**Title:** Customer Lifetime Value (LTV) Prediction  
**Duration:** 2 Weeks  
**Tools Used:** Python (Pandas, Scikit-learn, Random Forest), Jupyter Notebook, Excel

**1. Introduction**

Customer Lifetime Value (LTV) refers to the projected revenue a business expects to earn from a customer throughout their entire relationship. By predicting LTV, companies can optimize marketing efforts and improve customer retention strategies.

**2. Abstract**

In this project, we use synthetic e-commerce transaction data to calculate key features such as Recency, Tenure, Frequency, and Average Order Value (AOV). A Random Forest Regression model is trained to predict the total monetary value of each customer. We evaluate the model using Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE) and further segment customers based on predicted LTV.

**3. Steps Involved**

* **Data Loading & Cleaning** – Import and clean transaction data with fields like CustomerID, InvoiceDate, Quantity, UnitPrice.
* **Feature Engineering** – Calculate Recency, Tenure, Frequency, AOV, and Monetary Value.
* **Model Building** – Use a Random Forest Regressor to predict LTV.
* **Evaluation** – Model tested using MAE and RMSE metrics.
* **Customer Segmentation** – Customers classified into Low, Medium, and High LTV segments using quantiles.

**4. Conclusion**

The model accurately predicted Customer Lifetime Value based on historical behavior. Businesses can use this approach to target high-value customers, personalize engagement, and maximize ROI on marketing spend.