

Exploratory Data Analysis of Customers, Products, and Transactions: Insights into Sales and Purchasing Patterns

1. Dataset Loading & Preview:

- **Datasets loaded:**
 - Customers.csv: Contains customer details like regions.
 - Products.csv: Contains product information such as categories.
 - Transactions.csv: Contains transaction data, including product sales and dates.
 - **Preview:** First 5 rows of each dataset are displayed to understand the data structure.
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2. EDA on Customers Dataset:

- **Info Displayed:**
 - Data types, non-null counts, and general structure using `.info()`.
 - Frequency of customers across regions using `.value_counts()`.
 - **Visualization:**
 - A bar chart (`sns.countplot`) shows the number of customers by region.
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3. EDA on Products Dataset:

- **Info Displayed:**
 - Data types, non-null counts, and structure of the Products dataset.
 - Frequency of products across categories using `.value_counts()`.
 - **Visualization:**
 - A horizontal bar chart (`sns.countplot`) shows the number of products by category.
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4. EDA on Transactions Dataset:

- **Info Displayed:**
 - Data types, non-null counts, and structure of the Transactions dataset.
 - Top 5 products with the highest total sales value using `.groupby()` and `.sum()`.
 - **Visualization:**
 - A time-series plot shows the trend of total sales over time using `.plot()`.
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5. Merging Datasets for Combined Analysis:

- The datasets (Transactions, Customers, and Products) are merged on their common keys (CustomerID and ProductID), creating a unified dataset for deeper insights.
- **Preview:** First 5 rows of the merged dataset are displayed.

Insights Derived:

1. **Customer Distribution by Region:**
 - Identifies which regions have the highest or lowest number of customers.
2. **Top-Selling Products & Categories:**
 - Highlights popular products and categories based on sales data.
3. **Sales Trends Over Time:**
 - Reveals periods of high or low sales activity.
4. **Customer Purchasing Patterns:**
 - Allows further exploration of buying habits by merging datasets.
5. **Region-Based Purchasing Behavior:**
 - Investigates whether customer location influences product preferences or spending.