

Here's an overview of the next activity focusing on product analysis using seasonal decomposition for each sub-category in the Superstore Sales Dataset. This analysis will involve examining the trend, seasonality, and residual components for the sales data of each sub-category.

Objective: To understand the underlying patterns in sales data for each sub-category of products by applying seasonal decomposition techniques. This will help us identify trends, seasonal fluctuations, and any irregularities or residuals in the sales data.

Methodology:

1. Data Preparation:

- Load the dataset and ensure that the 'Order Date' column is converted to datetime format.
- Set 'Order Date' as the index for time series analysis.
- Filter data by sub-categories and resample sales data to monthly totals.

2. Seasonal Decomposition:

- Use the `seasonal_decompose` function to break down the monthly sales data into three main components:
 - **Trend:** The long-term progression of the time series, showing whether sales are increasing or decreasing over time.
 - **Seasonality:** The repeating short-term cycle in sales data, indicating regular fluctuations that occur at specific periods (e.g., monthly or quarterly).
 - **Residuals:** The remainder of the data after removing the trend and seasonality, capturing irregular or random variations.

3. Visualization:

- Plot the trend, seasonal, and residual components for each sub-category using Plotly for interactive visualizations.

Sub-Categories for Analysis

The following sub-categories will be analyzed:

1. **Bookcases**
2. **Chairs**
3. **Labels**
4. **Tables**
5. **Storage**
6. **Furnishings**
7. **Art**
8. **Phones**
9. **Binders**
10. **Appliances**
11. **Paper**
12. **Accessories**
13. **Envelopes**
14. **Fasteners**
15. **Supplies**
16. **Machines**
17. **Copiers**