



# **BENBELLAH OWINO**

## **PHASE 3 CLASSIFICATION PROJECT**

LOAN APPROVAL MODEL

# ABOUT THE CLIENT

Mouz Bank is a rapidly expanding retail and commercial bank that prioritizes quick, ethical financing via online platforms. The bank is implementing data-driven algorithms to enhance credit choices, control risk, and guarantee equitable loan approvals in order to support its growing loan portfolio.



# BUSINESS PROBLEM

Our client Mouz bank is looking for a clever way to simplify and streamline the loan approval procedure while upholding ethical lending standards. In order to achieve this goal, we will create a prediction model that analyzes applicant data and more effectively evaluates risk in order to automate and assist credit decision-making. The following model will serve as the basis for increasing approval speed, decreasing manual labor, improving decision consistency, and supporting Mouz Bank's objective of providing quicker and more equitable loan outcomes



# PROJECT OBJECTIVES

We want a model that satisfies the following thresholds

1. Minimum f1 score of 90%
2. Recall f1 score of 90%
3. Minimum precision score of 90%

We have very high thresholds because the model will operate in a high risk high reward environment so we want to minimize the former while maximize the latter. Anything less than that is as good as useless. Also the model must be good in order not to affect customer satisfaction negatively.



# MODEL RESULTS

| SCORE FALSE  | METRIC    | SCORE TRUE    |
|--------------|-----------|---------------|
| 0.87         | F1        | 0.92          |
| 0.87         | RECALL    | 0.92          |
| 0.86         | PRECISION | 0.92          |
| TEST - 0.902 | ACCURACY  | TRAIN - 0.923 |

# BASE MODEL LOGISTIC REGRESSION

Our base model is a logistic regression model from sklearn

We chose this model since it is simple and computationally efficient, so it's very good for a base model.

# MODEL RESULTS

| SCORE FALSE | METRIC    | SCORE TRUE   |
|-------------|-----------|--------------|
| 0.97        | F1        | 0.98         |
| 0.96        | RECALL    | 0.99         |
| 0.98        | PRECISION | 0.98         |
| TEST - 0.98 | Accuracy  | TRAIN - 1.00 |

## MODEL 2 DECISION TREE

This model is a Decision Tree classifier from sklearn

We chose this model since it maps well to the laon approval process for banks

MODEL 3

DECISION TREE

This model is a Decision Tree classifier from sklearn

In this stage we did cross-validation, whereby we run the model numerous times with different parameters to find the best performing model thus effectively tuning it.

