**Project Summary: Northwind Traders Data Analysis**

In this project, I performed a comprehensive data analysis on the Northwind Traders database to derive actionable insights that could guide strategic business decisions. The analysis involved multiple areas, including employee performance, sales trends, customer segmentation, and product/category performance.

**Key Steps and Analyses Conducted:**

1. **Database Setup:**
   * Installed PostgreSQL locally and imported the Northwind database.
   * Explored the database schema to understand tables, relationships, and constraints.
   * Connected the database to Jupyter Notebook using ipython-sql for executing SQL queries.
2. **Employee Performance Analysis:**
   * Identified all employees and calculated the total number of orders handled by each.
   * Ranked employees based on total sales using SQL Common Table Expressions (CTE) and the RANK() function.
   * Visualized employee performance by sales for UK and USA offices, identifying top and low-performing employees.
3. **Sales Trend Analysis:**
   * Calculated monthly sales totals and running cumulative sales to identify overall growth trends.
   * Computed month-over-month sales growth rates using SQL window functions (LAG) to understand fluctuations and seasonality.
   * Analyzed cumulative sales for each product category over time, identifying high-performing categories like Beverages and Dairy.
4. **Customer Analysis:**
   * Identified high-value customers by above-average order value.
   * Determined the top 20% of customers by total purchase volume and purchase value, visualizing top customers for targeted marketing strategies.
5. **Product and Category Performance:**
   * Calculated the percentage contribution of each product category to total sales.
   * Identified top-performing products within each category to optimize inventory management and marketing efforts.

**Tools and Technologies Used:**

* **SQL & PostgreSQL:** For querying, aggregation, and ranking data.
* **Python (Pandas, Matplotlib, Seaborn):** For data visualization and result interpretation.
* **Jupyter Notebook:** For an integrated workflow of querying, analysis, and visualization.

**Outcomes:**

* Ranked employees based on sales to highlight top performers and identify those needing support.
* Identified sales trends and seasonal patterns to guide business planning.
* Highlighted high-value customers for potential targeted promotions.
* Provided insights into product categories and top-selling products to optimize inventory and marketing strategies.

Overall, this project demonstrates the end-to-end process of extracting, analyzing, and visualizing data from a relational database to support informed business decisions.