

# Exploratory Data Analysis of Amazon Sales Data

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M.SC – DATA SCIENCE (3-sem)



## 1. DEFINE THE PROBLEM:

E-commerce sales promotions are sales and discounts that are used to attract new customers, increase conversions, and ultimately drive sales. They work. But the results are not guaranteed. The purpose of this EDA is to understand the main characteristics of Amazon's sales data and identify any patterns or trends that may help to spot the best days to start sales promotions, improve the sales performance of the company, services and warehousing.

## 2. MEASURE:

The data used for this EDA is a sample of Amazon's sales data, covering a period of one year. The data contains the following variables:

- Order ID - A unique identifier for each product order.
- Product - The name of the product.
- Quantity Ordered - The number of units of the product that purchased.
- Price Each - The price of the product.
- Order Date - The date on which the purchase was made.
- Purchase Address- The address of the customers, where order delivered

The following generated metrics will be used to measure the sales performance of the company:

- Month, day and hour is the generated used to measure the sales performance of the company this variables is generated from order date:
- Sales variable is the combinations of Price each and quantity ordered generated using multiplication both variables.

## 3. ANALYZE:

The EDA was conducted using a combination of summary statistics and visualizations. The following are some of the main findings:

For every e-commerce company, only sales promotion is not enough, it is also necessary to choose the best day and time of the month to make sales promotion successful. So our first analysis is identify the month, day and hour with the help of bar graph, we plot three bar graph that is show the sales and quantity ordered to the point of month days and sales,

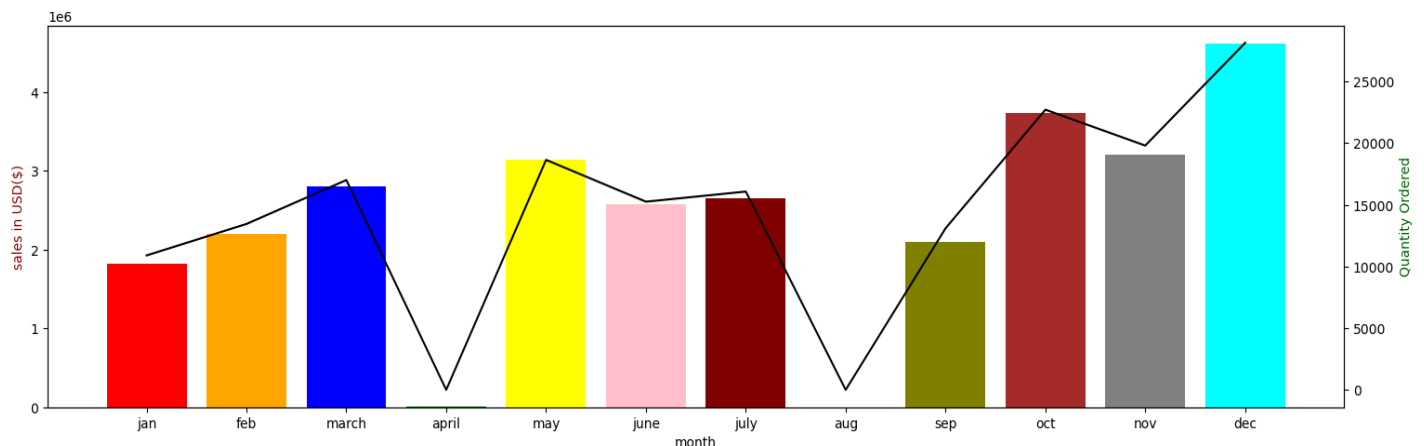


Figure 1 Monthly sales and quantity ordered

With the help of this graph we find December month having the highest sales and largest number of quantity ordered then the other month, So come to the conclusion that December is a good month for sales promotions.

