

Project 5: E-Commerce Analysis

OBJECTIVE:

The objective of this project is to analyze e-commerce data to understand customer behavior, sales performance, and business growth opportunities. The project focuses on evaluating purchasing patterns, product performance, revenue trends, and customer segmentation to derive actionable insights. It aims to support data-driven decision-making by identifying key drivers of sales, customer engagement, and operational efficiency within an online retail environment.

DATASETS:

The dataset used here is specified as IBM Telco Churn Dataset that contains five datasets: demographics, location, population, services, status.

METHODOLOGY:

This project follows a structured analytics approach beginning with data collection from the provided e-commerce dataset containing transactional records, customer details, product information, and revenue metrics. Data understanding is conducted to review dataset structure, feature types, and quality issues. Data cleaning and preprocessing steps include handling missing values, correcting inconsistencies, formatting date fields, removing duplicates, and generating derived features such as total order value. Exploratory Data Analysis (EDA) is performed using descriptive statistics, aggregations, and trend analysis to uncover patterns in sales, customer activity, and product demand. Customer analysis involves segmentation based on purchasing frequency, spending behavior, and demographics. Sales performance evaluation includes revenue distribution, best-selling products, and time-based trends. Data visualization techniques are applied throughout the process to communicate findings clearly and effectively.

TOOLS AND SOFTWARES:

This project was implemented using Python, utilizing Pandas for data manipulation, NumPy for numerical analysis, Matplotlib and Seaborn for visualizations, and executed within Jupyter Notebook or Google Colab. The dataset was provided in CSV format, allowing seamless integration with Python analytics libraries. Optional tools such as Microsoft Excel, PowerPoint, or PDF reporting may be used for supplementary validation and presentation.

RESULTS:

ML report-

TELCO CUSTOMER CHURN ANALYSIS REPORT

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Dataset Shape: (7043, 53)

