



BHARATIYA VIDYA BHAVAN'S
SARDAR PATEL INSTITUTE OF TECHNOLOGY
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai – 400093-India
(Autonomous College Affiliated to University of Mumbai)

Department of Computer Science and Engineering

Course – Advanced Data Visualization (ADV)

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Batch	A
Lab no	1

Aim :- Create basic charts using Power Python to be performed on the dataset of Ecommerce field

Objectives :- To Provide a comprehensive understanding of the eCommerce dataset, including key attributes and the general structure of the data.

To Analyze sales trends, revenue generation, and top-selling products over time.

To Examine the performance of different product categories and individual products.

To Evaluate the impact of marketing campaigns and promotions on sales figures.

Dataset :-

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Order ID	Order Date	Customer	State	City	Order ID	Amount	Profit	Quantity	Category	Sub-Categ	PaymentMode	
2	B-26055	10-03-2018	Harivansh	Uttar Prad	Mathura	B-25681	1096	658	7	Electronics	Electronic	COD	
3	B-25993	03-02-2018	Madhav	Delhi	Delhi	B-26055	5729	64	14	Furniture	Chairs	EMI	
4	B-25973	24-01-2018	Madan Mc	Uttar Prad	Mathura	B-25955	2927	146	8	Furniture	Bookcases	EMI	
5	B-25923	27-12-2018	Gopal	Maharash	Mumbai	B-26093	2847	712	8	Electronics	Printers	Credit Card	
6	B-25757	21-08-2018	Vishakha	Madhya Pr	Indore	B-25602	2617	1151	4	Electronics	Phones	Credit Card	
7	B-25967	21-01-2018	Sudevi	Uttar Prad	Prayagraj	B-25881	2244	247	4	Clothing	Trousers	Credit Card	
8	B-25955	16-01-2018	Shiva	Maharash	Pune	B-25696	275	-275	4	Clothing	Saree	COD	
9	B-26093	27-03-2018	Sarita	Maharash	Pune	B-25687	387	-213	5	Clothing	Saree	UPI	
10	B-25798	01-10-2018	Shishu	Andhra Pr	Hyderabad	B-25643	50	-44	2	Clothing	Hankerchi	UPI	
11	B-25602	01-04-2018	Vrinda	Maharash	Pune	B-25851	135	-54	5	Clothing	Kurti	COD	
12	B-25858	13-11-2018	Uudhav	Maharash	Mumbai	B-25703	231	-190	9	Clothing	Hankerchi	COD	
13	B-25969	21-01-2018	Shreyshi	Gujarat	Surat	B-25887	2125	-234	6	Electronics	Printers	EMI	
14	B-26099	30-03-2018	Bhishm	Maharash	Mumbai	B-25923	3873	-891	6	Electronics	Phones	Credit Card	
15	B-25997	04-02-2018	Yogesh	Maharash	Pune	B-25756	729	-492	5	Furniture	Bookcases	UPI	
16	B-25881	25-11-2018	Lalita	Uttar Prad	Mathura	B-25761	2188	1050	5	Furniture	Bookcases	Credit Card	
17	B-25761	25-08-2018	Madhav	Uttar Prad	Mathura	B-25655	6	-3	1	Clothing	Hankerchi	UPI	
18	B-25887	01-12-2018	Vishakha	Uttar Prad	Prayagraj	B-25786	1854	433	5	Furniture	Bookcases	Credit Card	
19	B-25823	18-10-2018	Rohan	Maharash	Mumbai	B-26095	6	1	1	Clothing	Kurti	UPI	
20	B-25853	08-11-2018	Gaurav	Gujarat	Ahmedaba	B-25853	2093	721	5	Furniture	Chairs	Credit Card	
21	B-25862	15-11-2018	Amol	Bihar	Patna	B-25735	7	-1	2	Clothing	Skirt	UPI	
22	B-25830	26-10-2018	Aastha	Himachal	Simla	B-25910	1622	-624	5	Furniture	Tables	Credit Card	
23	B-25786	19-09-2018	Madan Mc	Uttar Prad	Mathura	B-25950	1622	95	5	Electronics	Printers	Credit Card	
24	B-25686	11-06-2018	Pooja	Himachal	Simla	B-25744	373	254	6	Electronics	Printers	UPI	
25	B-26022	18-02-2018	Shrichand	Punjab	Chandigarh	B-25845	82	-33	4	Clothing	Kurti	COD	
26	B-26003	08-02-2018	Hitesh	Madhya Pr	Bhopal	B-26001	8	2	2	Clothing	Skirt	UPI	
27	B-25755	19-08-2018	Shourya	Kerala	Thiruvanan	B-25830	1954	782	3	Electronics	Phones	Credit Card	
28	B-25902	10-12-2018	Ishpreet	Maharash	Mumbai	B-25842	1543	370	8	Electronics	Printers	Credit Card	
29	B-25935	04-01-2018	Sudhir	Nagaland	Kohima	B-25778	1506	-266	6	Electronics	Printers	Credit Card	
30	B-25797	30-09-2018	Sauptik	Madhya Pr	Indore	B-25686	1829	-56	6	Furniture	Tables	Credit Card	



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Dataset Description :- This dataset contains information about various orders placed by customers. Each row represents a unique order with the following columns:

- 1) **Order ID:** A unique identifier for each order.
- 2) **Order Date:** The date when the order was placed.
- 3) **Customer Name:** The name of the customer who placed the order.
- 4) **State:** The state where the customer is located.
- 5) **City:** The city where the customer is located.
- 6) **Order ID:** This column to be a duplicate column of the Order ID.
- 7) **Amount:** The total amount of the order.
- 8) **Profit:** The profit made from the order. Negative values indicate a loss.
- 9) **Quantity:** The number of items ordered.
- 10) **Category:** The category of the items ordered (e.g., Electronics, Furniture, Clothing).
- 11) **Sub-Category:** The sub-category of the items ordered (e.g., Printers, Chairs, Saree).
- 12) **Payment Mode:** The mode of payment used for the order (e.g., COD, EMI, Credit Card, UPI).

