

**A  
INTERNSHIP REPORT  
on  
“PRODUCT SALES DASHBOARDS”**

*A report submitted in partial fulfillment of the requirements for the Award of Degree of*

**BACHELOR OF ENGINEERING**

**in**

**INFORMATION TECHNOLOGY**

**by**

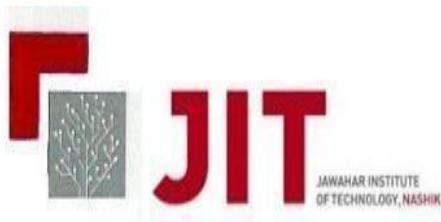
**Ms. Suprabha Prakash Potinde**

**Under Supervision of**

**Mr. Vijay Shirsath, CEO**

**Softcrowd Technologies, Nashik.**

**(Duration: 20th Dec, 2024 to 23th Jan, 2025)**



**DEPARTMENT OF INFORMATION TECHNOLOGY**

**JAWAHAR EDUCATION SOCIETY'S**

**INSTITUTE OF TECHNOLOGY, MANAGEMENT & RESEARCH, NASHIK**

(Approved by AICTE, New Delhi, DTE, Government of Maharashtra, Affiliated to Savitribai Phule Pune University, Pune)

**2024 – 2025**

**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**JAWAHAR EDUCATION SOCIETY'S**  
**INSTITUTE OF TECHNOLOGY, MANAGEMENT & RESEARCH, NASHIK**



## **CERTIFICATE**

This is to certify that the “**Internship report**” submitted by **Ms. Suprabha Prakash Potinde** is work done by her and submitted during 2024 – 2025 academic year, in partial fulfillment of the requirements for the award of the degree of **BACHELOR OF ENGINEERING IN INFORMATION TECHNOLOGY**, at **Jawahar Institute of Technology and Research, Nashik**.

**Internship Coordinator**  
**( Ms. D. D. Survase )**

**Head of Department**  
**( Prof. S. B. Patil )**

## Internship Completion Certificate



Changes for the Better  
www.softcrowdtechnologies.com

Date: 27<sup>th</sup> January, 2025

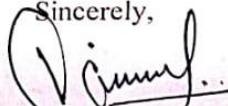
### Internship Completion Letter

This is to ensure that **Miss. Suprabha Prakash Potinde** has done her temporary position for a **1 Month** as a **Data Science Trainee Intern** at SoftCrowd Technologies, Nashik, Maharashtra from **20/12/2024 to 23/01/2025**.

During the temporary position she showed great abilities with a self-persuaded to learn new things. Her presentation surpassed assumptions and had the option to finish the tasks effectively on schedule.

We want her, to enjoy all that life has to offer for future undertakings.



Sincerely,  
  
Mr. Vijay Shirsath  
( Director )  
SoftCrowd Technologies

## **ACKNOWLEDGEMENT**

First I would like to thank **Mr. Vijay Shirsath , CEO, Head of Softcrowd Technologies** for giving me the opportunity to do an internship within the organization.

I also would like all the people that worked along with me of **Softcrowd Technologies** with their patience and openness they created an enjoyable working environment.

It is indeed with a great sense of pleasure and immense sense of gratitude that I acknowledge the help of these individuals.

I am highly indebted to Director Principal **Dr. M.V Bhatkar**, for the facilities provided to accomplish this internship.

I would like to thank my Head of the Department **Prof. S. B. Patil** for his constructive criticism throughout my internship.

I would like to thank **Ms. D. D . Survase** internship coordinator Department of Information Technology for their support and advices to get and complete internship

I am extremely great full to my department staff members and friends who helped me in successful completion of this internship.

**SUPRABHA PRAKASH POTINDE**

## **ABSTRACT**

### **Programmers and opportunities:**

The Institute combines pioneering research with top class education. An innovative curriculum allows the student flexibility in selecting courses and projects. Students, even at the undergraduate level, get to participate in on-going research and technology development - an opportunity unprecedented in India. As a result, a vibrant undergraduate programmer co-exists with a strong postgraduate programmer.

