

Introduction

This project aims to analyze and visualize sales data from the Australian Apparel Sales dataset for the 4th quarter of 2020. The objective is to identify trends, patterns, and insights, including sales performance across different states, groups, and over time. By using various data wrangling and visualization techniques, we were able to derive actionable recommendations for business strategies.

Data Overview

- **Dataset:** Australian Apparel Sales (4th Quarter 2020)
- **Features:**
 - **Date:** Date of the sales transaction
 - **Time:** Time of the day the sale was made
 - **State:** The state where the sale occurred
 - **Group:** Group of products sold (e.g., Men, Women, Kids, Seniors)
 - **Unit:** Units sold (normalized)
 - **Sales:** Sales amount (normalized)

Data Preprocessing

The dataset was preprocessed as follows:

1. **Handling Missing Data:** Missing values in the **Unit** and **Sales** columns were replaced with the mean of the respective columns.
2. **Removing Duplicates:** The dataset was checked for duplicates, and none were found.
3. **Normalization:** The **Unit** and **Sales** columns were normalized using Min-Max scaling to ensure comparability between features.

Summary of Data After Preprocessing:

- **Missing Data:** No missing data found after imputation.
- **Duplicates:** 0 duplicate rows.
- **Normalization:** The **Unit** and **Sales** values were transformed to a scale between 0 and 1.

Exploratory Data Analysis (EDA)

1. Descriptive Statistics for Sales and Unit

- **Sales:** Mean = 0.254, Median = 0.190, Mode = 0.111, Standard Deviation = 0.204
- **Unit:** Mean = 0.254, Median = 0.190, Mode = 0.111, Standard Deviation = 0.204

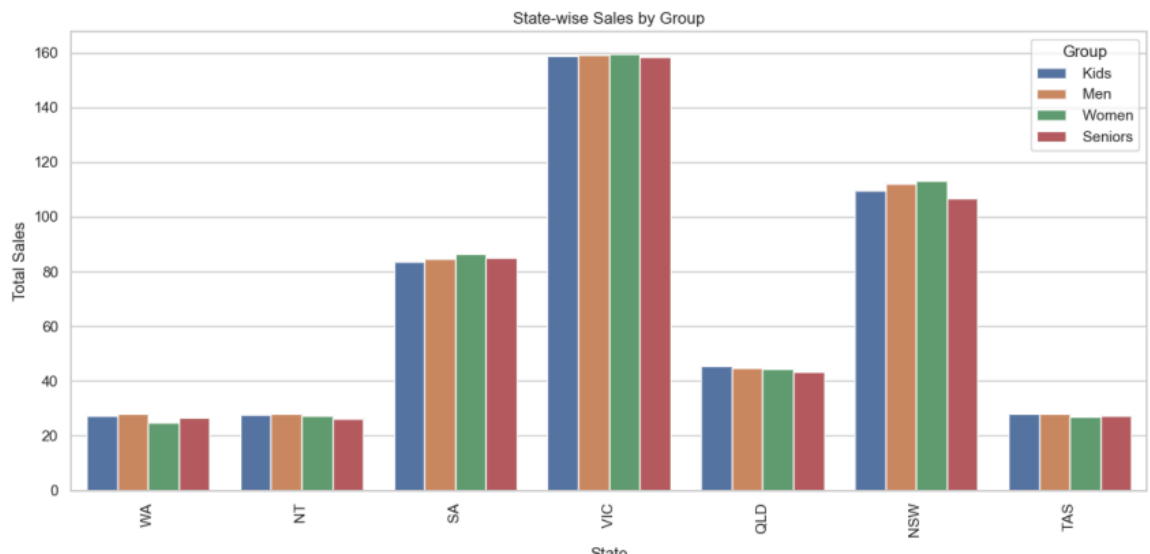
2. Grouping Data by State and Group

- **State with the highest sales:** Victoria (VIC)
- **State with the lowest sales:** Western Australia (WA)
- **Group with the highest sales:** Men
- **Group with the lowest sales:** Seniors

