



Title : Predicting Loan Approval using Machine learning

Group Member

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Project Motivation

- **Financial Institution:**
 - Loan approval is a crucial process for financial institutions, requiring accurate and efficient evaluation to minimize risks and enhance customer satisfaction.
- **Binary Classification Complexity:**
 - Approving loans is complex due to multiple factors; machine learning simplifies this process.
- **Improved Decision-Making:**
 - Machine learning models can identify patterns and trends in historical data, offering insights that are difficult to discern manually. This aids in making informed and consistent decisions.

Project Objectives

- Identify and analyze the most influential factors, such as income, credit history, and demographics, that impact loan approval decisions.
- Provide financial institutions with a reliable and automated tool to enhance decision-making efficiency and consistency.
- Automate the loan approval process to save time and resources compared to traditional manual methods.
- Ensure the model is unbiased, accurate, and capable of handling diverse datasets to promote fair loan approval practices.

Project Aim

To identify and analyze features that determine whether a loan will be approved or rejected by leveraging applicant data. The goal is to develop a machine learning model that accurately classifies loan applications based on key features like income, credit history, and demographic details. This solution should integrate MLOps for seamless real-time deployment and monitoring, providing insights into characteristics influencing loan approval to enhance prediction models, improve decision-making, and support efficient financial operations.

References

QR for Dataset information



QR for Colab notebook



CI and CD Pipelines

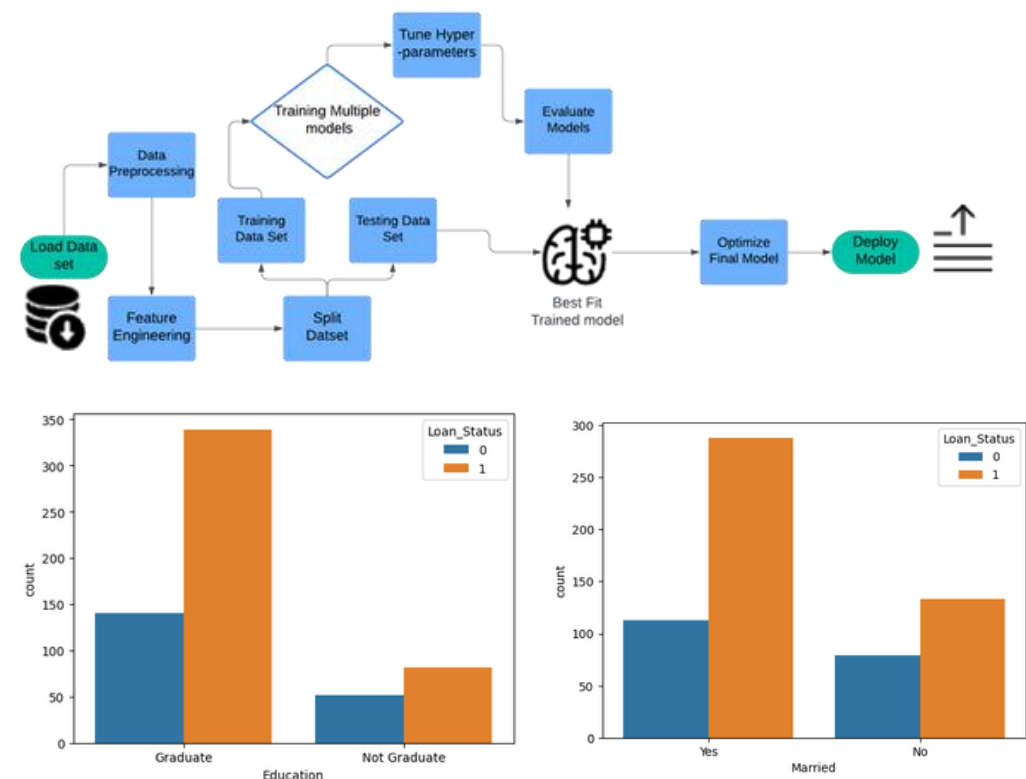
CI Pipeline:

Code commit → Automated testing → Model Training → Model Versioning

CD Pipeline

Fetch Training Model → Build API Endpoint → Deploy to production → Monitor performance

Flowchart

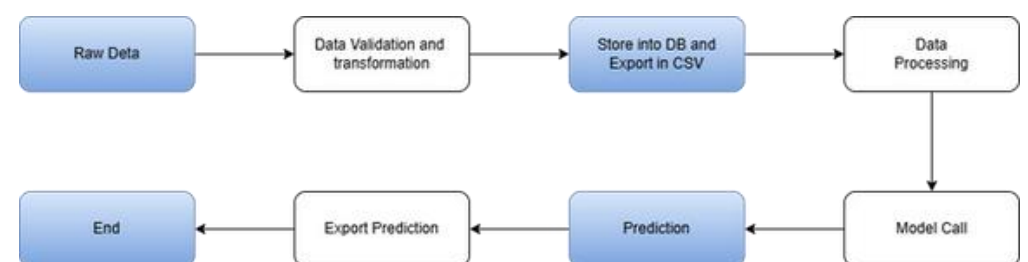


Experimental Results

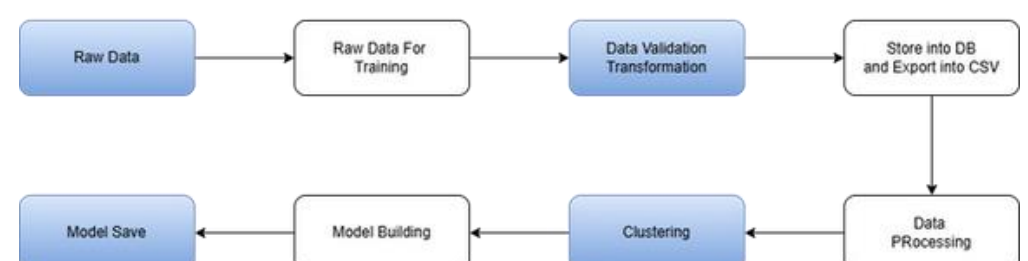
The experimental results show AdaBoost as the best-performing model, with 83% accuracy, 0.82 precision, and 0.89 F1 score, demonstrating its reliability in predicting loan approvals. By combining weak classifiers into a robust ensemble, AdaBoost effectively reduces variance and bias, making it ideal for binary classification tasks like loan approval.

The experimental analysis confirmed the Adaboost model as the most effective for accurate, real-time atteroid classification.

Predicting model



Training model



Conclusion

The project achieved 83% accuracy in predicting loan approvals, with key features like credit history and income influencing the classification. The integration of MLOps enabled real-time deployment and monitoring, improving decision-making efficiency. Future work will focus on refining the model and incorporating additional features for enhanced prediction accuracy.