | Precision | Recall | F1-Score | Cohen-Kappa Score | Roc-Auc Score |
|---|---|---|---|---|---|---|
| XGB-RS | +0.1560 | +0.0482 | +0.3011 | +0.1752 | +0.3700 | +0.1556 |
| LGBM-RS | +0.0005 | 0 | +0.0010 | 0 | +0.0009 | +0.0005 |
| AdaBoost-RS | +0.1574 | +0.1208 | +0.2529 | +0.1899 | +0.4346 | +0.1581 |
| CatBoost-RS | +0.0002 | -0.0010 | +0.0010 | +0.0010 | +0.0004 | +0.0003 |
| Gradient Boost-RS | +0.3055 | +0.2002 | +0.5152 | +0.3610 | +0.8868 | +0.3038 |