Implementation :- 1] Implementation in Power bi :-

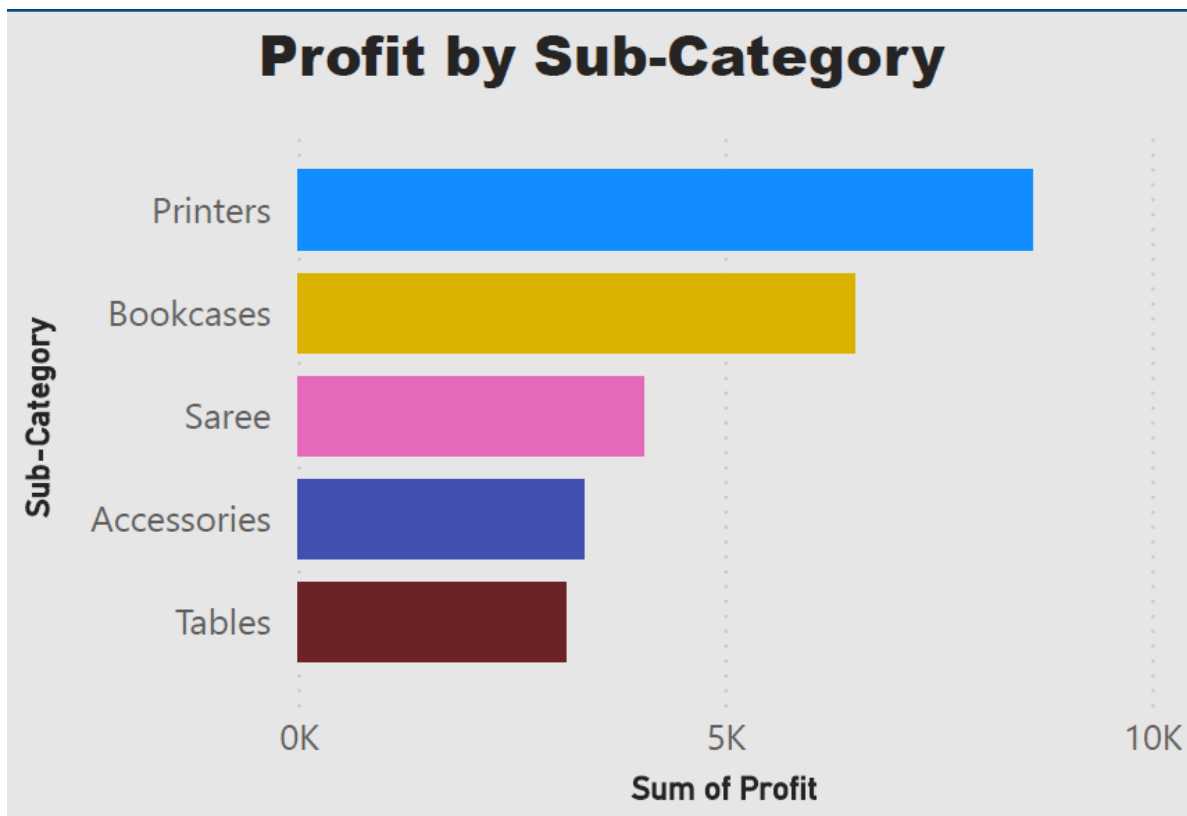




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- 1) **Bar Chart :-** Bar charts are ideal for comparing discrete categories or groups. They provide a clear visualization of the difference in values among different categories, making it easy to spot trends and outliers. In this case, using bar charts helps you compare profit margins across various subcategories and states effectively.



