

# Micro Credit Loan Rating

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01



# Business Problem Framing

A Microfinance Institution (MFI) is an organization that offers financial services to low-income populations. MFS becomes very useful when targeting especially the unbanked poor families living in remote areas with not much sources of income. The Microfinance services (MFS) provided by MFI are Group Loans, Agricultural Loans, Individual Business Loans and so on. Many microfinance institutions (MFI), experts and donors are supporting the idea of using mobile financial services (MFS) which they feel are more convenient and efficient, and cost saving, than the traditional high-touch model used since long for the purpose of delivering microfinance services. Though, the MFI industry is primarily focusing on low-income families and are very useful in such areas, the implementation of MFS has been uneven with both significant challenges and successes.

# **Conceptual Background of the Domain Problem.**

Today, microfinance is widely accepted as a poverty-reduction tool, representing \$70 billion in outstanding loans and the global outreach of 200 million clients. We are working with one such client that is in Telecom Industry. They are a fixed wireless telecommunications network provider. They have launched various products and have developed their business and organization based on the budget operator model, offering better products at Lower Prices to all value-conscious customers through a strategy of disruptive innovation that focuses on the subscriber. They understand the importance of communication and how it affects a person's life, thus, focusing on providing their services and products to low-income families and poor customers that can help them in the need of hours. They are collaborating with an MFI to provide micro-credit on mobile balances to be paid back in 5 days. The Consumer is believed to be a defaulter if he deviates from the path of paying back the loaned amount within the time duration of 5 days. For the loan amount of 5 (in Indonesian Rupiah), the payback amount should be 6 (in Indonesian Rupiah), while, for the loan amount of 10 (in Indonesian Rupiah), the payback amount should be 12 (in Indonesian Rupiah).

# What is Microfinance?

**Microfinance, also called microcredit, is a type of banking service provided to unemployed or low-income individuals or groups who otherwise would have no other access to financial services.**

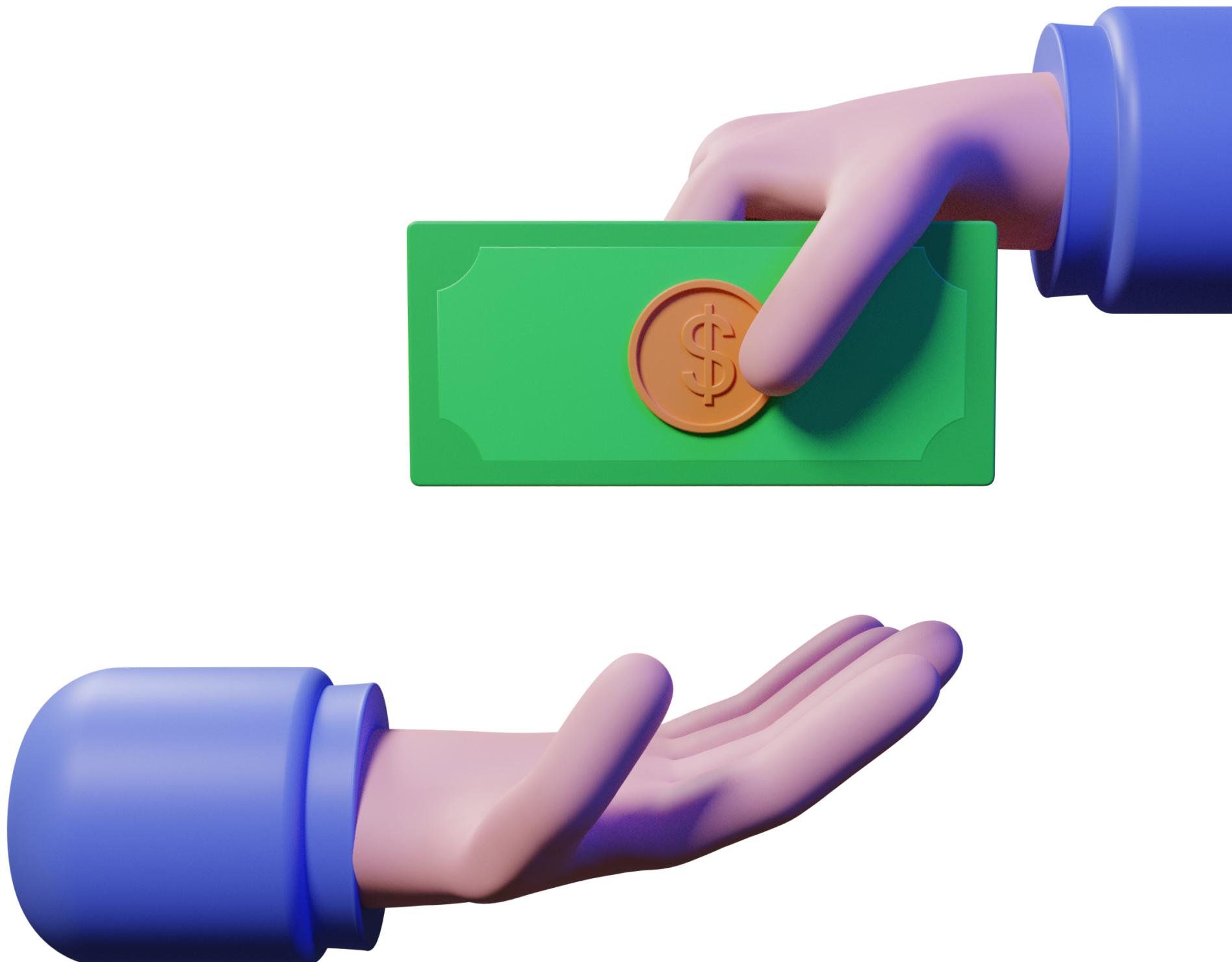
**Microfinance allows people to take on reasonable small business loans safely, and in a manner that is consistent with ethical lending practices.**