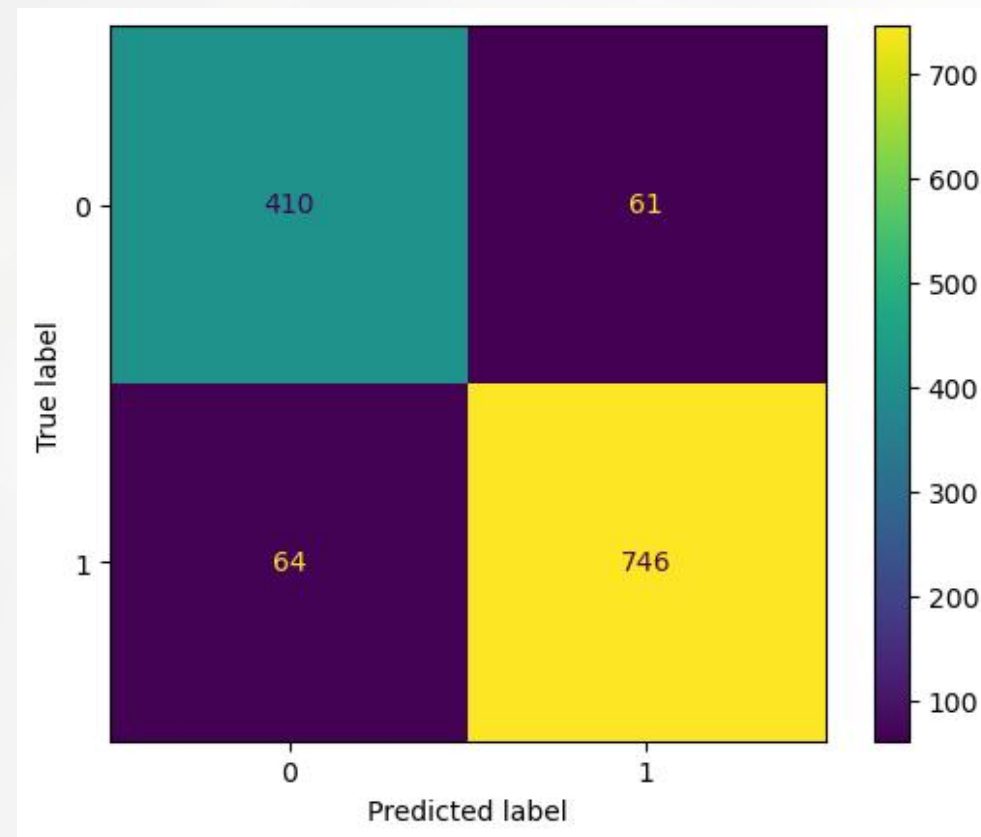
MODEL RESULTS

| SCORE FALSE | METRIC    | SCORE TRUE   |
|-------------|-----------|--------------|
| 0.97        | F1        | 0.98         |
| 0.96        | RECALL    | 0.99         |
| 0.98        | PRECISION | 0.98         |
| TEST - 0.98 | Accuracy  | TRAIN - 1.00 |