### **Methodology:**

This section can help stakeholders understand the process behind the data analysis and visualization. Clearly state the main objectives of the report. What questions are you trying to answer? What insights are you aiming to provide? Describe any transformations applied to the data, including merging tables, pivoting/unpivoting, and creating calculated columns. Discuss the types of visualizations chosen (e.g., bar charts, line graphs, maps) and the rationale behind these choices. Describe the layout and design principles used to create an intuitive and user-friendly dashboard. This methodology section provides a comprehensive overview of the processes involved in creating the Power BI report. It ensures transparency and helps stakeholders understand the rigor behind the data analysis and visualization efforts.

### **Key parts of the report:**

In existed system, users have to go that particular car and user should reserve it. Here, time consuming is more and there is no guarantee that car will come after waiting for long time. We will not able know the fair details of the distance of our journey

**Benefits to the company / institution through your report:**

The Institute combines pioneering research with top class education. An innovative curriculum allows the student flexibility in selecting courses and projects. Students, even at the undergraduate level, get to participate in on-going research and technology development - an opportunity unprecedented in India

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## **Learning Objectives/Internship Objectives**

- Internships are generally thought of to be reserved for college students looking to gain experience in a particular field. However, a wide array of people can benefit from
- Training Internships in order to receive real world experience and develop their skills.
- An objective for this position should emphasize the skills you already possess in the area and your interest in learning more
- Internships are utilized in a number of different career fields, including architecture, engineering, healthcare, economics, advertising and many more.
- Some internship is used to allow individuals to perform scientific research while others are specifically designed to allow people to gain first-hand experience working.
- Utilizing internships is a great way to build your resume and develop skills that can be emphasized in your resume for future jobs. When you are applying for a Training Internship, make sure to highlight any special skills or talents that can make you stand apart from the rest of the applicants so that you have an improved chance of landing the position.

**Daily Attendance Record**

Date	Signature of Student	Description of Work Carried Out	Signature of Supervisor / Guide
20/12/24	SPP	Introduction to Excel Interface, Data Types in Excel, Applying Calculations.	Desai
21/12/24	SPP	Relative and Absolute Cell Reference, Calculation Order Preference, Cell Errors.	Desai
24/12/24	SPP	Functions and Modifying Spreadsheets	Desai
24/12/24	SPP	Formatting the spreadsheet, Conditional Formatting, Illustrations	Desai
26/12/24	SPP	Charts :- Column Chart, Different chart types, sorting	Desai
27/12/24	SPP	Filters, Subtotals and custom sort	Desai
28/12/24	SPP	Format as Table, Duplicate Rows Treatment.	Desai
30/12/24	SPP	DSUM I, DSUM II and other Functions.	Desai
31/12/24	SPP	Subtotal Functions and Pivot Tables.	Desai
31/12/24	SPP	Grouping and Modifying Pivot Tables, Freeze Panes, IF Functions	Desai
01/01/25	SPP	Introduction to Power BI, Basic visuals : Bar, Pie, Donut, Funnel charts.	Desai
02/01/25	SPP	Advanced charts : Ribbon, Line, Area, combo, Scatter and Maps	Desai
03/01/25	SPP	Formatting Graphs, Power View, Dashboard Creation (Orders Dataset)	Desai
06/01/25	SPP	Introduction to Databases, Installation of MS SQL Server, ACID properties.	Desai
07/01/25	SPP	DDL operations :- Create, Alter, Drop, Truncate; SQL Constraints.	Desai

**Daily Attendance Record**

Date	Signature of Student	Description of Work Carried Out	Signature of Supervisor/Guide
08/01/25	SPP	DML Operations: Insert, update, Delete; Group By, Having, Aggregate Functions SQL Joins (outer, inner, left, Right, full) Subqueries (Pet, vet, owner Data)	Desai
09/01/25	SPP	Introduction to Python, Basic Operators Data Types, Variables, Control statements, Functions,	Desai
10/01/25	SPP	Object-oriented Programming. File Handling, Exception Handling	Desai
11/01/25	SPP	Practice on Loops & OOP concepts. Introduction to 1D & 2D Arrays, Arrays Indexing, Arithmetic & Logical operations.	Desai
13/01/25	SPP	Pandas :- Series, Data Frames, merging Data Frames, Data input & output.	Desai
14/01/25	SPP	matplotlib :- Data visualization, plotting, Grids, Labels, colors.	Desai
15/01/25	SPP	Build an ATM System in Python.	Desai
16/01/25	SPP	Data Analysis on cars Dataset.	Desai
17/01/25	SPP	Introduction to Machine Learning Predictive models, Regression Basics.	Desai
20/01/25	SPP	Simple Linear Regression,	Desai
21/01/25	SPP	multiple Linear Regression.	Desai
22/01/25	SPP	classification K-nearest Neighbours, SVC.	Desai
22/01/25	SPP	PCA and clustering: PCA on Random Dataset, K-Means Clustering.	Desai
23/01/25	SPP	Decision trees, Random Forest. Wine Quality & IRIS Dataset Analysis.	Desai