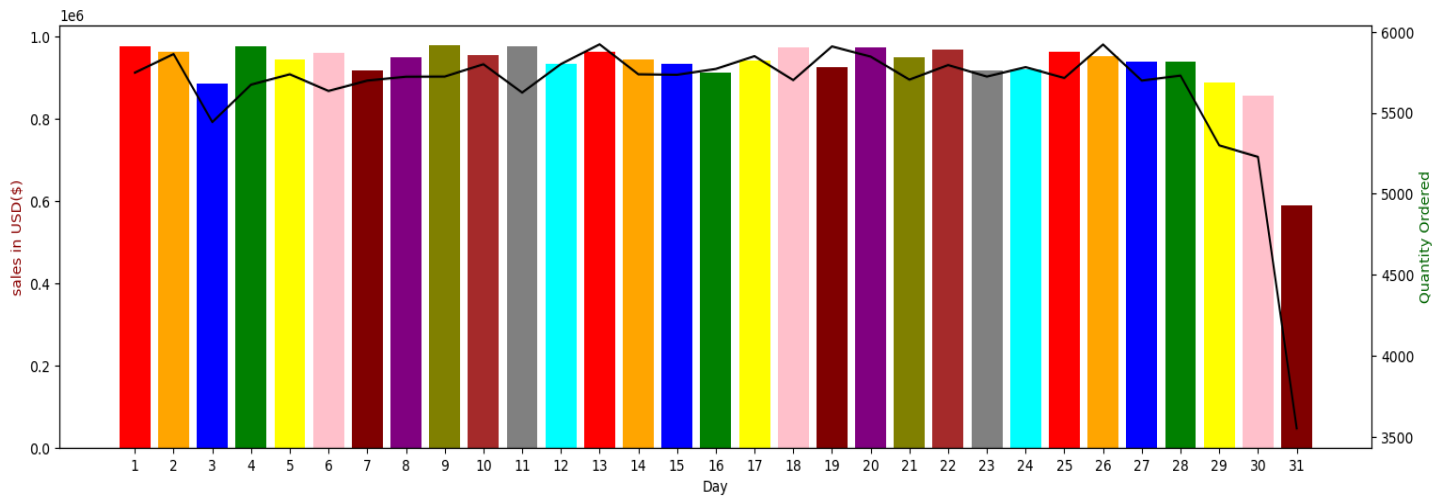


Figure 2 Daily sales and quantity ordered

This graph shows most of days having good sales and quantity ordered, So it is a bit difficult to come to any conclusion, but keeping in mind some reasons, December 25 will be the best for start sale promotions. Because 25 December having good number of sales and quantity ordered, also in these days 2 major festivals Christmas and New Year are exist.

