Retail Business Performance & Profitability Analysis Project Report

1. Introduction

This project focuses on analyzing retail sales data to extract insights into sales performance, inventory management, and profitability. Using SQL for data extraction, Python for analytical modeling, and Power BI for visualization, the project aims to identify actionable strategies to optimize inventory and boost profitability.

2. Abstract

The Retail Business Perfomance & Profitability Analysis project involved handling a raw sales dataset to perform structured data analysis and build an interactive dashboard. The key objectives were to:

- Aggregate and clean sales data.
- Analyze the relationship between inventory management and profitability.
- Visualize sales trends and inventory status.
- Provide strategic recommendations to improve operational efficiency and profitability.

The final deliverables include SQL scripts for data analysis, Python scripts for correlation analysis, and a Power BI dashboard summarizing key insights.

3. Tools Used

- **SQL (MySQL):** For data cleaning and aggregation.
- **Python (Pandas, Matplotlib, Seaborn):** For deeper data analysis and visualization.
- **Power BI:** For interactive dashboard creation.

4. Steps Involved in Building the Project

- **Data Loading and Cleaning (SQL)**
    - Created tables and loaded the retail sales dataset into MySQL.
    - Checked and handled missing values.
    - Performed aggregations on sales, profit, and profit margin by category and sub-category.
- **Correlation Analysis (Python)**
    - Standardized column names and converted date fields.
    - Calculated "Inventory Days" as Quantity divided by (Sales/30).
    - Analyzed correlation between Inventory Days and Profit.
    - Created scatter plots and regression lines to visualize relationships.
- **Dashboard Development (Power BI)**
    - Designed KPI tiles for Total Sales, Total Profit, and Profit Margin.
    - Developed regional analysis of sales quantities.
    - Built charts for seasonal and yearly sales trends.
    - Highlighted slow-moving and overstocked items in inventory tables.
- **Documentation and Reporting**
    - Compiled insights into a detailed project report.
    - Exported the Power BI dashboard into a PDF format.

Conclusion

The project showed that data-driven strategies can significantly enhance sales and inventory management. A weak correlation between Inventory Days and Profit suggests focusing on product popularity and margins. Key recommendations include promoting high-margin items, bundling slow-moving stock, and planning seasonal promotions. The project highlights the value of integrating SQL, Python, and Power BI for business insights.