## 1. INTRODUCTION

In today's data-driven business environment, organizations are increasingly relying on advanced analytics tools to gain insights into their sales performance. A Product Sales Dashboard in Power BI serves as a powerful tool for visualizing and analyzing sales data, enabling businesses to make informed decisions and drive growth.

A product sales dashboard is a visual representation of sales data that allows businesses to monitor and analyze their product performance over time. It consolidates various data points into a single view, making it easier for stakeholders to understand sales trends, customer behavior and overall business performance.

The ability to visualize and interpret sales data effectively can be a game-changer for organizations aiming to enhance their market position and optimize their operations. This is where Power BI, Microsoft's robust business intelligence tool, comes into play, offering a comprehensive solution for creating dynamic product sales dashboards.

Sales dashboards serve as a critical component of a company's analytics strategy. They provide a centralized platform for monitoring sales performance, enabling businesses to track progress against targets, identify areas for improvement, and respond swiftly to market changes. A well-designed sales dashboard can transform complex data into actionable insights, allowing teams to focus on what matters most—driving revenue and improving customer satisfaction.

In a competitive marketplace, the ability to make data-driven decisions is paramount. Product sales dashboards in Power BI empower organizations to analyze historical sales data, understand customer preferences, and evaluate the effectiveness of marketing strategies.

## **2. ANALYSIS**

### **Introduction of Industry/ Organization, Types of Product and Services, History, Number of Employees**

Softcrowd Technologies is a company established in April 2017 . It has industry-specific software expertise in technology, healthcare, financial, media, manufacturing and many other sectors. This company specializes in offering Web Designing, Web Application Development, Mobile App Development, Software Development, Digital Marketing, Software Testing, Quality Assurance Services and many more.

Softcrowd Technologies aspire to be the global sourcing choice of the world market and revolutionizes the way service processes function. To reach out to the common people across the globe and making Information Technology a tool for the “MASS” along with the tool for the “CLASS”. Creating innovative IT solutions and provide IT-enabled services to delight customers worldwide and build Relationships based on Trust, Values and Professionalism.

Softcrowd Technologies has industry-specific software expertise in Technology, Financial, Healthcare, Media, Manufacturing, and many other sectors. The company specializes in offering Web Designing, Web Application Development, Mobile Application Development, Software Development, Digital Marketing, Software Testing, Quality Assurance services, and many more. We are a team of committed innovative, clientsensitive and experienced software professionals who always strive to deliver customized, cost- effective and long-term software solutions that complement our client's objective and result in a satisfied customer.

At Softcrowd Technologies, “Strive with Technology” to provide the most effective and affordable service that fulfills our customer's needs and budget. They provide customized websites and software solutions that suit customer's company objectives.

## **SERVICES PROVIDED BY SOFTCROWD TECHNOLOGIES**

### **WEB DEVELOPMENT**

Softcrowd Technologies is a web design studio that offers corporate web design and custom web design. Our website designers offer cheap website design that is user-friendly at the same time easily customizable. We offer both corporate web design as well as custom web design. Web design solutions include Complete Site Design from Scratch, Redesign of your existing website, Error correction in your website, New Sections in your current website, Complete revamp of your present website with old/new content and Daily site content maintenance

### **MOBILE APP DEVELOPMENT**

Android is the Latest technology. Most Companies Prefer using Android development because it is cheap and efficient with respect to speed and execution. Many Mobile Apps are developed in android because it provides a wide range of functionality.

Software on Android Application is used widely because it is available on every mobile, iPad and tablets. Android application is developed in cheap charges due to free availability with respect to other tools.

### **SOFTWARE DEVELOPMENT**

Software development is a process by which standalone or individual software is created using a specific programming language. It involves writing a series of interrelated programming code, which provides the functionality of the developed software. Software development may also be called application development and software design.

