# **Exploratory Data Analysis on Sales Data**

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## ****1. Introduction****

This project performs an **Exploratory Data Analysis (EDA)** on a sales dataset to uncover trends, seasonal patterns, and key performance metrics. The goal is to identify factors affecting sales performance, including top-performing products and seasonal variations.

## ****2. Dataset Overview****

The dataset contains transactional sales data, including order details, product sales, and timestamps. Key columns include:

* **Order Number**: Unique identifier for each order
* **Quantity Ordered**: Number of units purchased
* **Price Each**: Price per unit
* **Sales**: Total revenue generated
* **Order Date**: Timestamp of the purchase
* **Quarter, Month, Year**: Derived time-based features
* **MSRP**: Manufacturer’s Suggested Retail Price

## ****3. Installation & Dependencies****

To run this project, install the necessary Python libraries:

pip install pandas numpy seaborn matplotlib scipy

## ****4. Code Explanation****

The project is divided into the following key sections:

### ****A. Data Loading & Cleaning****

* The dataset is loaded using **pandas**.
* Missing values and inconsistencies are handled by dropping or imputing values where necessary.

### ****B. Statistical Analysis****

* Summary statistics (mean, median, mode, standard deviation, skewness, kurtosis) are computed for numerical columns.
* A chatbot-style interface allows the user to select which column they want statistics for.

### ****C. Data Visualization****

* **Sales Trends**: Line chart & Area chart to analyze revenue trends over time.
* **Seasonal Patterns**: Bar plots to examine how sales fluctuate across months/quarters.
* **Top Performing Products**: Pie chart & Treemap to showcase best-selling products.
* **Correlation Analysis**: Heatmap to find relationships between numerical variables.
* A chatbot interface lets users choose what type of visualization they want.

## ****5. Usage Instructions****

1. **Run the script in Jupyter Notebook.**
2. **Follow the chatbot prompts** to select an analysis type.
3. **Choose a specific category & visualization.**
4. **Interpret the insights based on the output graphs and statistics.**

## ****6. Conclusion****

This project successfully explores sales data, identifying trends, seasonal patterns, and key performance metrics. The chatbot-based interface enhances user experience, making data analysis interactive and customizable. The visualizations provide valuable insights into business performance and can aid in strategic decision-making.

This documentation serves as a guide to understanding the project workflow and how to use it effectively.