Sales Analysis Project Using SQL and Power BI

Abstract

This project demonstrates an end-to-end approach to sales data analysis using SQL Server and Power BI. The primary objectives include cleaning and transforming data, understanding business requirements through user stories, and designing a Power BI dashboard to address business needs. Key concepts such as data warehousing, dimensional modeling, and interactive visualization are utilized to provide actionable insights.

1 Introduction

Sales data is a crucial asset for businesses, offering insights into customer behavior, operational efficiency, and financial performance. This project involves analyzing sales data from a Data Warehouse (DW) to derive actionable insights and fulfill business requests. The analysis process includes:

- Restoring and comparing DW and LT data.
- Cleaning and preparing data using T-SQL.
- Designing and implementing a Power BI dashboard.

2 Setup and Data Preparation

2.1 Setup

The project requires the following tools:

- **SQL Server (SQL Express):** To manage and query sales data.
- **Power BI Desktop:** To create interactive visualizations and dashboards.

2.2 Data Restoration and Comparison

Data restoration involves obtaining and loading backup Data Warehouse (DW) and Lightweight (LT) datasets. Comparing DW and LT data helps understand structured vs. unstructured data.

2.3 Data Cleaning and Transformation

T-SQL was used for:

- Renaming and combining columns.
- Filtering data using `WHERE` and `ORDER BY` clauses.
- Performing joins with `LEFT JOIN`.
- Handling null values using `ISNULL()`.
- Adding calculated columns with `CASE()` functions.

3 Business Request and User Stories

The business request outlines the need for actionable insights from sales data. Key user stories include:

- Identifying top-performing products and regions.
- Analyzing trends over time.
- Visualizing customer demographics.

4 Data Modeling and Dashboard Creation

4.1 Data Modeling

- **Fact and Dimension Tables:** The data was organized into fact and dimension tables to create a robust data model.
- **Key Relationships:** Primary and foreign key relationships were defined to connect tables.

4.2 Dashboard Design

The Power BI dashboard includes:

- **Pie Chart:** To display sales distribution by category.
- **Line Chart:** To visualize sales trends over time.
- **Bar Charts:** For comparative analysis of sales across regions.
- **Map Graph:** To represent geographic sales data.
- **Top 10 Graphs:** To highlight top-performing products and customers.

4.3 Custom Features

- Gradient bar chart colors for improved readability.
- Drill-down functionality for detailed insights.
- Pivot tables for customer details.

5 Conclusion

The project successfully demonstrates the integration of SQL and Power BI to analyze sales data. Key takeaways include:

- The importance of data cleaning and preparation.
- The value of dimensional modeling in data analysis.
- The power of interactive visualizations for deriving insights.