### **Web hosting**

Web hosting is a service that allows organizations and individuals to post a website or web page onto the Internet. A web host, or web hosting service provider, is a business that provides the technologies and services needed for the website or webpage to be viewed in the Internet. Websites are hosted, or stored, on special computers called servers. When Internet users want to view your website, all they need to do is type your website address or domain into their browser. Their computer will then connect to your server and your webpages will be delivered to them through the browser.

## **Bulk SMS**

Bulk sms is part of digital Marketing solution. Bulk SMS is easier way to communicate thousands of people just in second. You are able to send SMS in bulk with Single click from Desktop and Laptop by using our online Web portal with secure Username and Password.

## **Social Media marketing**

Whether it's creating your digital product or just designing it, whether it's engaging with your audiences or just marketing to them, we do it all.

Social media is the collective of online communications channels dedicated to community-based input, interaction, content-sharing and collaboration. Websites and applications dedicated to forums, micro blogging, social networking, social bookmarking, social curation, and wikis are among the different types of social media.

## **ERP**

The need of the hour for manufacturing industries to overcome aggressive business competition does not rest only with techno-savvy production line equipment's and gadgets, but also depends on smart usage of technology to leverage their true potential.

## **Products of Softcrowd Technology**

- Online Examination System
- ERP
- Magic Bricks Application
- Food Delivery Application
- Online Service Provider Application
- Home Automation System
- E-commerce Application

## 3. SYSTEM REQUIREMENTS SPECIFICATIONS

### 3.1 Functional Requirements

- **Data Sources:** List the data sources that will be integrated (e.g., SQL databases, Excel files, cloud services). Specify any APIs or data connectors required.
- **Data Processing:** Describe the data cleaning, transformation, and modelling processes. Specify any DAX calculations or measures that need to be implemented.
- **Dashboard Features:**
  - **Visualizations:** List the types of visualizations required (e.g., bar charts, line graphs, pie charts, maps).
  - **Interactivity:** Specify features such as filters, slicers, drill-throughs, and tooltips.
  - **User Roles:** Define different user roles and their access levels (e.g., admin, viewer).
- **Export and Sharing:** Describe the requirements for exporting reports (e.g., PDF, Excel). Specify sharing options (e.g., sharing via Power BI Service, embedding in other applications).

### 3.2 Non-Functional Requirements

- **Performance:** Specify performance requirements, such as load times for dashboards and data refresh rates.
- **Usability:** Define usability requirements, including user interface design principles and accessibility standards.
- **Security:** Outline security requirements, including data encryption, user authentication, and row-level security (RLS).
- **Scalability:** Describe the expected scalability of the dashboards to accommodate growing data volumes and user numbers.
- **Compliance:** Specify any compliance requirements (e.g., GDPR, HIPAA) that the dashboards must adhere to.

### 3.3 System Requirements

- **Hardware Requirements:**
  - **Client-Side:** Specify the minimum and recommended hardware specifications for users accessing the dashboards (e.g., CPU, RAM, storage).
  - **Server-Side:** If applicable, outline the server requirements for hosting data sources or Power BI Report Server.

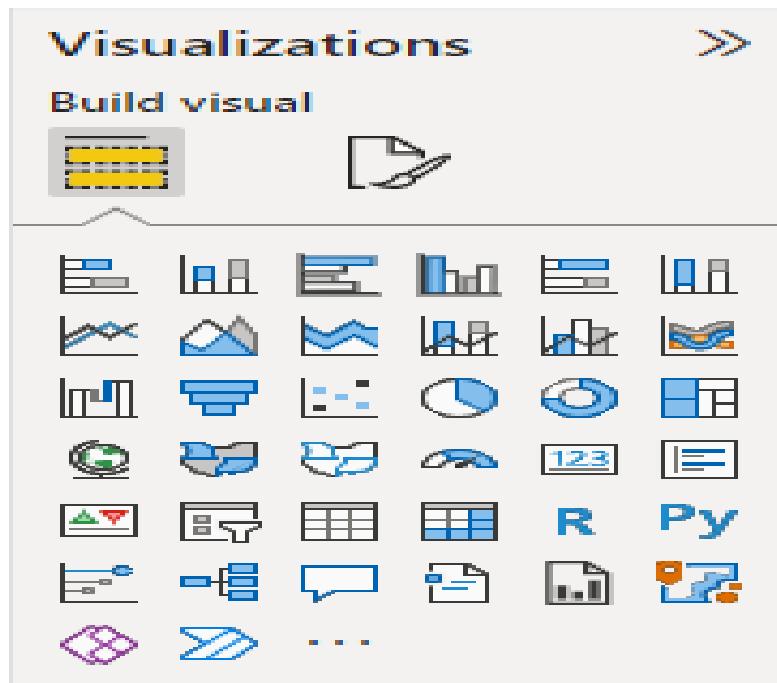
- **Software Requirements:**
  - **Power BI Desktop:** Specify the version and any prerequisites for Power BI Desktop.
  - **Power BI Service:** Outline any requirements for using Power BI Service (e.g., licensing).
  - **Operating Systems:** List supported operating systems for client machines (e.g., Windows, macOS).
- **Network Requirements:** Specify network bandwidth requirements for optimal performance, especially for cloud-based data sources.

