**Sales Data Visualization & Analysis**

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**Introduction**

Objective:

The goal of this project is to analyze sales data, identify revenue trends, understand product demand, and observe seasonal sales patterns. The insights derived will help in better decision-making regarding inventory, marketing strategies, and revenue forecasting.

Key Questions Answered:

* How does revenue fluctuate over months and years?
* Which products are in high demand?
* How does sales revenue vary across different seasons?

**Methodology**

Dataset Used:

* The dataset contains 100 rows of dummy sales data, including columns:
  + Date: The date of the sale.
  + Revenue: The revenue generated on that date.
  + Product: The product sold.
  + Quantity: Number of units sold.

Steps Followed:

1. Data Preprocessing:
   * Loaded the dataset into a Pandas DataFrame.
   * Converted the Date column to datetime format.
   * Extracted Year and Month for trend analysis.
2. **Revenue Trend Analysis:**
   * **Aggregated monthly revenue.**
   * Visualized revenue trends over time using a line chart.
3. Product Demand Analysis:
   * Grouped sales data by Product and calculated the total quantity sold.
   * Displayed a bar chart showing product demand.
4. Seasonal Sales Analysis:
   * Mapped months to seasons (Winter, Spring, Summer, Fall).
   * Aggregated revenue per season and plotted a bar chart.

**Code Typed**

import pandas as pd

import matplotlib.pyplot as plt

import seaborn as sns

# Load sales data (replace 'sales\_data.csv' with your actual file)

df = pd.read\_csv("sales\_data.csv")

# Ensure date column is in datetime format

df["Date"] = pd.to\_datetime(df["Date"])

# Extract year and month for trend analysis

df["Year"] = df["Date"].dt.year

df["Month"] = df["Date"].dt.month

# Aggregate revenue by month

monthly\_revenue = df.groupby(["Year", "Month"])["Revenue"].sum().reset\_index()

# Plot monthly revenue trends

plt.figure(figsize=(10, 5))

sns.lineplot(data=monthly\_revenue, x="Month", y="Revenue", hue="Year", marker="o")

plt.title("Monthly Revenue Trends")

plt.xlabel("Month")

plt.ylabel("Revenue")

plt.grid()

plt.show()

# Aggregate product demand

product\_demand = df.groupby("Product")["Quantity"].sum().reset\_index()

# Plot product demand

plt.figure(figsize=(10, 5))

sns.barplot(data=product\_demand, x="Product", y="Quantity", palette="viridis")

plt.xticks(rotation=45)

plt.title("Product Demand")

plt.xlabel("Product")

plt.ylabel("Quantity Sold")

plt.show()

# Seasonal sales trend (assuming a 'Season' column exists or inferred from months)

df["Season"] = df["Month"].map({12: "Winter", 1: "Winter", 2: "Winter",

                                3: "Spring", 4: "Spring", 5: "Spring",

                                6: "Summer", 7: "Summer", 8: "Summer",

                                9: "Fall", 10: "Fall", 11: "Fall"})

seasonal\_sales = df.groupby("Season")["Revenue"].sum().reset\_index()

# Plot seasonal sales trends

plt.figure(figsize=(8, 5))

sns.barplot(data=seasonal\_sales, x="Season", y="Revenue", palette="coolwarm")

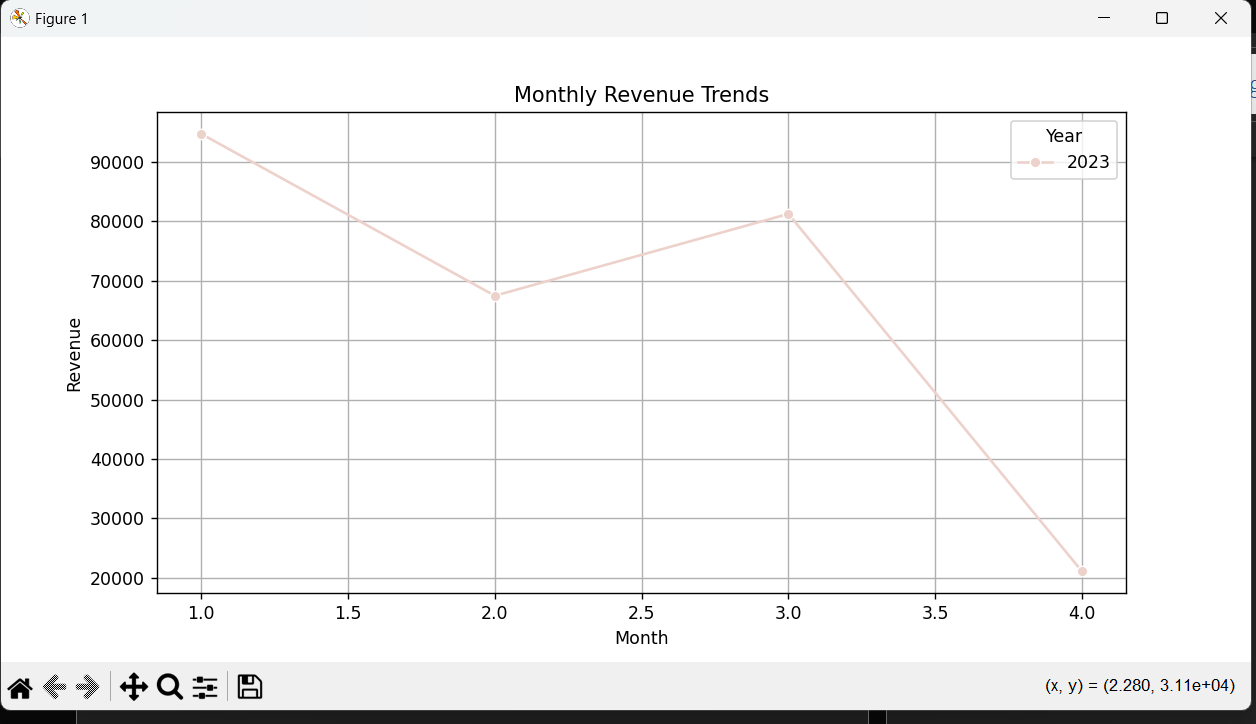
plt.title("Seasonal Sales Trends")

plt.xlabel("Season")

plt.ylabel("Revenue")

plt.show()

**OUTPUT**

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