**Like conventional lenders, microfinanciers charge interest on loans and institute specific repayment plans.**



# Objective

**Building a Model to  
predict the user's trend  
of repaying the loan on  
time or not.**



200  
million  
clients

Microfinance

Today, microfinance is widely accepted as a poverty-reduction tool.



# PROJECT GOALS:

Analytical Problem Framing:

- Exploratory Data Analysis (EDA)
- Visualizations

Data Pre-Processing on train and test datasets.

Model/s Development and Evaluation.

Performing hyperparameter tuning, saving the best model, and predicting the label.

Conclusion and future work discussion.

# ANALYTICAL PROBLEM FRAMING

## EXPLANATORY DATA ANALYSIS

### Shape of the data

209593 rows and 37  
Columns

### Null Values

Zero Null Values  
Present

### Duplicate Data

Only one Duplicate  
Row/Record found

### Data Types

Float, Integer & Object  
Data types present.

## VISUALIZATIONS

Used the below Visualizations Method to complete the project.

1. Univariate Analysis
2. Bivariate Analysis
3. Multivariate Analysis
4. Correlation & Importance Bar

# Classification Model Used

1. Logistic Regression
2. Decision Tree Classifier
3. Random Forest Classifier
4. K Neighbors Classifier
5. Extra Trees Classifier
6. XGB Classifier
7. LGBM Classifier