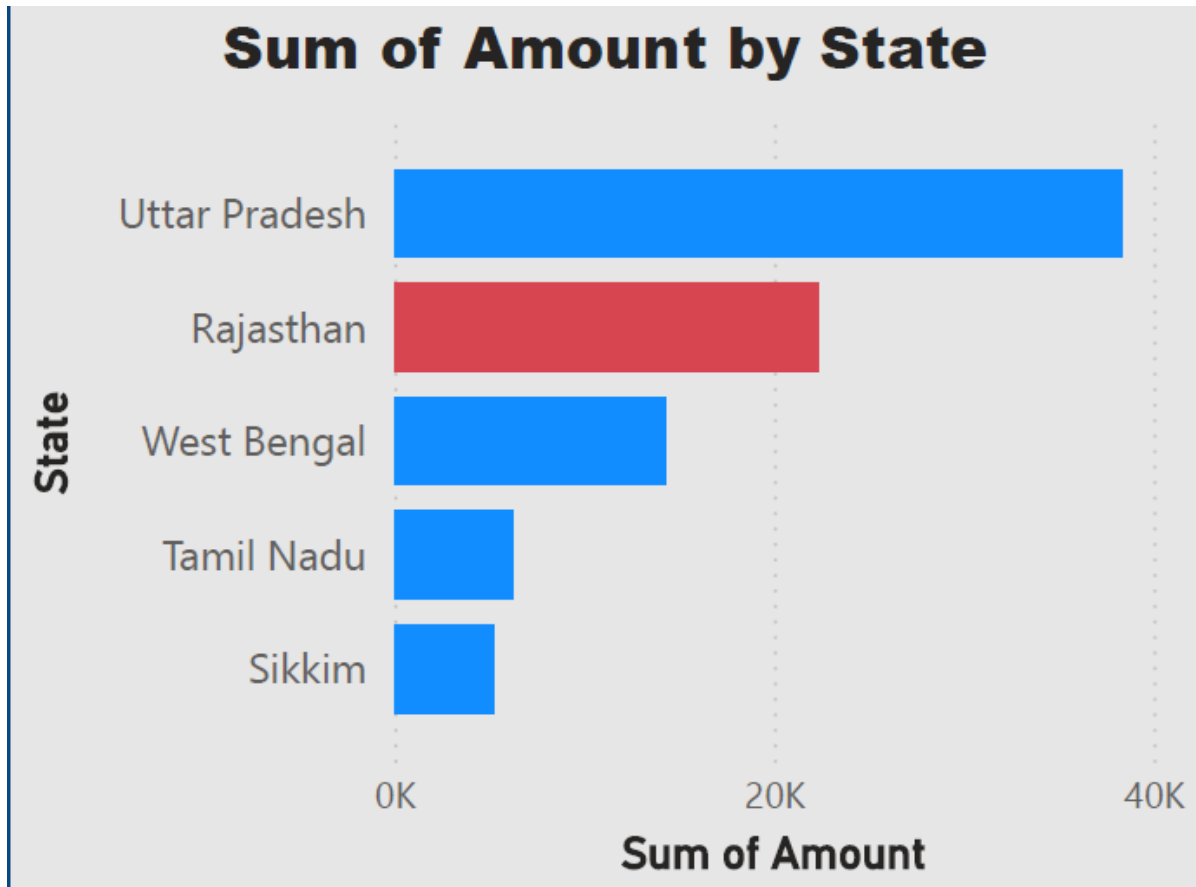
This bar chart shows how much profit each product subcategory is generating. It helps identify which subcategories are the most profitable and which may not be performing well. For instance, if "Printers" show low or negative profit, it might be a signal to investigate pricing, demand, or costs associated with that subcategory.



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Bar Chart: Sum of Amount by State



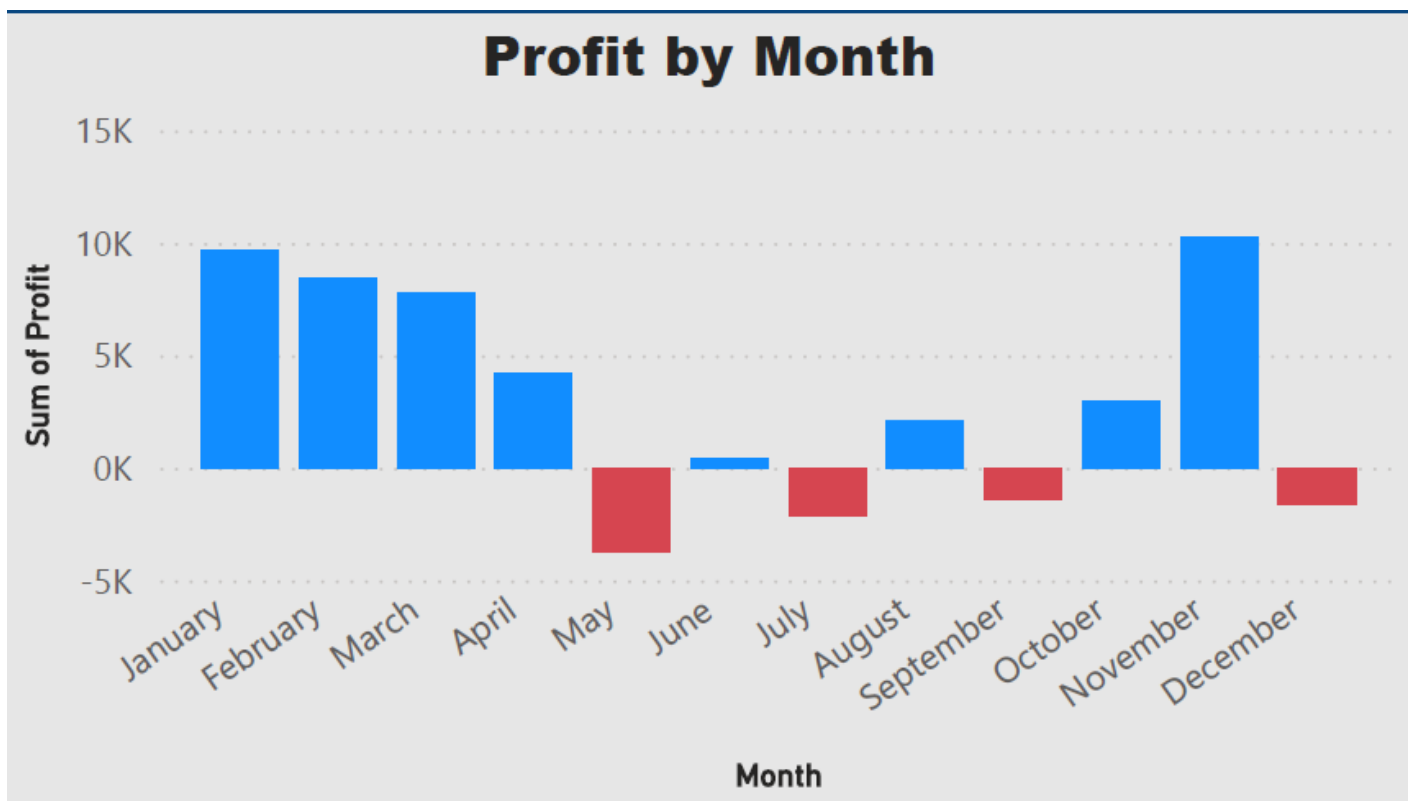
This bar chart displays the total amount of orders for the top 5 states: Uttar Pradesh, Rajasthan, West Bengal, Tamil Nadu, and Sikkim. Each bar represents the sum of the order amounts for each state.



