

| Initial Data Set | | | | | | | | | | | | | | | | | | |
|------------------|---------------|------------|--------------------|------------|------------|-----------|---------|------|-------|---------------|----------------|----------------|---------------|----------|-----------|--------|----------|---|
| Model | data_date | data_shape | data_balance_ratio | data-split | train size | test_size | AUC ROC | Flag | count | True Positive | False positive | False negative | True Negative | Accuracy | precision | recall | f1-score | comments |
| NN-Training | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 80-20 | 32000 | 8000 | 78.02% | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | The entire data set is perfectly balanced |
| NN-Testing | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 80-20 | 32000 | 8000 | 78.24% | 1 | 4013 | 2846 | 600 | 1141 | 3413 | 0.782 | 0.826 | 0.714 | 0.766 | |
| | | | | | | | | 0 | 3987 | 3413 | 600 | 1141 | 2846 | 0.782 | 0.85 | 0.749 | 0.796 | |
| RF Accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 80-20 | 32000 | 8000 | 79.70% | 1 | 4013 | 3026 | 660 | 961 | 3353 | 0.797 | 0.821 | 0.759 | 0.789 | |
| | | | | | | | | 0 | 3987 | 3353 | 660 | 961 | 3026 | 0.797 | 0.836 | 0.777 | 0.805 | |
| XGB accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 80-20 | 32000 | 8000 | 80.00% | 1 | 4013 | 2870 | 446 | 1117 | 3567 | 0.805 | 0.866 | 0.72 | 0.786 | |
| | | | | | | | | 0 | 3987 | 3567 | 446 | 1117 | 2870 | 0.805 | 0.889 | 0.762 | 0.821 | |
| LGBM accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 80-20 | 32000 | 8000 | 79.20% | 1 | 4013 | 2839 | 517 | 1148 | 3496 | 0.792 | 0.846 | 0.712 | 0.773 | |
| | | | | | | | | 0 | 3987 | 3496 | 517 | 1148 | 2839 | 0.792 | 0.871 | 0.753 | 0.808 | |

| In-time Sample 1 | | | | | | | | | | | | | | | | | | |
|------------------|---------------|------------|--------------------|----------------------|------------|-----------|---------|------|-------|---------------|----------------|----------------|---------------|----------|-----------|--------|----------|---|
| Model | data_date | data_shape | data_balance_ratio | In-Time (data-split) | train size | test_size | AUC ROC | Flag | count | True Positive | False positive | False negative | True Negative | Accuracy | precision | recall | f1-score | comments |
| NN-Training | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 70-30 | 28000 | 12000 | 78.13% | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | The entire data set is perfectly balanced |
| NN-Testing | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 70-30 | 28000 | 12000 | 77.25% | 1 | 6037 | 4347 | 1040 | 1690 | 4923 | 0.773 | 0.807 | 0.72 | 0.761 | |
| | | | | | | | | 0 | 5963 | 4923 | 1040 | 1690 | 4347 | 0.773 | 0.826 | 0.744 | 0.783 | |
| RF Accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 70-30 | 28000 | 12000 | 79.20% | 1 | 6037 | 4611 | 1078 | 1426 | 4885 | 0.791 | 0.811 | 0.764 | 0.787 | |
| | | | | | | | | 0 | 5963 | 4855 | 1078 | 1426 | 4611 | 0.791 | 0.818 | 0.773 | 0.795 | |
| XGB accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 70-30 | 28000 | 12000 | 80.00% | 1 | 6037 | 4408 | 738 | 1629 | 5225 | 0.803 | 0.857 | 0.73 | 0.788 | |
| | | | | | | | | 0 | 5963 | 5225 | 738 | 1629 | 4408 | 0.803 | 0.876 | 0.762 | 0.815 | |
| LGBM accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 70-30 | 28000 | 12000 | 78.30% | 1 | 6037 | 4242 | 804 | 1795 | 5159 | 0.783 | 0.841 | 0.703 | 0.766 | |
| | | | | | | | | 0 | 5963 | 5159 | 804 | 1795 | 4242 | 0.783 | 0.865 | 0.742 | 0.799 | |