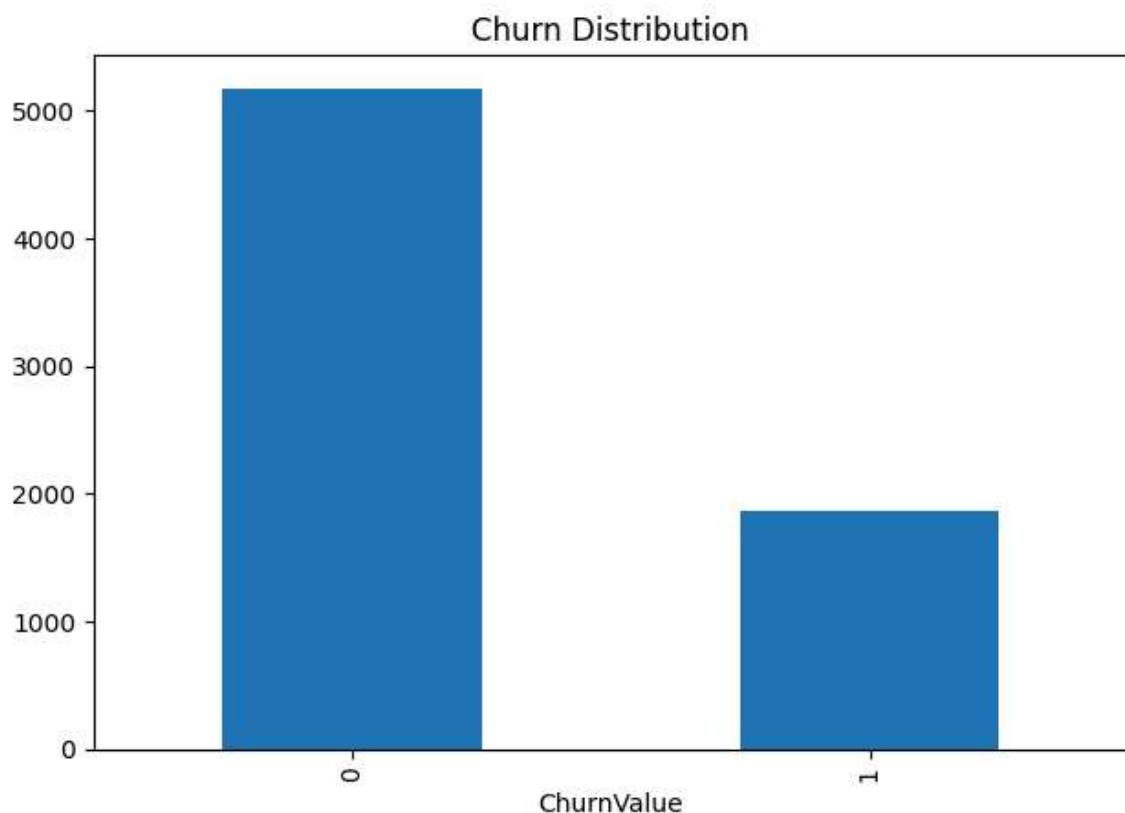
Accuracy: 95.60%

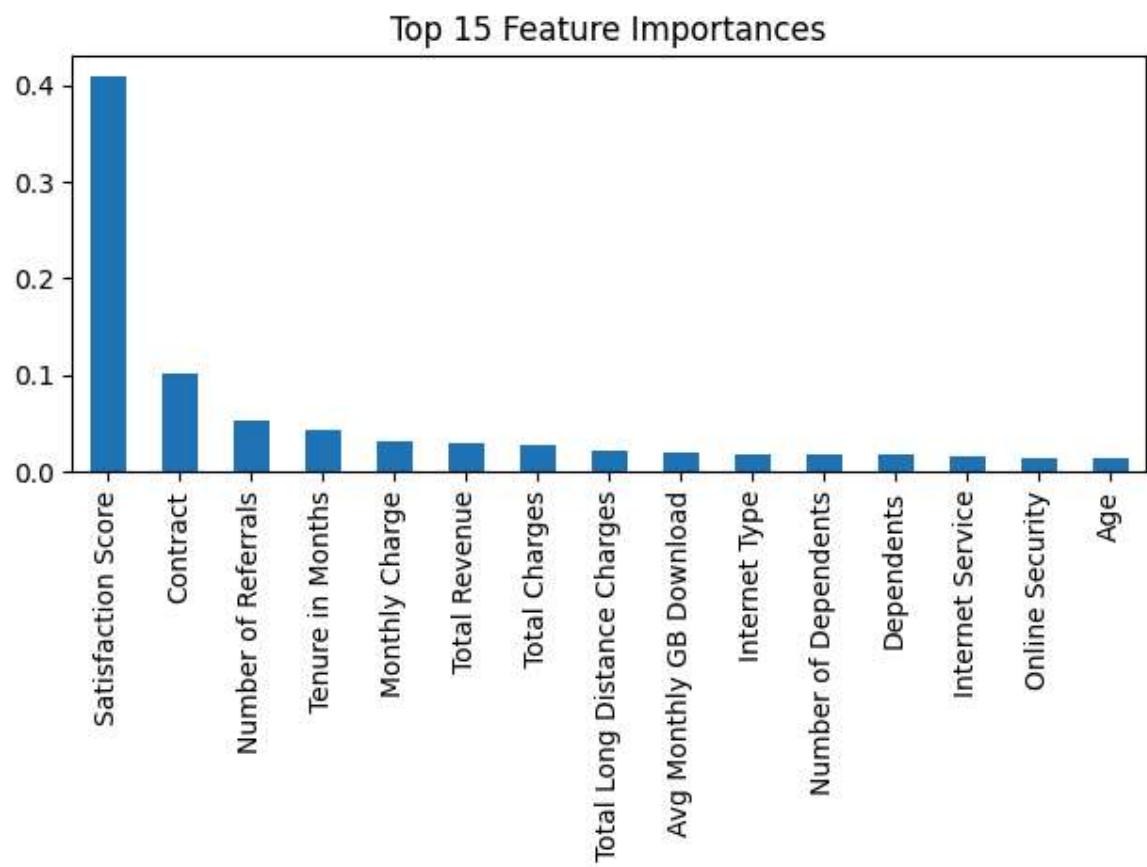
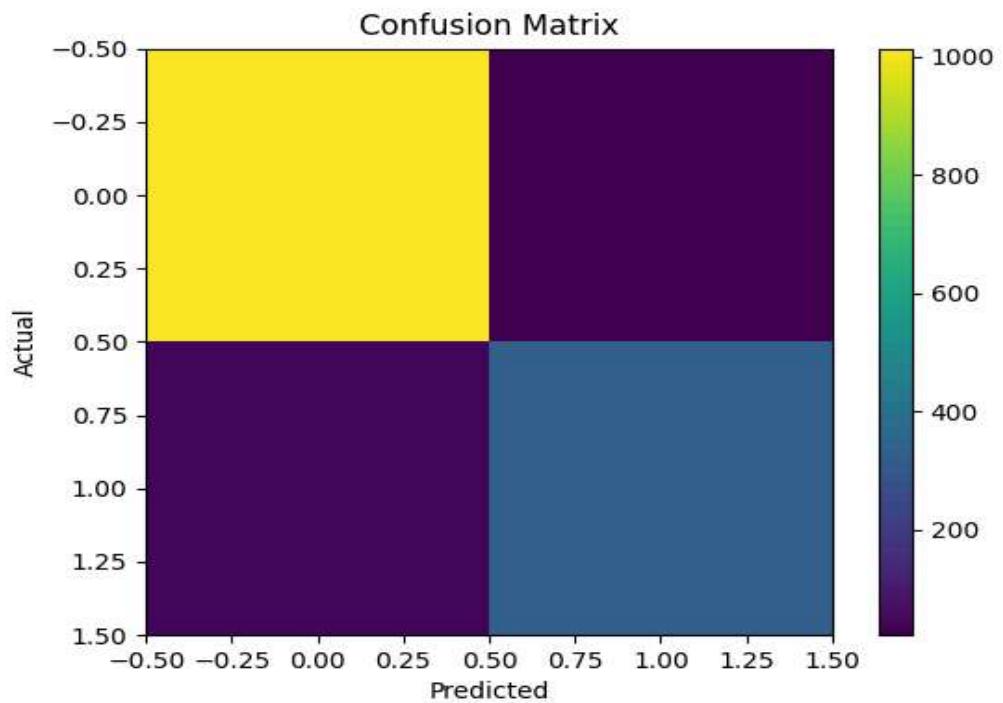
ROC-AUC: 0.985