## 4. TECHNOLOGY

A Power BI report is a multi-perspective view into a semantic model, with visuals that represent findings and insights from that semantic model. A report can have a single visual or many pages full of visuals. Depending on your job role, you might be someone who designs reports, or you might be a business user who consumes reports. This article is for business users. Power BI bases a report on a single semantic model. Report designers create the visuals in a report to represent pieces of information. Presenting data as visuals makes it easier to grasp the meaning of what you're seeing. And, the visuals aren't static. They update as the underlying data changes. The designers do the pre-work, adding visuals that they believe are interesting. But you get to explore and dig deeper. You interact with the visuals and filters as you dig into the data to discover insights and find answers. The extent of what you can do with a report depends on your role and the permissions the report designer assigns to you.

### 1. Visualization Pane

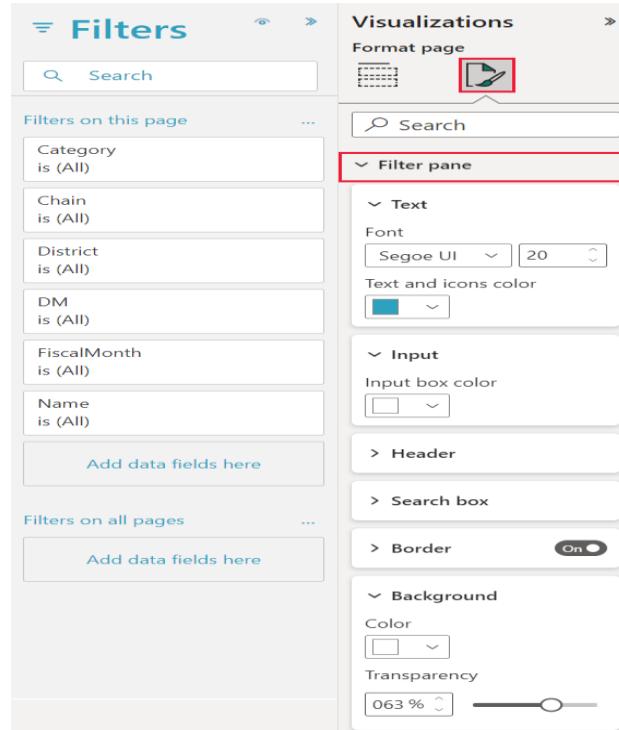
The small icons show the different types of visualizations you can create. If you start building a visualization by selecting fields without selecting a visualization type first, Power BI picks the visualization type for you. You can keep Power BI's selection, or change the type by selecting a different icon.



### 2. Filter Pane

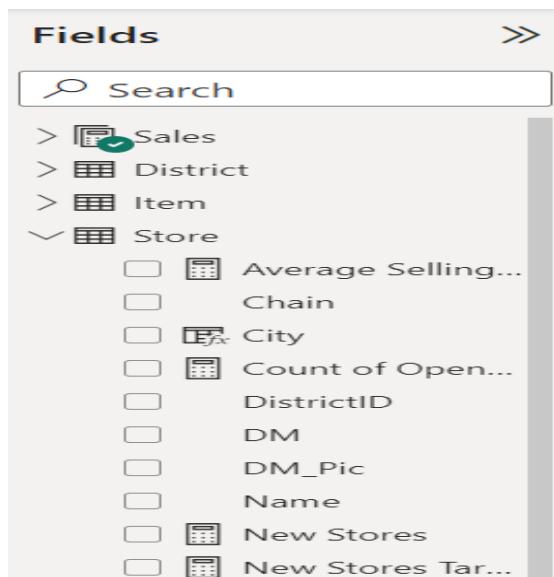
Use the Filters pane to view, set, and modify persistent filters to your reports at the page, report, drill-through, and visual-level. Yes, you can do ad-hoc filtering on report pages and visuals by

selecting elements of the visuals or by using tools like slicers. Filtering in the Filters pane has the advantage that the state of the filters is saved with the report.