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- 2) **Column chart** :- A column chart is a type of bar chart that uses vertical bars to represent data. Each bar's height corresponds to the value of the category it represents. Column charts are particularly useful for comparing different categories or tracking changes over time.



The chart displays both positive and negative profits for each month. Positive profits are represented by bars extending upwards, while negative profits are represented by bars extending downwards. We can easily compare the profit for each month and identify trends or patterns. The chart highlights the months with the highest profit (January and November) and the months with the lowest profit (May and December). It helps in identifying any seasonal trends or patterns in profit over the year.

High Profits: January (9869) and November (10253) are the months with the highest profits.

Low Profits: May (-3730) and December (-1604) show significant losses.

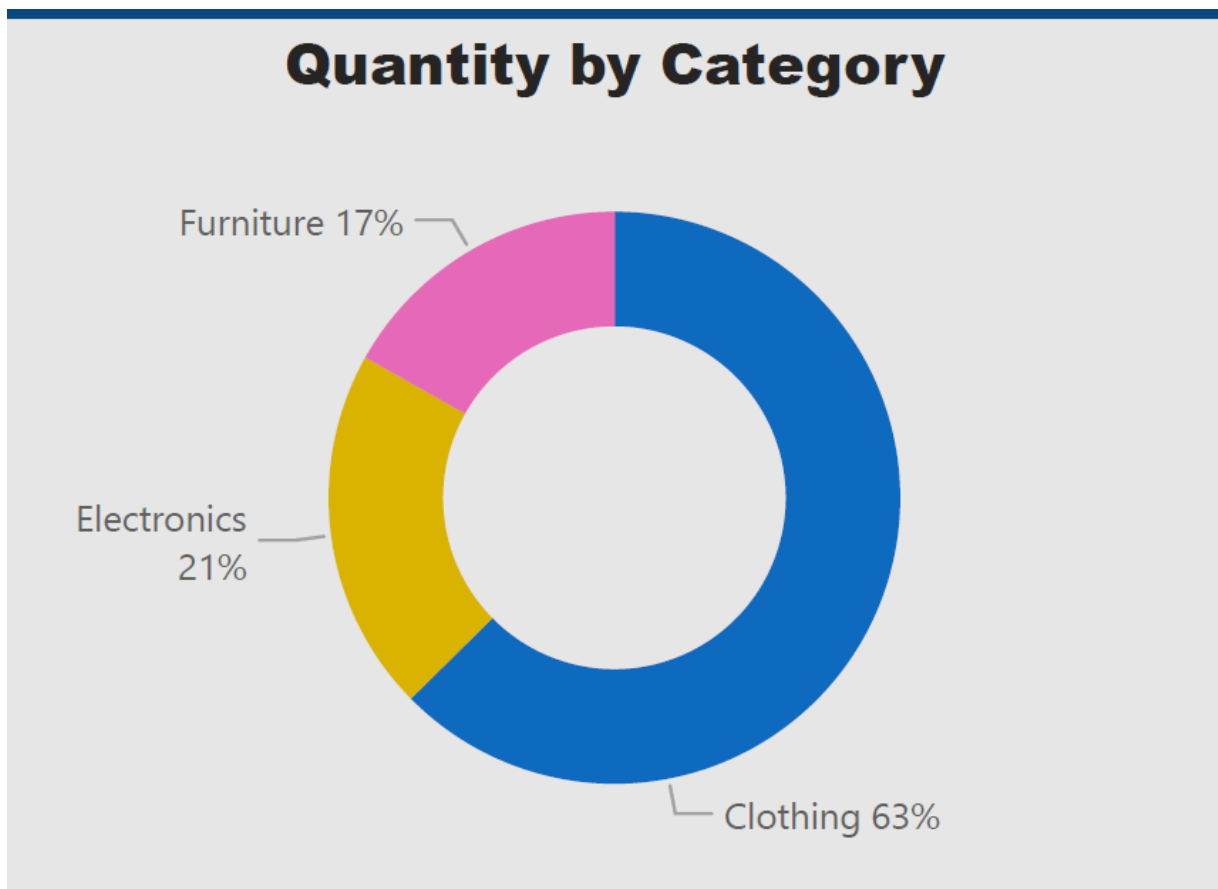


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- 3) **Pie chart :-** A pie chart is a circular statistical graphic divided into slices to illustrate numerical proportions. Each slice represents a category's contribution to the whole, with the size of each slice proportional to the quantity it represents. Pie charts are useful for showing the relative sizes of parts to a whole