| In-time Sample 2 | | | | | | | | | | | | | | | | | | |
|------------------|---------------|------------|--------------------|----------------------|------------|-----------|---------|------|-------|---------------|----------------|----------------|---------------|----------|-----------|--------|----------|---|
| Model | data_date | data_shape | data_balance_ratio | In-Time (data-split) | train size | test_size | AUC ROC | Flag | count | True Positive | False positive | False negative | True Negative | Accuracy | precision | recall | f1-score | comments |
| NN-Training | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 60-40 | 24000 | 16000 | 78.33% | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | The entire data set is perfectly balanced |
| NN-Testing | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 60-40 | 24000 | 16000 | 76.64% | 1 | 7997 | 4916 | 656 | 3081 | 7347 | 0.766 | 0.882 | 0.615 | 0.725 | |
| | | | | | | | | 0 | 8003 | 7347 | 656 | 3081 | 4916 | 0.766 | 0.918 | 0.705 | 0.798 | |
| RF Accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 60-40 | 24000 | 16000 | 79.10% | 1 | 7997 | 6121 | 1474 | 1876 | 6529 | 0.791 | 0.806 | 0.765 | 0.785 | |
| | | | | | | | | 0 | 8003 | 6529 | 1474 | 1876 | 6121 | 0.791 | 0.816 | 0.777 | 0.796 | |
| XGB accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 60-40 | 24000 | 16000 | 80.00% | 1 | 7997 | 5841 | 1051 | 2156 | 6952 | 0.8 | 0.848 | 0.73 | 0.785 | |
| | | | | | | | | 0 | 8003 | 6952 | 1051 | 2156 | 5841 | 0.8 | 0.869 | 0.763 | 0.813 | |
| LGBM accuracy | 10/06 - 20/06 | 40000 307 | 20000 P : 20000 N | 60-40 | 24000 | 16000 | 87.00% | 1 | 7997 | 6080 | 1733 | 1917 | 6270 | 0.772 | 0.778 | 0.76 | 0.769 | |
| | | | | | | | | 0 | 8003 | 6270 | 1733 | 1917 | 6080 | 0.772 | 0.783 | 0.766 | 0.774 | |

| Out-of-time Sample | | | | | | | | | | | | | | | | | | |
|--------------------|---------------|-------------|--------------------|----------------------|----------------------|-----------|---------|------|-------|---------------|----------------|----------------|---------------|----------|-----------|--------|----------|---|
| Model | data_date | test_size | data_balance_ratio | out-of-Time | train size | test_size | AUC ROC | Flag | count | True Positive | False positive | False negative | True Negative | Accuracy | precision | recall | f1-score | comments |
| XGB accuracy | 01/06 - 05/06 | 5000 224 | 4941 P : 59 N | transferred-learning | transferred-learning | 5000 | 78.36 | 1 | 59 | 54 | 1077 | 5 | 3864 | 0.784 | 0.048 | 0.915 | 0.091 | The testing data set is heavily imbalanced. Hence the difference in precision and recall |
| | | | | | | | | 0 | 4941 | 3864 | 1077 | 5 | 54 | 0.784 | 0.782 | 0.999 | 0.877 | |
| XGB accuracy | 01/05 - 05/05 | 10000 240 | 9673 P : 327 N | transferred-learning | transferred-learning | 10000 | 80.20% | 1 | 327 | 274 | 2269 | 53 | 7404 | 0.7678 | 0.1077 | 0.8379 | 0.19 | |
| | | | | | | | | 0 | 9673 | 7404 | 2269 | 53 | 274 | 0.7678 | 0.7654 | 0.9929 | 0.86 | |