Customer Churn Prediction – Raport

1. Goal

The goal of this analysis is to predict if a customer will **churn** (leave the service).
This helps the bank understand customer behavior and reduce churn risk.

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2. Dataset

- **Number of customers:** 1000
- **Features:** Age, Gender, MaritalStatus, IncomeLevel, TotalSpent, AvgSpent, NumTransactions, NumInteractions, ResolvedRatio, AvgLoginFreq, MostUsedPlatform
- **Target:** ChurnStatus (0 = stay, 1 = churn)

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3. Model

- **Algorithm:** Random Forest Classifier
- **Train/Test Split:** 80% train, 20% test
- **Preprocessing:**
  - Missing values filled with median
  - One-hot encoding for categorical features
  - CustomerID removed

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4. Model Performance

Metric	Value
Accuracy	0.745
Precision	0.0
Recall	0.0
F1-score	0.0

Confusion Matrix:

```
[[149   1]
 [ 50   0]]
```

Classification Report:

```
              precision    recall  f1-score   support

           0       0.75      0.99      0.85       150
           1       0.00      0.00      0.00        50

    accuracy                           0.74       200
   macro avg       0.37      0.50      0.43       200
weighted avg       0.56      0.74      0.64       200
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Note: The model predicts class **0 (stay)** well, but it fails to predict **1 (churn)**.
This happens because there are fewer churn cases in the data.

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5. Top Features (Importance)

Feature	Importance
AvgSpent	0.1736
AvgLoginFreq	0.1631
TotalSpent	0.1553
Age	0.1487
NumTransactions	0.0825
NumInteractions	0.0437
ResolvedRatio	0.0430
Gender_M	0.0292
MostUsedPlatform_Online Banking	0.0269
IncomeLevel_Medium	0.0248

Explanation:

- AvgSpent, AvgLoginFreq, and TotalSpent are the most important features.
- Bank can focus on these features to reduce churn.

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6. Recommendations

1. Solve **class imbalance** problem (use SMOTE, undersampling, or class weights).
2. Add more features to detect churn customers better.
3. Train the model again to increase recall and F1-score.
4. Use top features to make business strategies (loyalty programs, special offers).