Pizza Sales Analysis – End-to-End Data Analytics Project

1. Project Overview

This project focuses on analyzing pizza sales data to uncover key business insights related to revenue performance, customer ordering behavior, product popularity, and time-based demand patterns. The objective of the analysis is to support data-driven decision-making for operations, marketing, and inventory planning.

The project was executed end-to-end using **Python (EDA)**, **PostgreSQL (SQL analysis)**, and **Power BI (interactive dashboarding)**, simulating a real-world data analyst workflow.

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2. Dataset Summary

- **Source:** Transactional pizza sales dataset
- **Granularity:** Order-level sales data
- **Key Columns:**
- Order details: `order_id`, `order_date`, `order_time`
- Sales metrics: `quantity`, `unit_price`, `total_price`
- Product attributes: `pizza_name`, `pizza_category`, `pizza_size`
- Time attributes: `day_name`, `month`, `year`

The dataset captures detailed transactional information that allows analysis across time, product categories, and customer demand patterns.

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3. Exploratory Data Analysis (EDA) using Python

Exploratory Data Analysis was conducted in **Google Colab** using Python libraries such as `pandas`, `numpy`, `matplotlib`, and `seaborn`.

Key EDA Steps:

- Imported the dataset and performed initial inspection using `.head()`, `.info()`, and `.describe()`.
- Checked for missing values and data consistency.
- Verified data types for numerical and time-based columns.
- Converted date and time fields into appropriate formats.
- Performed feature engineering:
- Extracted `day_name` from order date
- Extracted hour from `order_time`

• Created structured time-based columns for analysis

EDA helped in understanding sales distribution, identifying peak ordering times, and validating data quality before database ingestion.

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4. Database Integration and SQL Analysis

After cleaning and preparation, the dataset was imported into **PostgreSQL** for structured analysis using SQL.

Key Business KPIs Derived using SQL:

1. **Total Revenue** – Overall sales performance
2. **Total Orders** – Unique orders placed
3. **Total Pizzas Sold** – Aggregate quantity sold
4. **Average Order Value (AOV)** – Revenue per order
5. **Average Pizzas per Order** – Customer ordering behavior
6. **Revenue by Pizza Category** – Category-level contribution
7. **Revenue Percentage Contribution by Category** – Share of total revenue
8. **Top 5 Pizzas by Revenue** – Best-performing products
9. **Weekday vs Weekend Orders** – Demand variation across the week
10. **Monthly Revenue Trend** – Seasonality and time-based trends
11. **High-Value Orders** – Orders exceeding average order value

Advanced SQL concepts such as **aggregations, subqueries, window functions, and conditional logic** were used to derive these insights.

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5. Power BI Dashboard

An interactive dashboard was built in **Power BI** by connecting directly to the PostgreSQL database.

Dashboard Components:

KPI Cards

• Total Revenue
• Total Orders
• Total Pizzas Sold
• Average Order Value (AOV)
• Number of Pizza Categories

Visualizations

• **Orders Heatmap (Day vs Hour):** Identifies peak lunch and dinner hours across weekdays
• **Orders by Weekday (Bar Chart):** Highlights the busiest days of the week

• **Orders by Hour (Column Chart):** Shows time-based demand peaks
• **Monthly Revenue Trend (Column Chart):** Displays seasonal performance
• **Revenue by Pizza Category (Donut Chart):** Revenue contribution by category
• **Order Distribution by Pizza Category (Pie Chart):** Demand distribution across categories
• **Top 5 Pizzas by Revenue (Bar Chart):** Best-selling products

Slicers for Interactivity

• Month
• Day of Week
• Pizza Category
• Pizza Size
• Order Hour

These slicers enable dynamic filtering and exploratory analysis for stakeholders.

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6. Key Insights

• Lunch (12–2 PM) and dinner (7–9 PM) are peak ordering periods.
• Certain pizza categories contribute disproportionately to total revenue.
• A small number of pizzas drive a large share of sales.
• Weekends and Fridays show higher order volumes.
• Average order value remains relatively stable across months.

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7. Business Recommendations

• **Optimize Staffing:** Allocate more staff during peak lunch and dinner hours.
• **Product Focus:** Promote top-performing pizzas through targeted campaigns.
• **Category Strategy:** Invest in high-revenue categories while improving underperforming ones.
• **Promotions:** Design weekday offers to balance demand across the week.
• **Inventory Planning:** Align ingredient procurement with peak demand periods.

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8. Tools & Technologies Used

• **Python:** Data cleaning and exploratory analysis (pandas, numpy)
• **PostgreSQL:** SQL-based business analysis
• **Power BI:** Interactive dashboards and data visualization
• **Google Colab:** EDA environment

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9. Conclusion

This project demonstrates an end-to-end data analytics workflow, from raw data exploration to database-driven analysis and executive-level dashboard reporting. It showcases strong analytical thinking, SQL proficiency, and data storytelling skills, making it a portfolio-ready project suitable for data analyst roles.