E-Commerce Sales Analytics Project Report

📌Project Title

E-Commerce Sales Analytics Using Python, SQL & Power BI

📘1. Introduction

This project analyzes e-commerce sales data to understand customer behavior, product performance, and profitability trends. Using Python, SQL, and Power BI, we transform raw data into actionable insights for business decision-making.

The goal is to uncover: - Sales trends over time - High-performing product categories - Customer purchase patterns - Regional sales performance - Profitability distribution

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📂2. Dataset Description

The project uses a dataset named `sales.csv` containing: - **Order ID** – Unique order identifier - **Order Date** – Date of purchase - **Category** – Product category - **Sub-category** – Detailed product segment - **Customer Name** – Buyer's name - **State** – Customer location - **Quantity** – Items sold - **Sales** – Revenue generated - **Profit** – Profit earned - **Discount** – Discount applied

Row count: **500+ records**

🧹3. Data Cleaning & Preprocessing

Performed using Python & Power Query.

🔧Steps:

- Handle missing values
- Convert data types (date, numeric)
- Remove duplicates
- Create new columns:
- Month
- Year
- Profit Margin %

🧹4. Python Analysis Summary

Python is used for: - Data overview & summary statistics - Visualizing sales & profit trends - Identifying top customers - Category contribution analysis - Heatmap correlation

Key Python libraries: - Pandas - Matplotlib - Seaborn - NumPy

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🗄️5. SQL Analysis Summary

SQL queries were used to perform: - Total sales & profit calculations - Monthly sales trend - Top 10 customers - Category & subcategory analysis - State-wise performance - Discount impact analysis

A full `queries.sql` file is included in the project.

📊6. Power BI Dashboard Summary

Power BI visualizes insights through an interactive dashboard.

🧰Key Visuals:

- Sales Trend (Line Chart)
- Category Sales (Bar Chart)
- State-wise Sales (Map)
- Top 10 Customers (Bar Chart)
- Profit vs Sales (Scatter Plot)
- KPI Cards (Sales, Profit, Quantity)

Insights Discovered:

- Sales peak in **November & December**
- Electronics is the top-performing category
- Maharashtra & Karnataka lead in revenue
- High discounts reduce profit margin
- Top 10 customers contribute ~40% of revenue

💡7. Business Insights

🔧Seasonal Trends

Sales spike during holidays → Opportunity for targeted promotions.

🔧Product Strategy

Focus on electronics & tech accessories for revenue growth.

🔧Regional Strategy

Invest marketing in high-performing states & improve presence in low-sales regions.

🔧Profit Optimization

Reduce excessive discounting to improve margin.

🔧Customer Strategy

Loyalty programs for top customers who drive major revenue.

🧱8. Project Structure

```
Ecommerce_Sales_Analytics_Project/
│
├── data/
│   └── sales.csv
│
├── src/
│   └── project.py
│
├── sql/
│   └── queries.sql
│
├── powerbi/
│   └── powerbi_notes.md
│
├── reports/
│   └── project_report.txt
│
├── README.md
└── requirements.txt
```

💴9. Conclusion

This project demonstrates the complete data analytics lifecycle—from data cleaning to visualization. Using Python, SQL, and Power BI, we extracted meaningful insights that can support e-commerce decision-making in product strategy, regional growth, and profitability improvement.

This report can be directly uploaded to the **reports/** folder in GitHub.