Credit Risk Analysis Report

Overview of the Analysis

The goal of this analysis was to evaluate how well a machine learning model can predict credit risk. Specifically, the model classifies clients as either low-risk (non-default) or high-risk (default). The idea is to see if the model can help the company make smarter decisions when it comes to managing credit risk and identifying potential defaults.

Results

Here's how the model performed:

- **Overall Accuracy**: 99%
    - The model correctly predicted the outcomes for most clients.
- **Class 0 (No Default)**:
    - **Precision**: 1.00
    - **Recall**: 0.99
    - **F1-Score**: 1.00
- **Class 1 (Default)**:
    - **Precision**: 0.84
    - **Recall**: 0.94
    - **F1-Score**: 0.89
- **Macro Average** (treating both classes equally):
    - **Precision**: 0.92
    - **Recall**: 0.97
    - **F1-Score**: 0.94
- **Weighted Average** (accounting for class imbalance):
    - **Precision**: 0.99
    - **Recall**: 0.99
    - **F1-Score**: 0.99

Summary

Model Performance

Overall, the model performed really well, with an accuracy of 99%. It's especially good at identifying low-risk clients (Class 0), where it achieved perfect precision and near-perfect recall. For high-risk clients (Class 1), it also performed well, with a recall of 94%. This means the model is great at catching most default cases. However, its precision for Class 1 (84%) is slightly lower, which means it does incorrectly flag some non-default clients as high-risk. That said, the model still has a good balance.

Recommendation

We believe this model is a good fit for the company's credit risk analysis. Its ability to identify default cases (Class 1) makes it a valuable tool for managing risk proactively. While there's room to improve precision for Class 1 to reduce false positives, the overall performance is strong enough to recommend its use. Refinements like tweaking the classification threshold or using cost-sensitive learning could further enhance the results.