**📘 Case Study: Diwali Sales Data Analysis**

**🧩 Background**

The Diwali festival in India is a peak season for shopping, with consumers purchasing everything from electronics and clothing to gifts and home décor. Understanding customer behavior during this period is critical for retailers to optimize inventory, create personalized marketing campaigns, and maximize profits.

This case study explores how data analysis can provide meaningful insights into consumer patterns during Diwali using a real-world retail dataset.

**🎯 Problem Statement**

**How can retailers identify key customer segments and top-performing product categories during the Diwali season to enhance marketing strategies and improve sales performance?**

**🔍 Objectives**

* Analyze customer demographics and their purchasing behavior
* Identify high-performing product categories and city segments
* Derive actionable insights to inform business strategies
* Recommend data-driven marketing approaches

**📁 Dataset Overview**

* **Name:** Diwali\_Sales\_Data.csv
* **Records:** ~11,000 rows
* **Attributes:** Gender, Age, Marital Status, Occupation, Product Category, City Tier, Amount Spent

**🛠 Tools & Technologies Used**

* **Programming Language:** Python
* **Platform:** Jupyter Notebook
* **Libraries:** Pandas, NumPy, Matplotlib, Seaborn
* **Techniques:** Data Cleaning, Exploratory Data Analysis (EDA), Visualization

**🧪 Approach**

1. **Data Preprocessing**
   * Removed null values and redundant columns
   * Cleaned column names and standardized data formats
2. **Exploratory Data Analysis**
   * Gender-based purchase patterns
   * Age group preferences
   * City-wise sales contribution
   * Product category performance
3. **Visualizations**
   * Bar plots for sales by gender and age
   * Pie charts for city contributions
   * Histograms for amount distribution

**📊 Key Insights**

* **Gender:** Male users dominate purchases during Diwali
* **Age Group:** 26–35-year-olds form the most active customer segment
* **Marital Status:** Married customers tend to spend more on average
* **City Tier:** Tier A & B cities contribute most to revenue
* **Product Category:** Category 1 records the highest number of purchases and total sales

**📈 Impact & Value**

This analysis provided the retail business with:

✅ A clear view of who their core customers are during Diwali  
✅ Identification of top-selling products for inventory focus  
✅ Regional patterns that can guide ad targeting and logistics  
✅ Demographic segmentation to personalize marketing campaigns

**💡 Business Recommendations**

* **Focus on male customers aged 26–35** in targeted campaigns
* **Promote Category 1 products** with special offers and bundles
* **Use city-specific deals** for Tier A & B customers
* **Design loyalty programs for married couples/families**

**📌 Conclusion**

This Diwali Sales Data Analysis highlights how even basic retail data can reveal valuable insights when approached strategically. The findings helped the business better understand customer behavior and provided a strong foundation for targeted marketing and future planning. As a result, this data-driven approach empowers better decision-making and boosts seasonal sales performance.