Title: Customer Lifetime Value (LTV) Prediction using Machine Learning
Duration: 2 Weeks
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1. INTRODUCTION

Understanding the long-term value of a customer is essential for businesses to strategize marketing and retention efforts effectively. This project focuses on predicting the **Customer Lifetime Value (LTV)** based on historical purchase data. Using machine learning, we built a regression model to estimate the LTV of customers and segment them for targeted marketing.

2. ABSTRACT

The objective was to analyze customer transaction data, extract meaningful features, and train a machine learning model to predict each customer's future value. We used a Random Forest Regressor due to its robustness and interpretability. This model will help businesses prioritize high-value customers and enhance their marketing ROI.

3. TOOLS USED

- **Programming Language:** Python
- **Libraries:** Pandas, NumPy, Scikit-learn, Seaborn, Matplotlib, Pickle
- **Model:** Random Forest Regressor
- **Data Visualization:** Matplotlib, Seaborn

4. Steps Involved in Building the Project

Data Collection: Imported transactional data (data.csv) containing customer IDs, purchase dates, and amounts.

Data Cleaning: Handled null values and removed duplicates.

Feature Engineering:

- o Recency: Days since last purchase
- o Frequency: Number of purchases
- o Monetary: Total amount spent
- o Average Order Value

Model Building:
- o Split data into training and testing sets (80/20)
- o Trained RandomForestRegressor

Evaluation:
- o Used MAE, RMSE, and R^2 Score to evaluate performance
- o Model showed good accuracy with low error rates

Customer Segmentation:
- o Based on predicted LTV values, customers were segmented into High, Medium, and Low tiers

Model Saving:
- o Used pickle to save the trained model for future use in APIs

5. CONCLUSION

The LTV prediction model provides a scalable way to identify high-value customers and personalize marketing strategies. With further integration into a dashboard or web application, this project can serve as a powerful decision-support tool for any retail or e-commerce company.