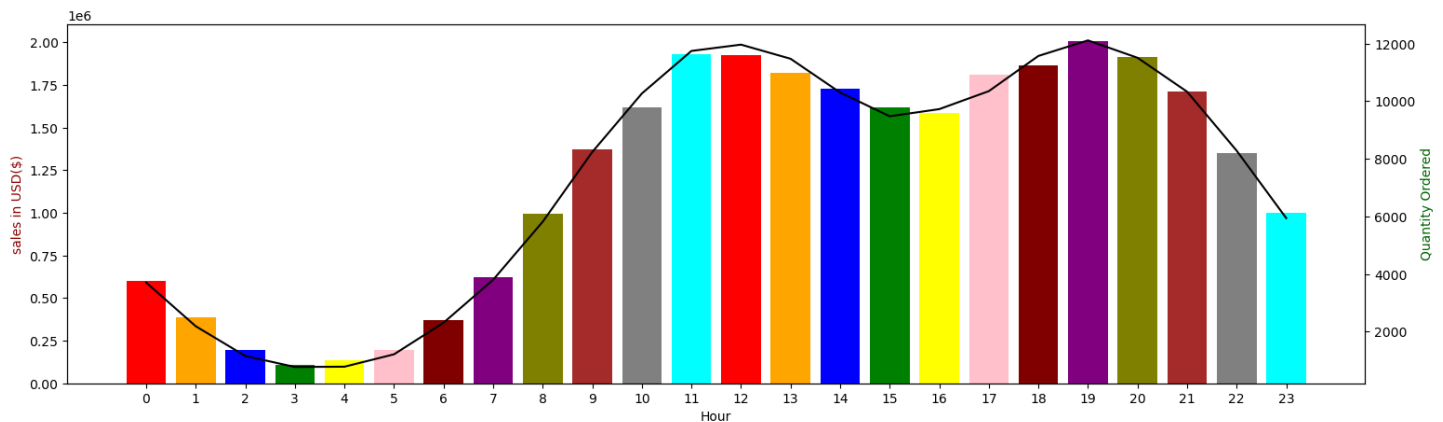
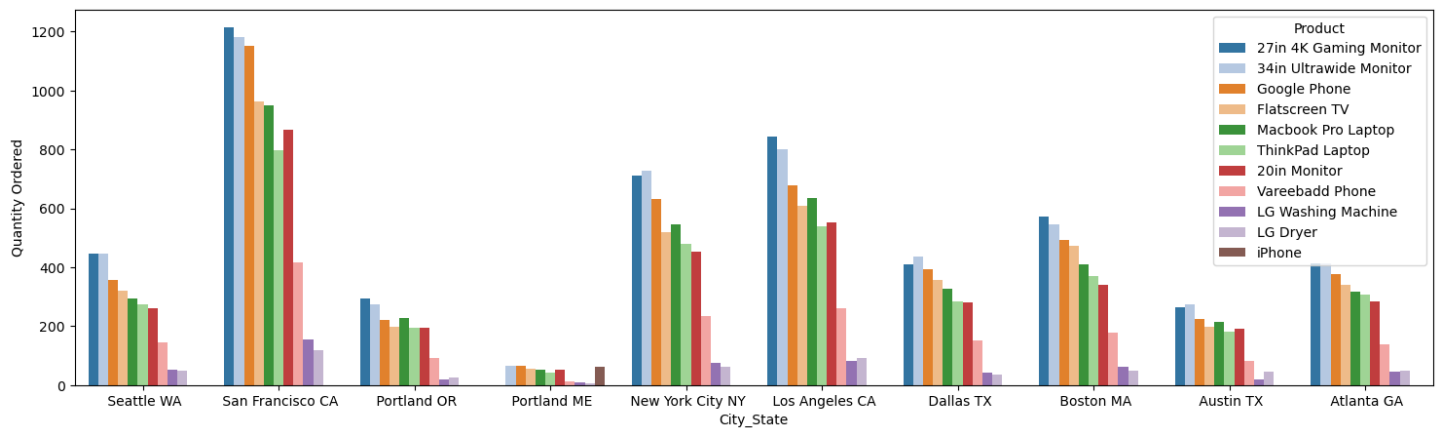