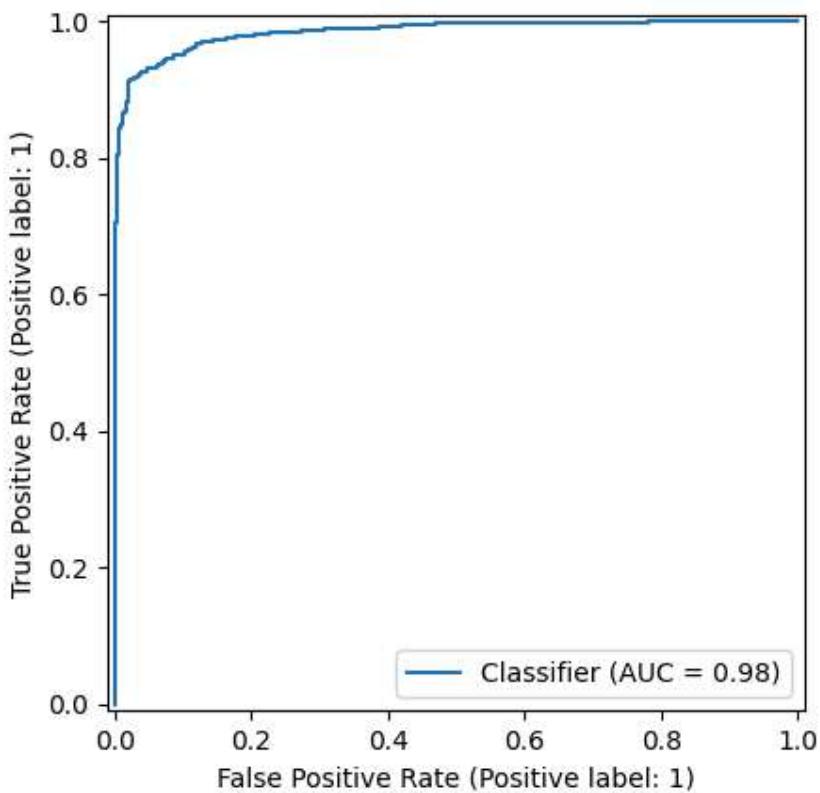
Classification Report:

	precision	recall	f1-score	support
0	0.96	0.98	0.97	1035
1	0.94	0.89	0.91	374
accuracy		0.96	0.96	1409
macro avg	0.95	0.94	0.94	1409
weighted avg	0.96	0.96	0.96	1409

Visuals-







CONCLUSION:

This E-commerce Analytics project successfully applied data analysis techniques to evaluate customer behavior, sales trends, and product performance. The analysis provided valuable insights into purchasing patterns, revenue drivers, and customer segmentation, supporting improved marketing strategies, inventory management, and business optimization. By combining data preprocessing, exploratory analysis, and visualization, the project demonstrated the critical role of analytics in enhancing decision-making and driving growth in the e-commerce domain.