Data Visualization

1. State-wise Sales by Group

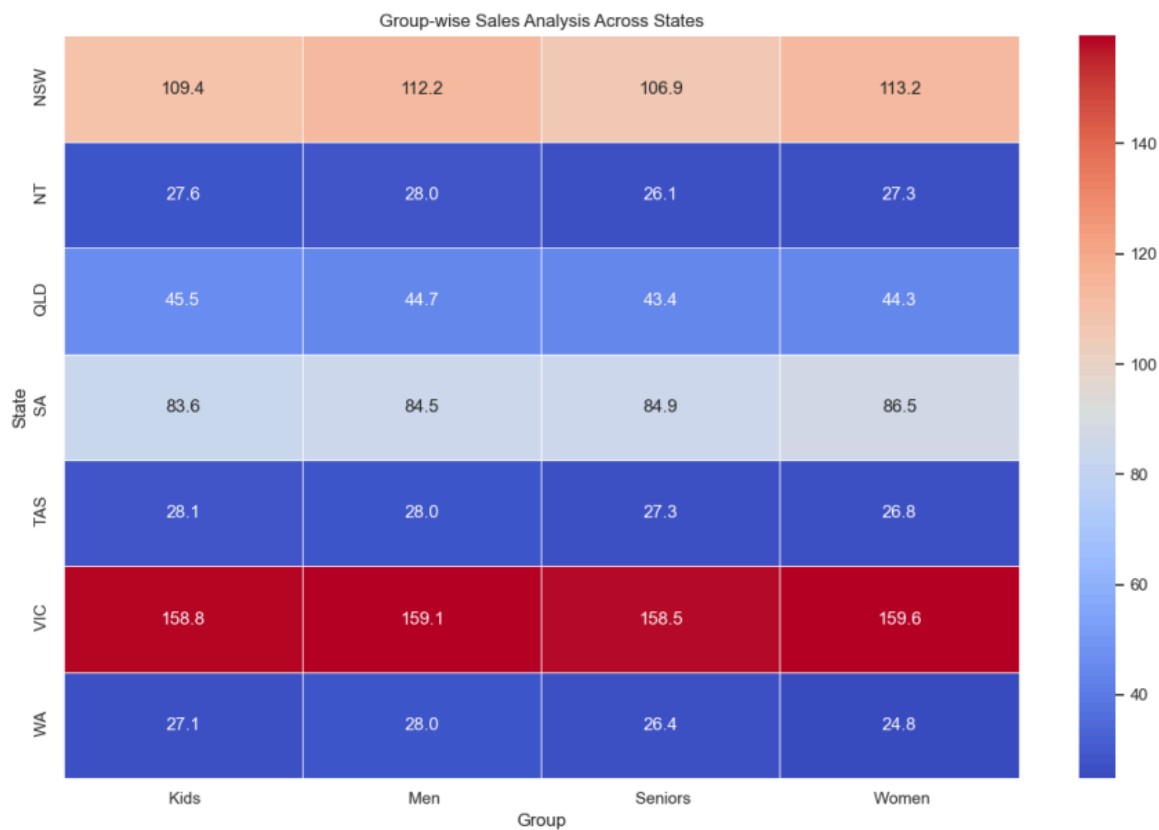
This bar plot compares total sales by state, broken down by group. This visualization helps in understanding which states and product groups contribute most to sales.



What this graph is used for: This plot provides insights into how different states contribute to sales across various product groups. Notably, **Men** have the highest sales in **Victoria (VIC)**.

2. Group-wise Sales Analysis Across States

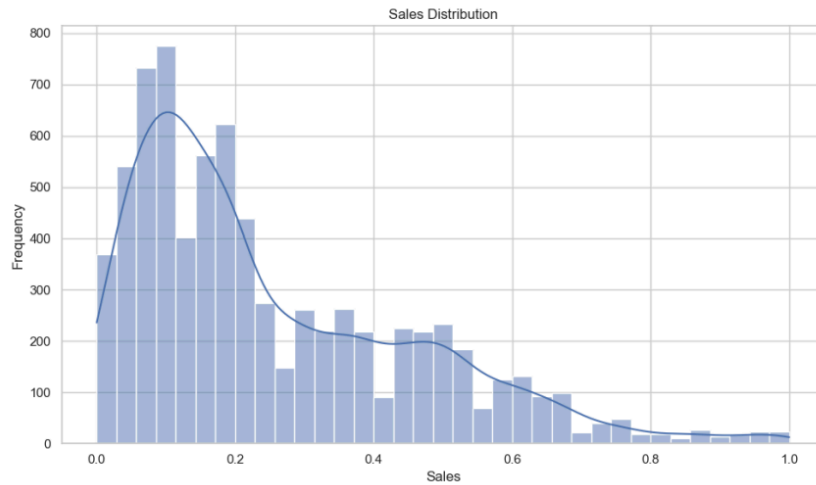
A heatmap was generated to display sales across different groups and states. It shows which combinations of **State** and **Group** have the highest and lowest sales.



What this graph is used for: The heatmap highlights patterns in sales across different states and groups, helping identify regional preferences for certain product groups.

3. Sales Distribution

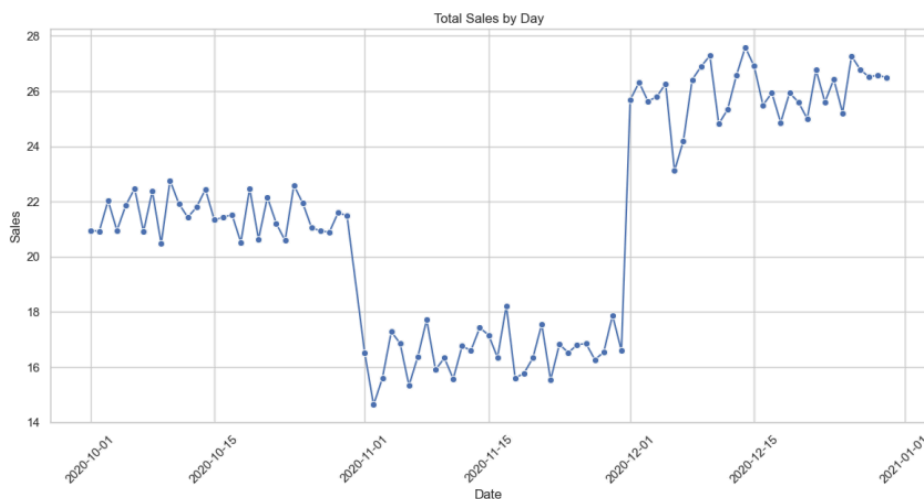
This histogram visualizes the distribution of the **Sales** feature to assess its spread, central tendency, and presence of outliers.