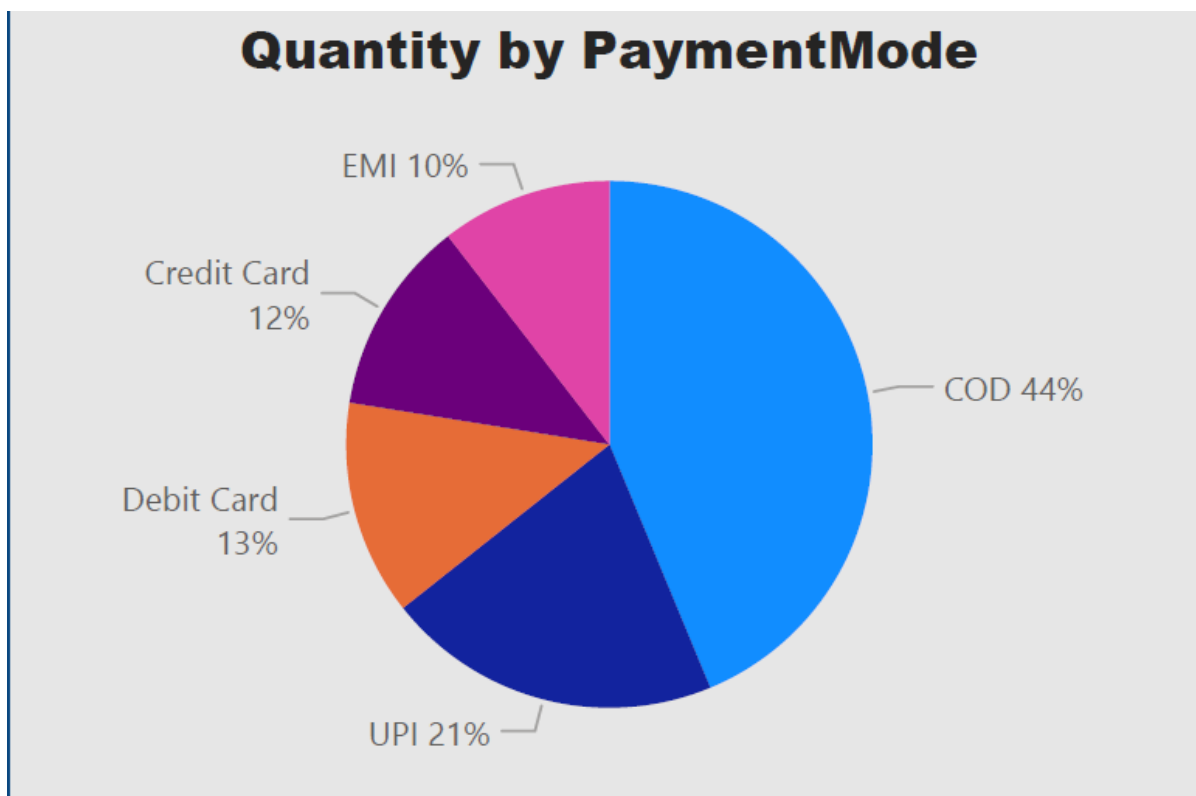
This pie chart shows the distribution of order quantities based on different payment modes. The segments represent the percentage of total quantities for each payment mode: EMI (10%), Credit Card (12%), Debit Card (13%), UPI (21%), and COD (44%).



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- 4) **Donut Chart :-** A donut chart is similar to a pie chart but with a hole in the center, giving it a donut-like appearance. This hole can be used to display additional information or simply to improve the visual appeal. Donut charts also show proportions of categories to the whole, but they can be easier to read when there are many categories.



This donut chart illustrates the distribution of order quantities across different product categories. The segments represent the percentage of total quantities for each category: Furniture (17%), Electronics (21%), and Clothing (63%).



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Implementation :- 2] Implementation using Python :-

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np

df = pd.read_csv('OrdersDetails.csv')
df.head()

df['Order Date'] = pd.to_datetime(df['Order Date'], format='%d-%m-%Y')
# Histogram for distribution of Profit
plt.figure(figsize=(10, 6))
plt.hist(df['Profit'], bins=20, color='skyblue', edgecolor='black')
plt.title('Distribution of Profit')
plt.xlabel('Profit')
plt.ylabel('Number of Orders')
plt.show()

# Sort the data by 'Order Date'
df.sort_values('Order Date', inplace=True)

# Timeline chart for Profit over Order Date
plt.figure(figsize=(14, 7))
plt.plot(df['Order Date'], df['Profit'], marker='o', linestyle='-', color='g')
plt.title('Timeline of Profit Over Time')
plt.xlabel('Order Date')
plt.ylabel('Profit')
plt.grid(True)
plt.show()