**94.8547**

## Extra Trees Classifier

Choosed my best model since it  
gave better score compared to  
other models

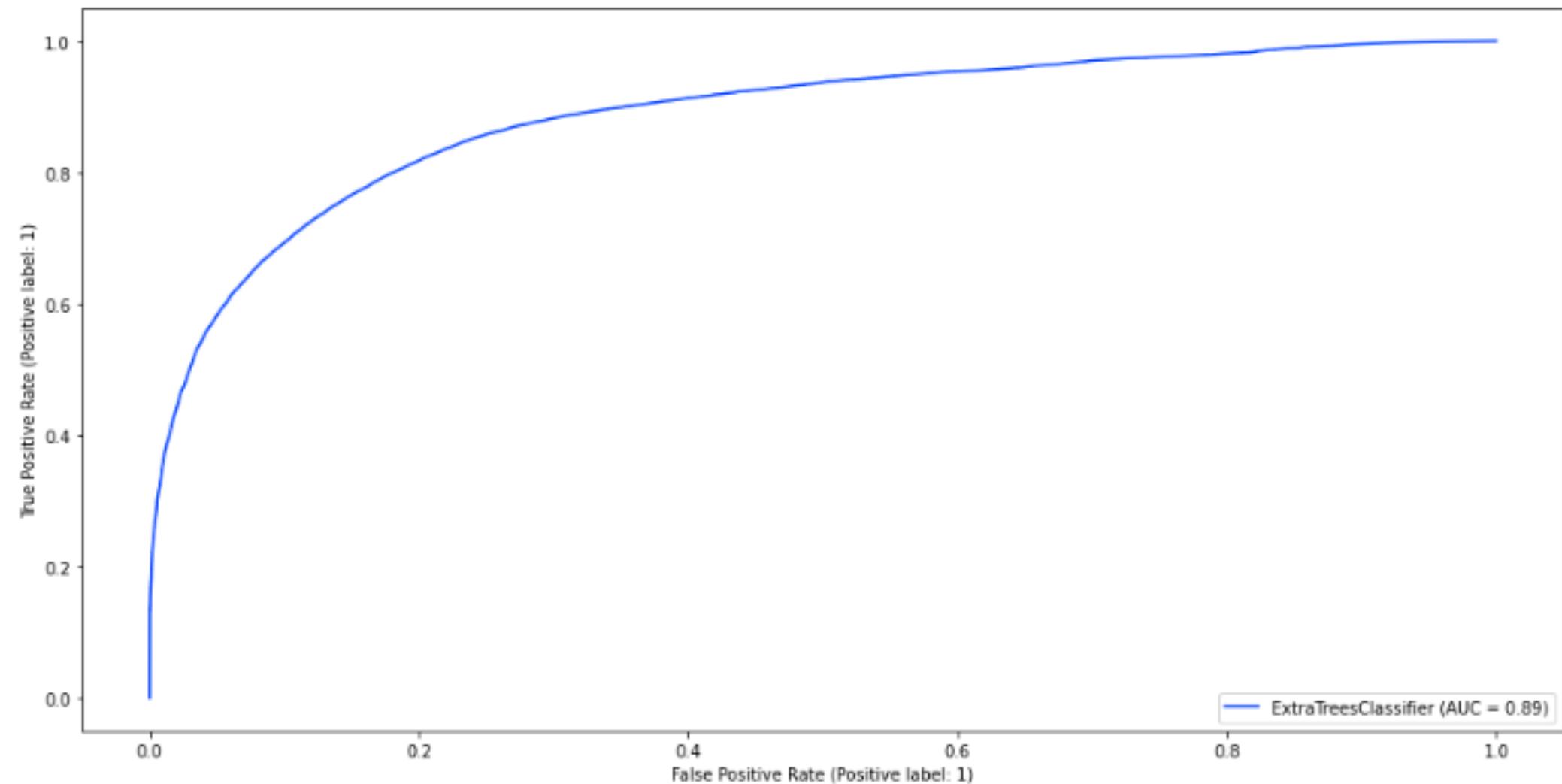


# AUC ROC CURVE

## AUC ROC Curve

```
disp = metrics.plot_roc_curve(Final_Model, X_test, Y_test)
disp.figure_.suptitle("ROC Curve")
plt.show()
```