What this graph is used for: This histogram shows how sales values are distributed, revealing whether the sales are skewed or normally distributed.

4. Total Sales by Day

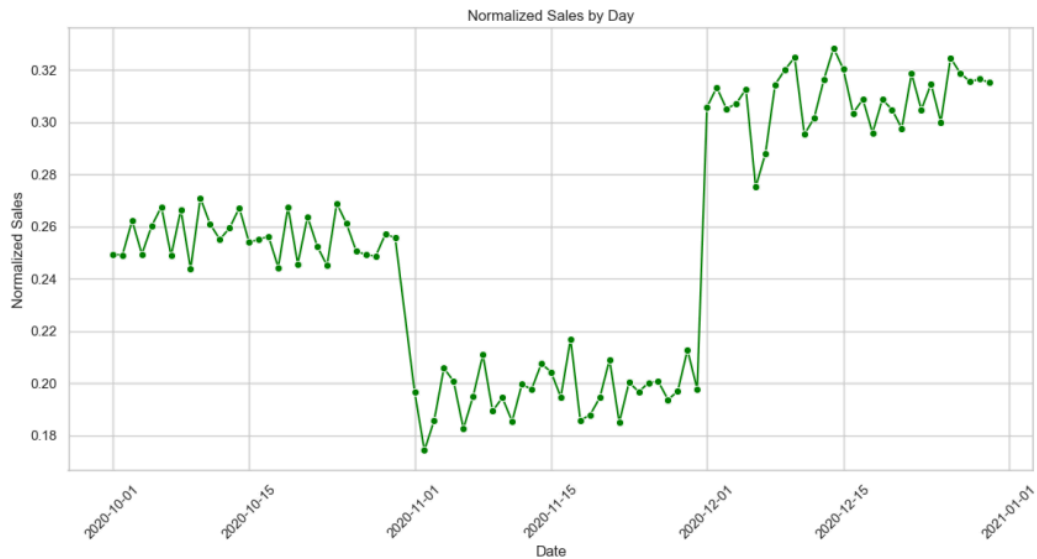
This line plot illustrates the daily sales trends, providing insights into which days had the highest and lowest sales.



What this graph is used for: The line plot reveals trends in daily sales, helping to identify peak sales days and periods of lower sales activity.

5. Normalized Sales by Day

This line plot shows the normalized sales on a daily basis, providing a comparison between daily sales across different days of the week.



What this graph is used for: This plot shows how normalized daily sales vary across different days. It helps in understanding daily sales performance when adjusted for scale.

Key Findings

1. **Sales by State:** The analysis reveals that **Victoria (VIC)** leads in sales, while **Western Australia (WA)** records the lowest sales. This suggests that consumer demand for apparel might be stronger in some regions than others.
2. **Sales by Product Group:** **Men's** apparel generates the highest sales across all states, whereas the **Seniors** group consistently shows the lowest sales. This highlights a potential area for improvement in the senior-focused product category.
3. **Sales Trends Over Time:** Sales numbers fluctuate over the weeks, with a noticeable spike in week 53, indicating that the final week of the quarter saw a surge in sales.
4. **Sales During the Day:** Sales seem to be higher during the **morning** hours and drop off in the **afternoon**. This could reflect consumer shopping patterns or the types of promotions offered during the day.

Recommendations

Based on the findings, here are some suggestions to improve sales performance:

1. **Focus on High-Performing States:** Since **Victoria (VIC)** has the highest sales, it would be beneficial to concentrate more marketing efforts and promotional campaigns in this region. It could help maintain or even increase the sales momentum there.
2. **Expand Men's Product Range:** Given that **Men's** products are the highest-sellers, consider expanding the variety in this category or increasing marketing efforts for these products to further boost sales.
3. **Target Afternoon Shoppers:** Since sales tend to dip in the afternoon, consider launching time-specific promotions or discounts to drive sales during these off-peak hours. Offering special deals in the afternoon could help even out sales throughout the day.
4. **Revamp the Seniors' Line:** The **Seniors** group has the lowest sales, so it might be worth revisiting this product category. Tailoring products to meet the specific needs of senior customers or creating targeted promotions might help drive better sales in this segment.

Conclusion

The analysis has shed light on several important trends in the data, including regional differences in sales, strong performance in the men's apparel segment, and fluctuations in sales over the course of the quarter. By focusing on high-performing areas like **Victoria**, expanding popular product categories, and addressing the afternoon sales dip, there is significant potential to enhance overall performance. In particular, revisiting the **Seniors** product line could lead to better engagement and sales in this underperforming segment. These insights provide a clear direction for optimizing sales strategies in the future.