**Appendix XX: Churn Predication Leaderboard**

| **Model** | **Churn\_Rank** | **Overall\_Rank** | **Accuracy\_0** | **Accuracy\_1** | **F1\_0** | **F1\_1** | **F1\_Weighted** | **ROC\_AUC** | **PR\_AUC** | **Churn\_Performance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **kNN\_SMOTE\_ENN** | 1 | 43 | 0.3855 | 0.7465 | 0.5457 | 0.2003 | 0.5122 | 0.5793 | 0.1169 | Good |
| **Top\_Churn\_Accuracy\_Ensemble** | 2 | 41 | 0.4371 | 0.7183 | 0.5957 | 0.2068 | 0.5579 | 0.6222 | 0.1596 | Good |
| **kNN\_ADASYN** | 3 | 38 | 0.5057 | 0.6655 | 0.6560 | 0.2127 | 0.6129 | 0.5977 | 0.1238 | Fair |
| **Balanced\_Churn\_Performance\_Ensemble** | 4 | 37 | 0.5118 | 0.6444 | 0.6603 | 0.2085 | 0.6164 | 0.6223 | 0.1538 | Fair |
| **LogReg\_SMOTE\_ENN** | 5 | 34 | 0.5330 | 0.6338 | 0.6779 | 0.2123 | 0.6327 | 0.6220 | 0.1592 | Fair |
| **kNN\_SMOTE\_Tomek** | 6 | 35 | 0.5182 | 0.6232 | 0.6649 | 0.2044 | 0.6201 | 0.5954 | 0.1245 | Fair |
| **kNN\_SMOTE** | 7 | 36 | 0.5182 | 0.6197 | 0.6647 | 0.2034 | 0.6199 | 0.5949 | 0.1245 | Fair |
| **DecisionTree\_SegmentBalanced** | 8 | 39 | 0.5669 | 0.6056 | 0.5781 | 0.5941 | 0.5861 | 0.5863 | 0.5503 | Fair |
| **kNN\_BorderlineSMOTE** | 9 | 33 | 0.5914 | 0.6056 | 0.7239 | 0.2243 | 0.6753 | 0.6173 | 0.1349 | Fair |
| **Diverse\_Algorithm\_Churn\_Ensemble** | 10 | 31 | 0.7373 | 0.5458 | 0.8256 | 0.2739 | 0.7719 | 0.6757 | 0.2368 | Poor |
| **kNN\_SegmentBalanced** | 11 | 42 | 0.5352 | 0.5423 | 0.5371 | 0.5404 | 0.5387 | 0.5684 | 0.5504 | Poor |
| **LogReg\_SegmentBalanced** | 12 | 40 | 0.6268 | 0.5352 | 0.5993 | 0.5609 | 0.5801 | 0.6217 | 0.6461 | Poor |
| **DecisionTree\_SMOTE\_ENN** | 13 | 32 | 0.6198 | 0.5246 | 0.7418 | 0.2075 | 0.6899 | 0.5722 | 0.1141 | Poor |
| **kNN\_RandomCombined** | 14 | 30 | 0.7597 | 0.4437 | 0.8350 | 0.2414 | 0.7773 | 0.6135 | 0.1439 | Poor |
| **XGBoost\_CostSensitive** | 15 | 29 | 0.8472 | 0.4261 | 0.8876 | 0.2995 | 0.8304 | 0.6914 | 0.2738 | Poor |
| **DecisionTree\_CostSensitive** | 16 | 26 | 0.8916 | 0.3099 | 0.9071 | 0.2675 | 0.8449 | 0.6007 | 0.1400 | Poor |
| **DecisionTree\_RandomCombined** | 17 | 27 | 0.9007 | 0.2570 | 0.9095 | 0.2359 | 0.8440 | 0.5789 | 0.1282 | Poor |
| **DecisionTree\_BorderlineSMOTE** | 18 | 25 | 0.9181 | 0.2218 | 0.9173 | 0.2238 | 0.8499 | 0.5700 | 0.1257 | Poor |
| **GradientBoost\_OptimalBalanced** | 19 | 28 | 0.9030 | 0.2007 | 0.9079 | 0.1910 | 0.8383 | 0.6240 | 0.1467 | Poor |
| **DecisionTree\_SMOTE\_Tomek** | 20 | 24 | 0.9337 | 0.1655 | 0.9228 | 0.1858 | 0.8512 | 0.5496 | 0.1161 | Poor |
