**Task 5: Interactive Business Dashboard in Streamlit**

# Problem Statement and Objective

The objective of this task is to develop an interactive Streamlit dashboard   
for analyzing sales, profit, and segment-wise performance. The dashboard should   
include filters (Region, Category, Sub-Category) and display key performance   
indicators (KPIs) such as Total Sales, Profit, and Top 5 Customers by Sales.

# Dataset Description and Loading

The dataset used is the \*\*Global Superstore Dataset\*\*. It contains transactional   
sales data including fields like Order Date, Ship Date, Customer Name, Segment,   
Region, Category, Sub-Category, Sales, Quantity, Discount, and Profit.   
The dataset was loaded into Python using pandas with appropriate encoding to   
handle special characters.

# Data Cleaning and Preprocessing

Data cleaning steps performed:   
1- Removed duplicate rows   
2- Handled missing values   
3- Converted date columns to datetime format   
4- Standardized column names for consistency   
5- Verified numerical columns for correct data types   
This ensured the dataset was ready for analysis and dashboard visualization.

# Exploratory Data Analysis (EDA)

EDA was performed to understand sales and profit trends:   
1- Sales distribution across Regions and Categories   
2- Profitability analysis by Sub-Category   
3- Customer contribution analysis   
4- Identification of top-performing segments   
Insights from EDA guided the KPIs and charts displayed on the dashboard.

# Dashboard Development in Streamlit

The Streamlit dashboard includes:   
1- \*\*Filters\*\*: Region, Category, Sub-Category   
2- \*\*KPIs\*\*: Total Sales, Profit, Top 5 Customers by Sales   
3- \*\*Visualizations\*\*:   
 4- Bar chart of Sales by Category   
 5- Profit trends over time   
 6- Top 5 Customers ranked by sales value   
This allows interactive exploration of sales performance across multiple dimensions.

Below is a sample screenshot of the Streamlit dashboard:

[Sample Dashboard Screenshot Placeholder]

# Visualizations (Charts, Plots, Graphs)

1- KPI metrics (Total Sales, Total Profit) displayed using `st.metric()`   
2- Bar chart for Sales by Category   
3- Line chart for Profit trends over time   
4- Horizontal bar chart for Top 5 Customers by Sales   
All visualizations were interactive and updated dynamically based on filter selections.

Sample visualizations:

[KPI Screenshot Placeholder]

[Bar Chart Screenshot Placeholder]

[Line Chart Screenshot Placeholder]

# Model Building and Evaluation

Since this task is visualization-focused, no predictive modeling was performed.   
The emphasis was on descriptive analytics and business intelligence insights   
through interactive dashboards rather than machine learning models.

# Final Conclusion with Insights

The Streamlit dashboard provided clear insights into sales and profit distribution.   
Key findings:   
1- The Technology category had the highest contribution to profit   
2- Certain sub-categories showed high sales but low profitability   
3- A small group of customers contributed disproportionately to total sales   
This dashboard allows business users to make data-driven decisions efficiently.