# Scatter plot for Profit vs Quantity
plt.figure(figsize=(10, 6))
```




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```
plt.scatter(df['Quantity'], df['Profit'], color='red')
plt.title('Profit vs Quantity Sold')
plt.xlabel('Quantity Sold')
plt.ylabel('Profit')
plt.grid(True)
plt.show()

# Bubble plot for Amount vs Profit size by Quantity
plt.figure(figsize=(12, 8))
bubble_size = df['Quantity'] * 10 # Scale factor for better visibility
colors = np.random.rand(len(df)) # Generate random colors for each bubble
plt.scatter(df['Amount'], df['Profit'], s=bubble_size, c=colors, alpha=0.5)
plt.title('Amount vs Profit (Bubble size by Quantity)')
plt.xlabel('Amount')
plt.ylabel('Profit')
plt.grid(True)
plt.show()
```

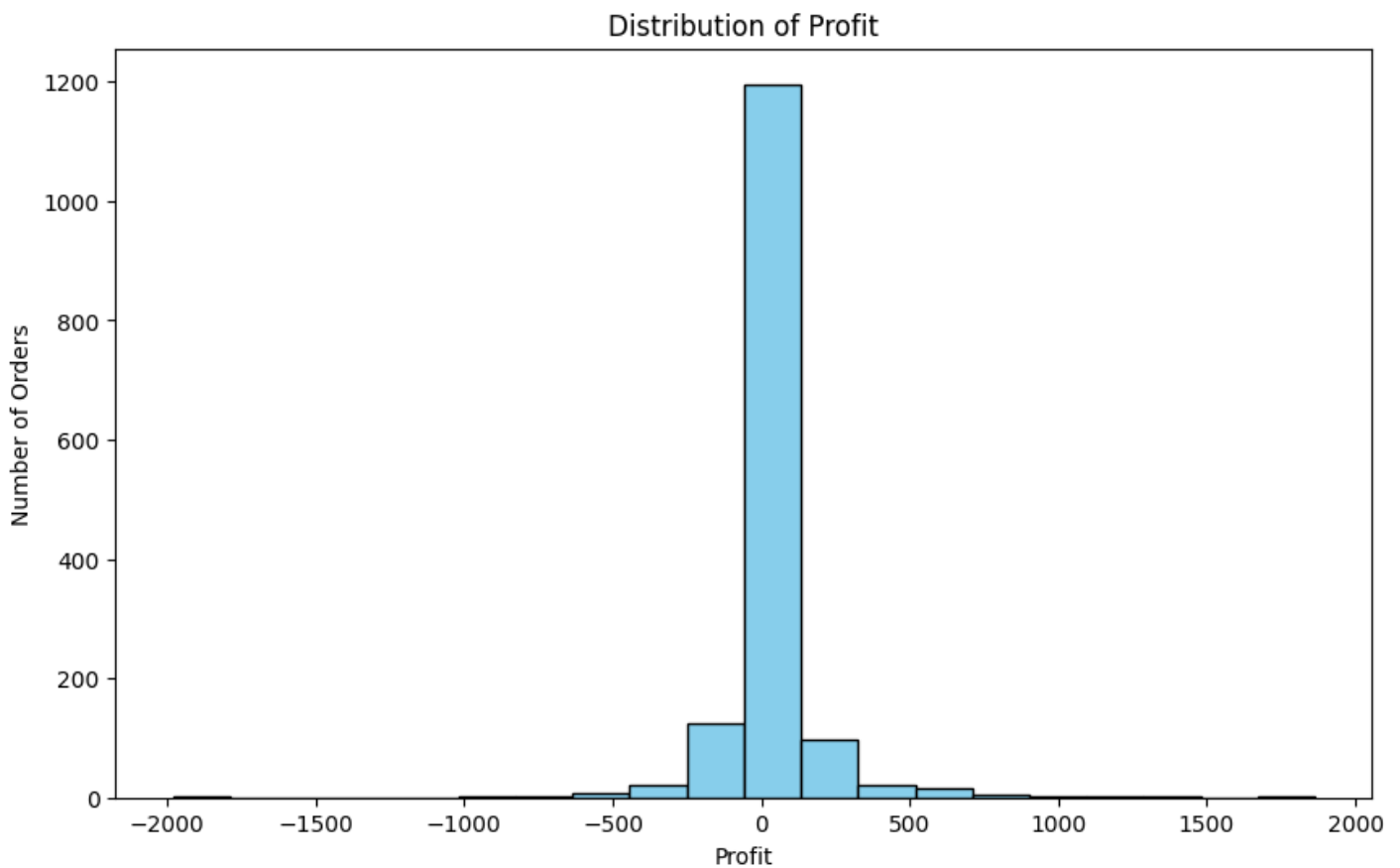


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1] Histogram :- Distribution of profit by numbers of orders

A histogram is a graphical representation that organizes a group of data points into user-specified ranges. It shows the frequency distribution of a dataset.



The histogram displays the distribution of profit values. It helps identify how profits are spread across different orders, showing the frequency of various profit ranges. Most orders have a profit around the lower range, with a few orders showing significant losses or high profits.