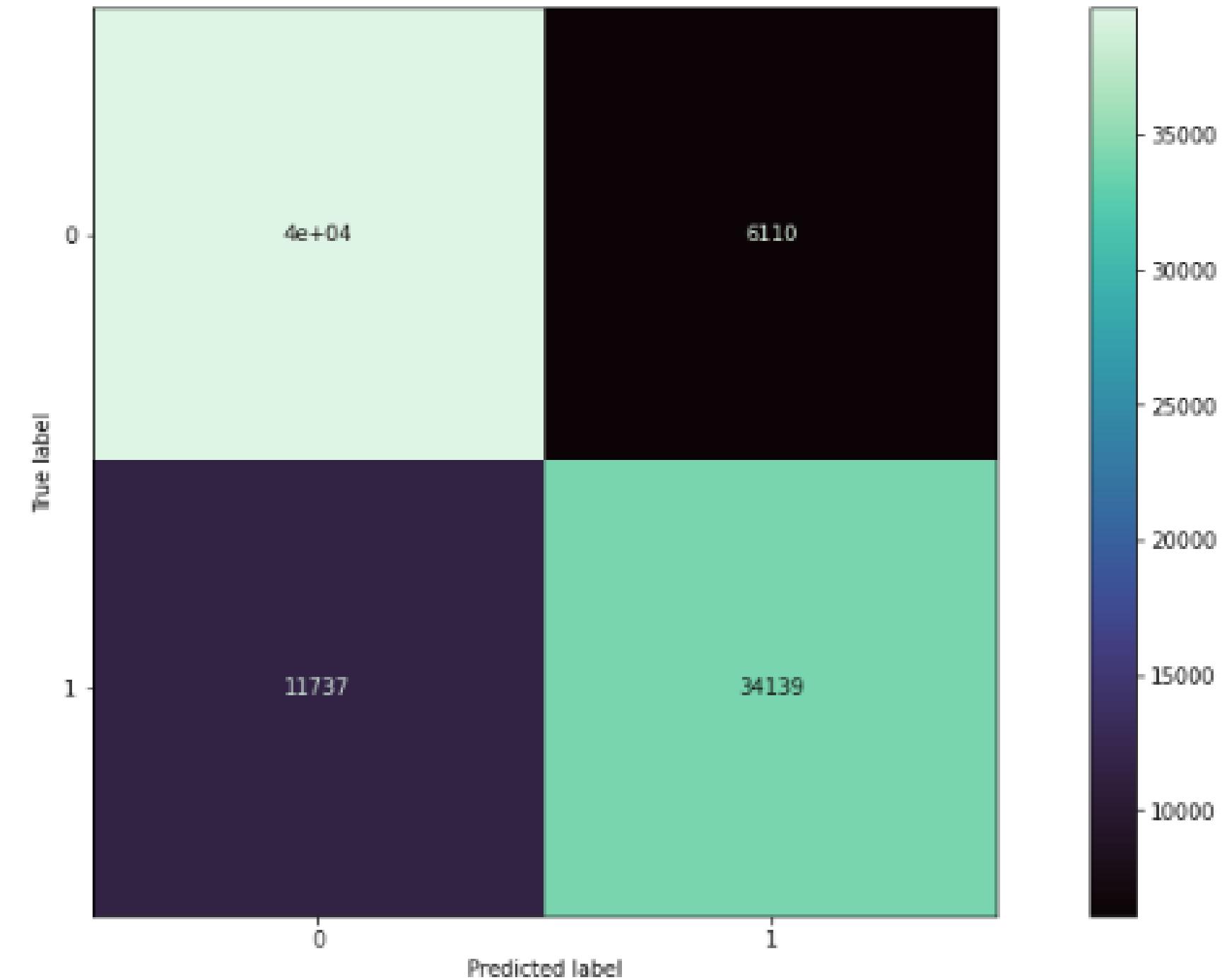
ROC Curve



**Score  
0.89**

# CONFUSION MATRIX

Confusion Matrix for the Final Model



# CONCLUSION

**Key Findings and Conclusions of the Study: From the final model MFI can find if a person will return money or not and should an MFI provide a load to that person or not judging from the various features taken into consideration.**

§Learning Outcomes of the Study in respect of Data Science: I built multiple classification models and did not rely on one single model for getting better accuracy and using cross-validation comparison I ensured that the model does not fall into overfitting and underfitting issues. I picked the best one and performed hyper-parameter tuning on it to enhance the scores.



*Thank you!*

Would like to express our sincerest gratitude to  
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