Customer Behavior analysis

Project Overview

This project demonstrates a **complete, industry-standard end-to-end data analytics workflow**, designed to closely mirror the real-world responsibilities of data analysts in modern business environments.

The objective is to transform raw customer transaction data into **actionable business insights** through structured data preparation, analysis, visualization, and reporting. The project showcases the ability to work across multiple tools and technologies commonly used in professional analytics teams.

Who This Project Is For

This project is ideal for:

- **Data Analyst Aspirants** building a strong, interview-ready portfolio project
- Learners working with **Python, SQL, and Power BI**
- Professionals preparing for roles in **Data Analytics, Data Science, or Product Analytics**

Business Objective

To simulate a **corporate-grade analytics workflow** that demonstrates how data analysts:

- Clean and model raw datasets
- Store and analyze data using SQL databases
- Extract insights on customer behavior, loyalty, and purchasing patterns
- Communicate findings effectively through dashboards and reports

Tools & Technologies

- **Python** (Pandas, NumPy, SQLAlchemy)
- **SQL** (PostgreSQL / MySQL / MS SQL Server)
- **Jupyter Notebook**
- **Power BI**
- **Git & GitHub**

Project Workflow

1️⃣ Data Preparation & Exploratory Analysis (Python)

- Import raw customer shopping data
- Perform data cleaning and transformation
- Handle missing values and inconsistencies
- Conduct exploratory data analysis (EDA) to understand trends and distributions

2️⃣ Database Modeling & Analysis (SQL)

- Create and manage relational database tables
- Load cleaned data from Python into SQL databases
- Write optimized SQL queries to answer business questions such as:
    - Customer segmentation
    - Subscription vs non-subscription spending behavior
    - Revenue contribution analysis
    - Purchase frequency patterns

3️⃣ Visualization & Insights (Power BI)

- Connect SQL database to Power BI
- Build an interactive dashboard with:

    - Key performance indicators (KPIs)
    - Customer behavior trends
    - Revenue and subscription insights
- Enable stakeholders to explore insights dynamically

4️⃣ Reporting & Presentation

- Summarize key findings in a structured project report
- Translate insights into **actionable business recommendations**
- Create a professional presentation deck for stakeholder communication

How to Use This Project

Step 1: Python Analysis

- Open Customer_Shopping_Behavior_Analysis.ipynb
- Perform:
    - Data import
    - Data exploration
    - Data cleaning
    - Feature engineering
- Connect to SQL database and load cleaned data

Step 2: SQL Analysis

- Create a database in PostgreSQL / MySQL / MS SQL Server
- Open customer_behavior_sql_queries.sql
- Run SQL queries to answer business questions

Step 3: Power BI Dashboard

- Open customer_behavior_dashboard.pbix
- Connect Power BI to the SQL database

- Explore interactive visualizations and insights

Step 4: Reporting & Presentation

- Review the project report summarizing findings
- Explore the presentation deck created for stakeholder communication

Key Insights Delivered

- Spending comparison between subscribed and non-subscribed customers
- Identification of high-value customer segments
- Revenue contribution analysis
- Purchase behavior trends and drivers

Learning Outcomes

By completing or reviewing this project, you will gain hands-on experience in:

- Real-world data cleaning and modeling
- Writing business-focused SQL queries
- Designing professional dashboards
- Communicating insights to non-technical stakeholders

Walkthrough

A complete step-by-step walkthrough of this project is available in the accompanying **YouTube video**, covering the full analytics lifecycle from raw data to insights.