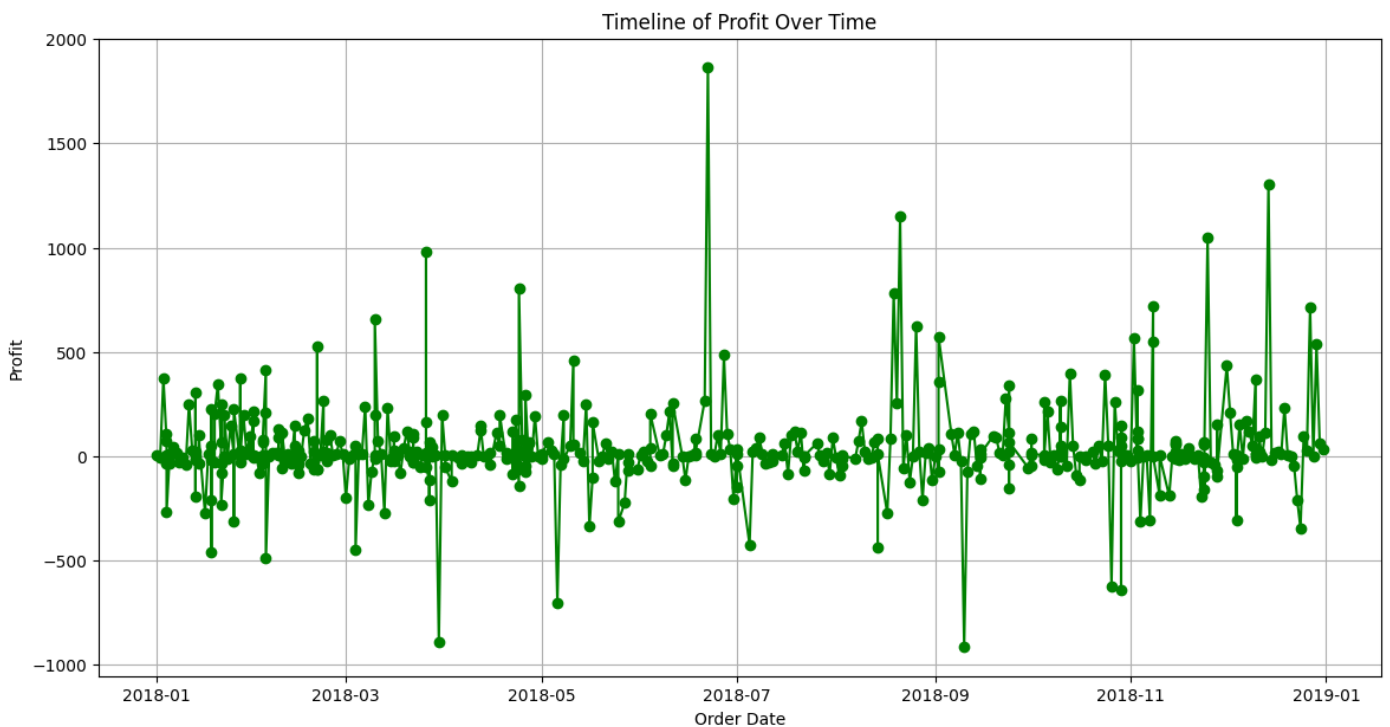


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2] Timeline Chart :- Timeline of profit Over Time

A timeline chart (or line chart) plots data points in time order. It is useful for visualizing trends over a period.



The timeline chart shows the profit over time. It helps identify trends, patterns, and fluctuations in profit throughout the year.

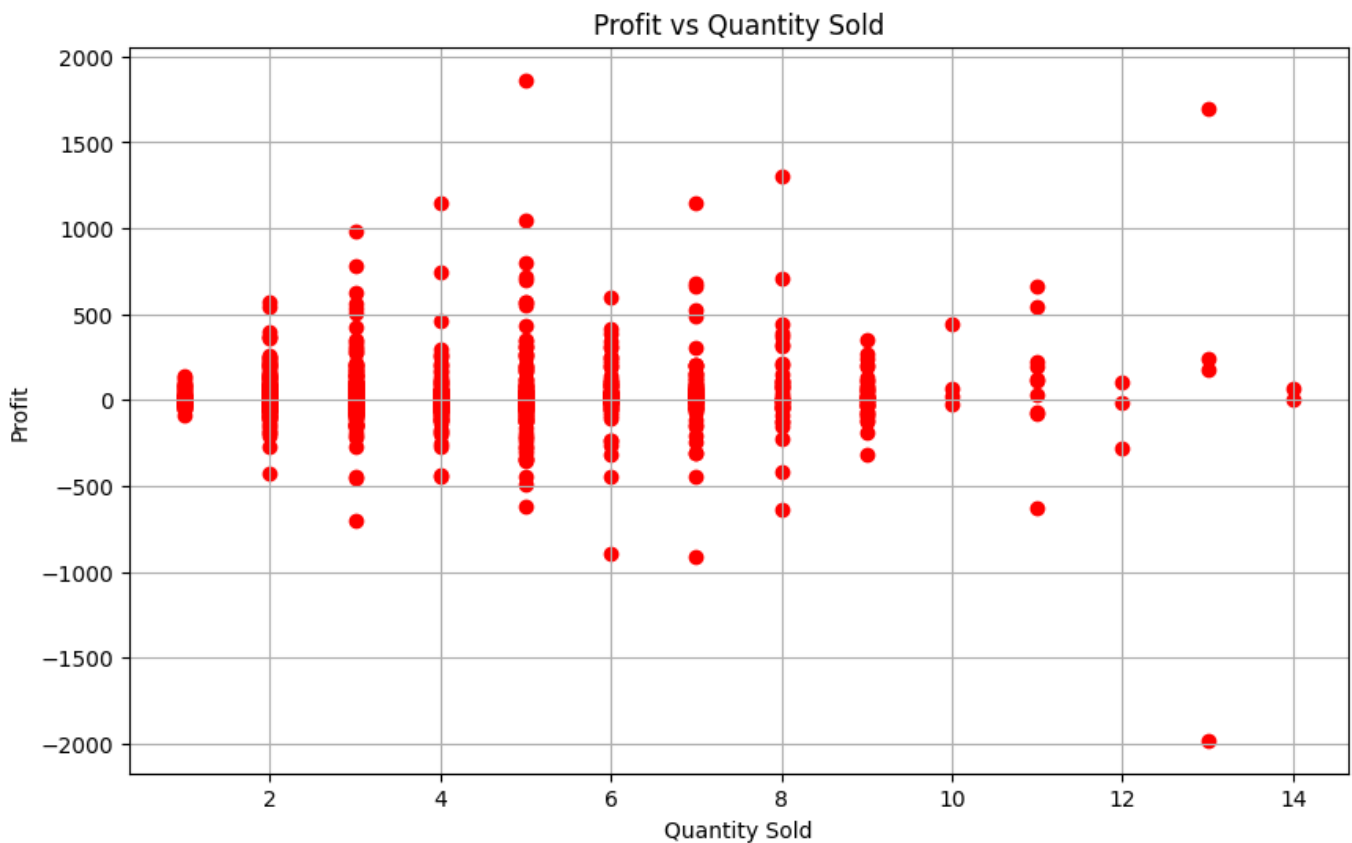
The profit fluctuates over time, with noticeable peaks and troughs. This can indicate seasonal trends or the impact of specific events on sales.