# CONFUSION MATRICES

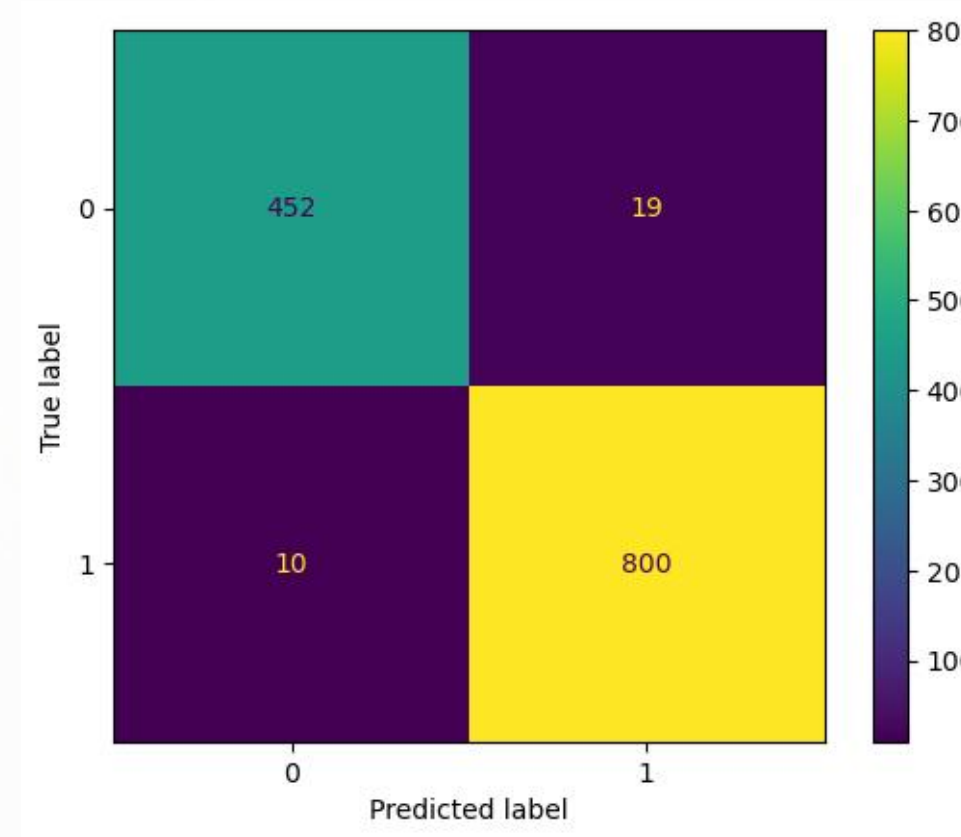
BASE MODEL

**Your paragraph text**



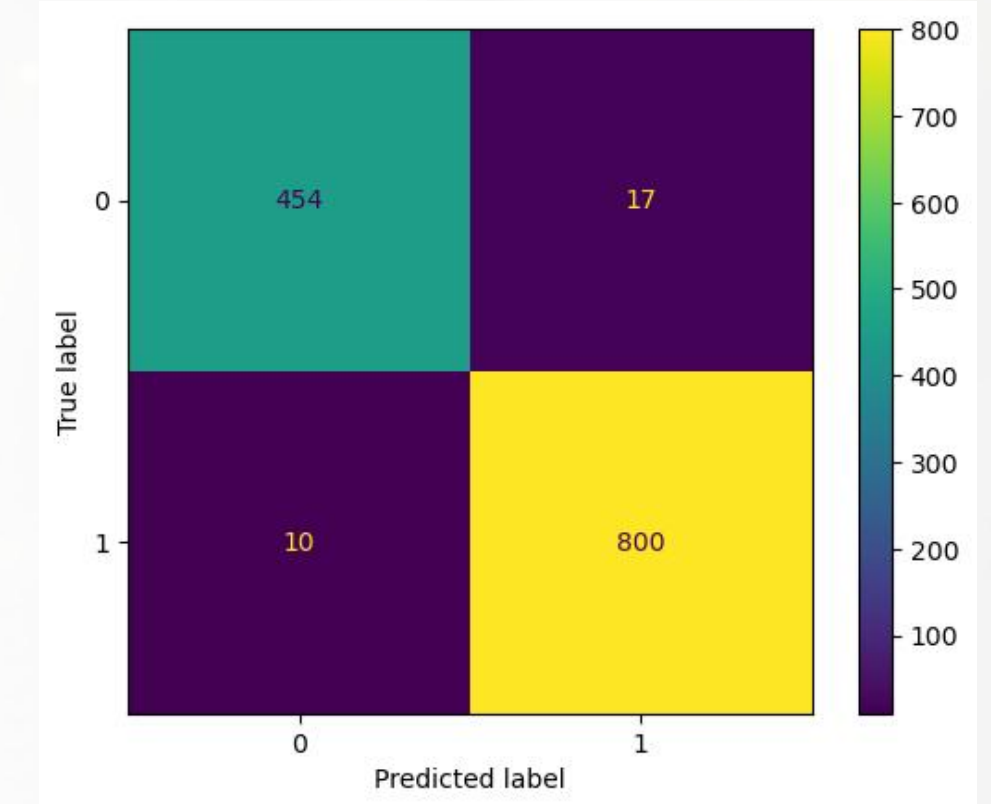
Approved correctly – 746  
Approved falsely – 61  
Rejected correctly – 410  
Rejected wrongly – 64

MODEL 2



Approved correctly – 800  
Approved falsely – 19  
Rejected correctly – 452  
Rejected wrongly – 10

MODEL 3



Approved correctly – 800  
Approved falsely – 17  
Rejected correctly – 454  
Rejected wrongly – 10

The third model performs slightly better than the second one and both greatly outperform the base model.



# CONCLUSION

1. The third model performs slightly better than the second one and both greatly outperforms the base model according to the metrics.
2. We will deploy the third model since it's the best performing model.
3. The model will do well to maximize revenue and customer satisfaction due to the reason above.

# RECOMENDATIONS

1. The model is ready for production.
  2. The bank should build an app/webapp to make it easier for the loan team to use the model.
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A top-down view of a desk with a laptop, a cup of coffee, a pen, glasses, paper clips, and a large leaf.

**THANK YOU**