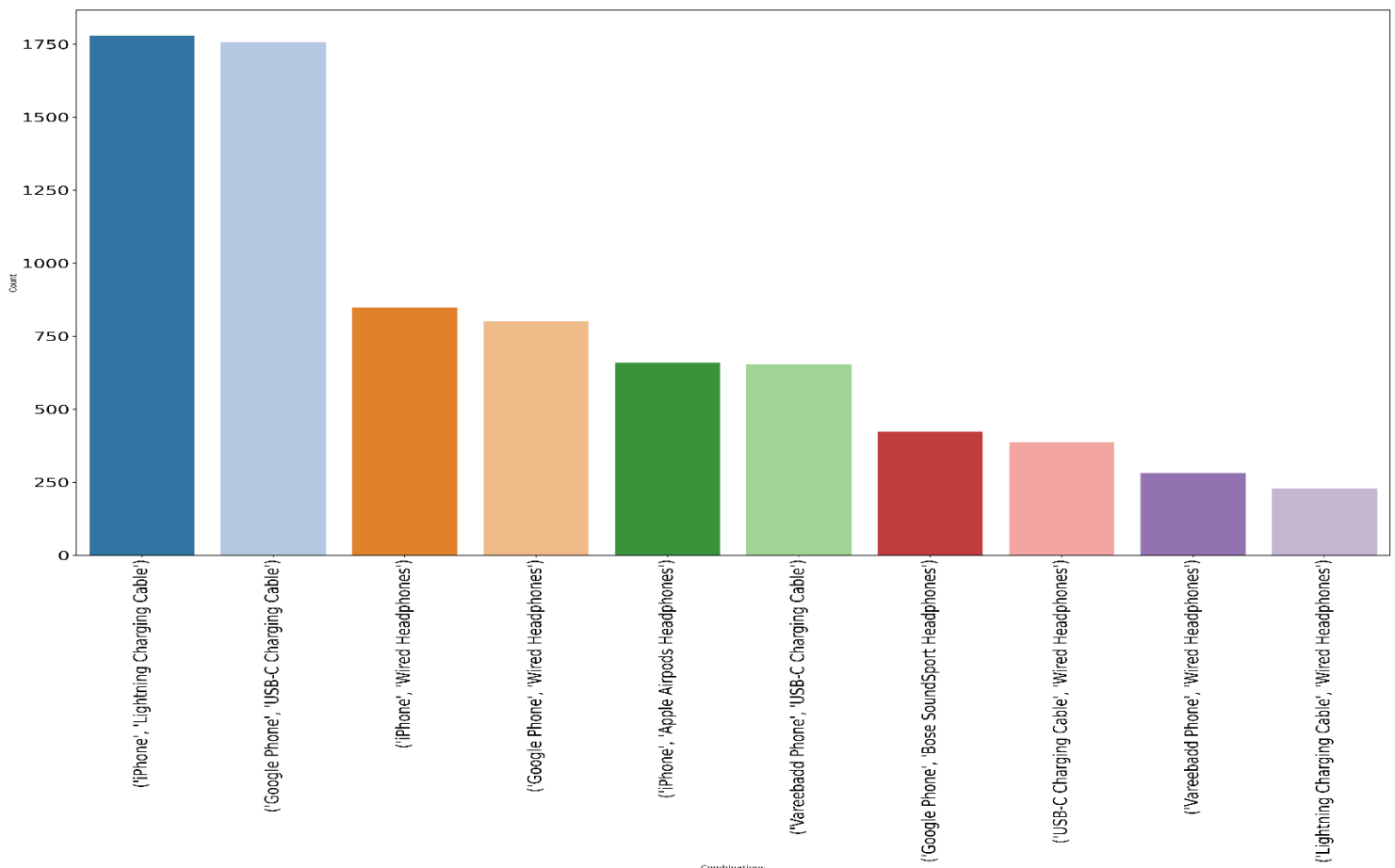
Figure 3 Hourly sales and quantity ordered

In this graph we can see that 7 PM is the hour have good number of sales and Quantity ordered but 7 PM is not a good time to launch a campaign because after 7 PM sales and quantity ordered graph has started to falling which will impact the campaign, so we need a time in the morning which tends to growing sales and quantity ordered that is 10 AM.

Our second analysis for another problem statement to identify the management issues such as warehousing problem. This will be helpful for company WMS (warehouse management system), to ensure that goods and materials move through warehouses in the most efficient and cost-effective way. For this, we plot stacked bar chart that showing the quantity ordered of product in each state,



With the help of graph we identify that San Francisco have higher demand of product, where as Portland ME have lower demand. The company should build a warehouse in San Francisco also company can establish a warehouse between Portland ME and Boston or any other nearby state, which will be beneficial for Portland as well as other nearby state.



Our third analysis is finding products that are bought with each other, to help the customer recommendations system. This bar graph is showing the product combinations that are being bought together the most. First two bars show customers who buy the iPhone they also buy the lightning charging cable, and customer who buy the Google phone they also buy the USB-C charging cable. More such products are visible in this graph which customers prefer to buy both the products together. So in future whenever a customer buy any product in this list we can recommend the similar product from the list.

#### **4. IMPROVE:**

Based on the findings from the EDA, the following recommendations can be made to improve the sales performance of the company:

- Consider offering promotions or discounts on certain products to increase their sales.
- 25<sup>th</sup> of December at 10AM, is best time to start sale promotions,
- Plan for establish new warehouse and stocking up on popular products and offering special deals.
- Improve the customer recommendations system, use data on customer purchasing habits to target marketing efforts towards those customers who are most likely to make a purchase.
- Start sale campaign on holiday season, to improve company sales and attract new customers.

#### **5. CONTROL:**

To ensure that the recommendations are implemented effectively, the following plan should be put in place:

- Use customer data to create targeted marketing campaigns and track the results of these campaigns.
- Monitor the sales data during the holiday season and adjust inventory levels and marketing efforts as needed.
- Set targets for sales growth and monitor progress towards these targets on a regular basis.