| **DecisionTree\_ADASYN** | 21 | 22 | 0.9416 | 0.1620 | 0.9269 | 0.1901 | 0.8553 | 0.5518 | 0.1187 | Poor |
| **DecisionTree\_SMOTE** | 22 | 23 | 0.9359 | 0.1585 | 0.9237 | 0.1807 | 0.8515 | 0.5472 | 0.1151 | Poor |
| **LogReg\_CostSensitive** | 23 | 17 | 0.9481 | 0.1479 | 0.9296 | 0.1814 | 0.8569 | 0.6374 | 0.1656 | Poor |
| **XGBoost\_OptimalBalanced** | 24 | 5 | 0.9761 | 0.1197 | 0.9427 | 0.1785 | 0.8684 | 0.6813 | 0.2478 | Poor |
| **DecisionTree** | 25 | 6 | 0.9723 | 0.1197 | 0.9408 | 0.1739 | 0.8662 | 0.5460 | 0.1236 | Poor |
| **XGBoost\_Unbalanced** | 26 | 1 | 0.9917 | 0.1127 | 0.9502 | 0.1893 | 0.8763 | 0.7038 | 0.3106 | Poor |
| **Top3\_Ensemble** | 27 | 2 | 0.9939 | 0.1021 | 0.9509 | 0.1763 | 0.8756 | 0.7192 | 0.3072 | Poor |
| **RandomForest\_OptimalBalanced** | 28 | 3 | 0.9932 | 0.0845 | 0.9496 | 0.1472 | 0.8716 | 0.6883 | 0.2513 | Poor |
| **Top5\_Ensemble** | 29 | 4 | 0.9932 | 0.0739 | 0.9491 | 0.1300 | 0.8695 | 0.7117 | 0.2834 | Poor |
| **kNN** | 30 | 7 | 0.9879 | 0.0704 | 0.9463 | 0.1190 | 0.8659 | 0.6071 | 0.1507 | Poor |
| **LogReg\_SMOTE\_Tomek** | 31 | 13 | 0.9784 | 0.0634 | 0.9411 | 0.1003 | 0.8594 | 0.6354 | 0.1663 | Poor |
| **LogReg\_BorderlineSMOTE** | 32 | 15 | 0.9769 | 0.0634 | 0.9403 | 0.0992 | 0.8586 | 0.6327 | 0.1670 | Poor |
| **LogReg\_SMOTE** | 33 | 14 | 0.9792 | 0.0599 | 0.9413 | 0.0955 | 0.8591 | 0.6357 | 0.1666 | Poor |
| **LogReg\_RandomCombined** | 34 | 12 | 0.9810 | 0.0563 | 0.9421 | 0.0914 | 0.8594 | 0.6371 | 0.1670 | Poor |
| **LogReg\_ADASYN** | 35 | 16 | 0.9807 | 0.0528 | 0.9418 | 0.0857 | 0.8586 | 0.6351 | 0.1658 | Poor |
| **Category\_Ensemble** | 36 | 11 | 0.9943 | 0.0387 | 0.9480 | 0.0710 | 0.8627 | 0.6988 | 0.2374 | Poor |
| **RF\_CostSensitive** | 37 | 8 | 0.9996 | 0.0352 | 0.9504 | 0.0678 | 0.8647 | 0.6857 | 0.2659 | Poor |
| **RandomForest\_Unbalanced** | 38 | 8 | 0.9996 | 0.0352 | 0.9504 | 0.0678 | 0.8647 | 0.6919 | 0.2645 | Poor |
| **Mega\_Ensemble** | 39 | 10 | 0.9966 | 0.0352 | 0.9489 | 0.0660 | 0.8631 | 0.7146 | 0.2751 | Poor |
| **LogReg** | 40 | 21 | 0.9989 | 0.0000 | 0.9484 | 0.0000 | 0.8562 | 0.6354 | 0.1671 | Poor |
| **GradientBoost\_Unbalanced** | 41 | 18 | 1.0000 | 0.0000 | 0.9489 | 0.0000 | 0.8567 | 0.6684 | 0.1813 | Poor |
| **Dummy\_SegmentBalanced** | 42 | 44 | 1.0000 | 0.0000 | 0.6667 | 0.0000 | 0.3333 | 0.5000 | 0.5000 | Poor |
| **Dummy\_SMOTE** | 43 | 18 | 1.0000 | 0.0000 | 0.9489 | 0.0000 | 0.8567 | 0.5000 | 0.0972 | Poor |
| **Dummy** | 44 | 18 | 1.0000 | 0.0000 | 0.9489 | 0.0000 | 0.8567 | 0.5000 | 0.0972 | Poor |