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3] Scatter Plot: Profit vs Quantity Sold

A scatter plot uses dots to represent values for two different numeric variables. It is useful for identifying relationships between variables.



The scatter plot shows the relationship between the quantity sold and the profit. It helps identify if there's any correlation between the number of items sold and the profit made.

There is no clear linear relationship between the quantity sold and profit. Some orders with high quantities have low profits and vice versa.



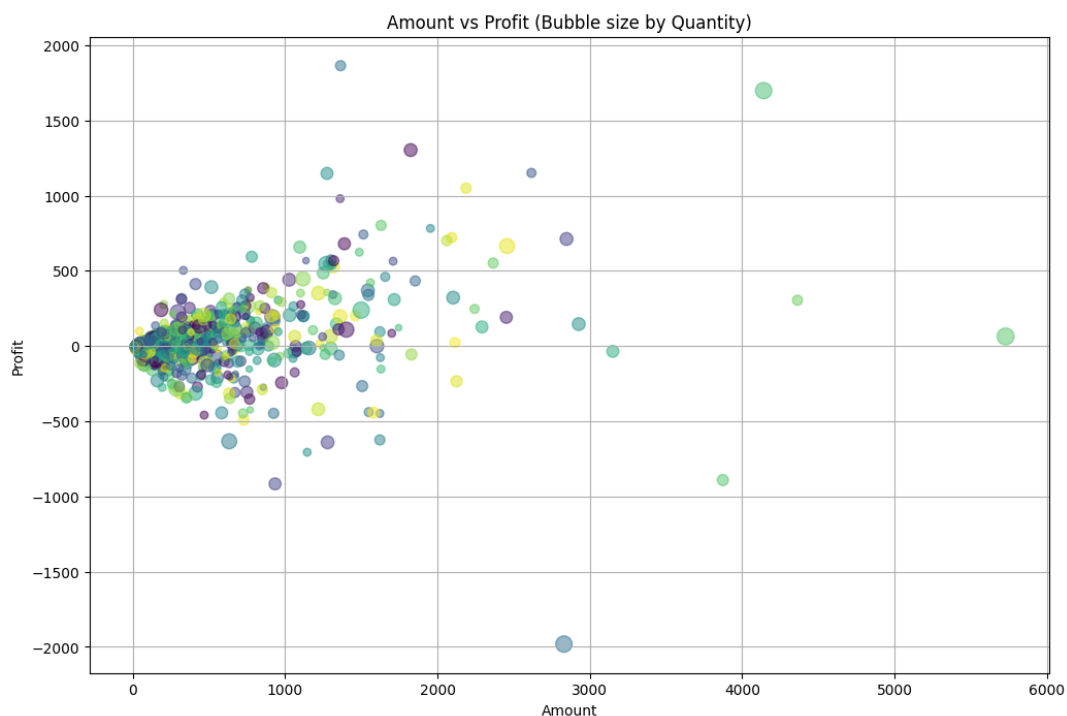
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4] Bubble Plot :- Amount vs Profit

A bubble plot is an extension of a scatter plot where each point is represented by a bubble. The size of the bubble represents an additional variable.



The bubble plot shows the relationship between the amount and profit, with the size of the bubbles representing the quantity sold. It helps visualize how different quantities sold impact the profit and amount. The plot shows that higher amounts do not always correlate with higher profits. The size of the bubbles indicates that larger quantities sold do not guarantee higher profits, highlighting the complexity of sales dynamics.

Conclusion :- In this experiment, we aimed to visualize Ecommerce sales data using Power BI. We created several charts to represent different aspects of the data. These visualizations together provided a comprehensive overview of sales performance, customer preferences, and product demand, helping us gain valuable insights into the business.