### 3. Field Pane

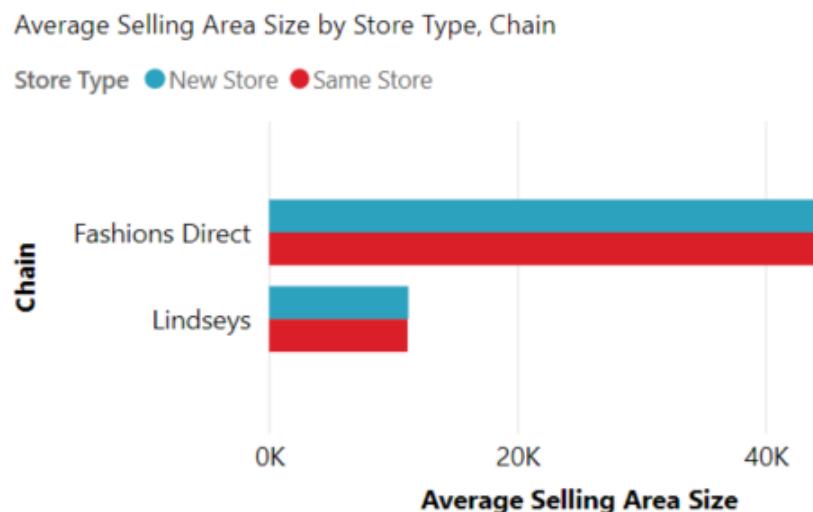
The Fields pane displays the tables, folders, and fields in your data that are available for you to use to create visualizations. Drag a field onto the page to start a new visualization. You can also drag a field onto an existing visualization to add the field to that visualization. When you add a checkmark next to a field, Power BI adds that field to the active or new visualization. It also decides which bucket to place that field into.



## 4.1 Stacked Bar Chart

A stacked bar chart is a type of chart that represents the total of different categories stacked on top of one another for each item in a category. It allows for easy comparison of the total values across categories while also highlighting the contributions of individual sub-groups.

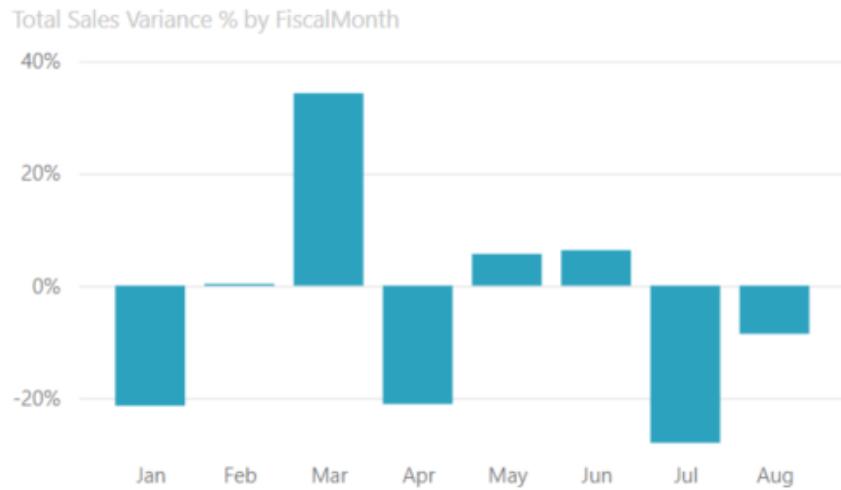
- **Categories on X-axis:** Each bar represents a different product category: Sports, Clothing, Toys, Electronics, Home & Kitchen, Books, and Beauty.
- **Categories on Y-axis:** The height of each segment within the bars represents the sum of sales or quantities sold, indicating performance or distribution in each category.



## 4.2 Stacked Column Chart

Used to show the total of different categories while comparing the sub-categories within each major category. Each column represents a main category (e.g., product types like Sports, Clothing, Toys, etc.). Each section of a stacked column represents a sub-category or division within the product type, indicating the distribution of sales data.

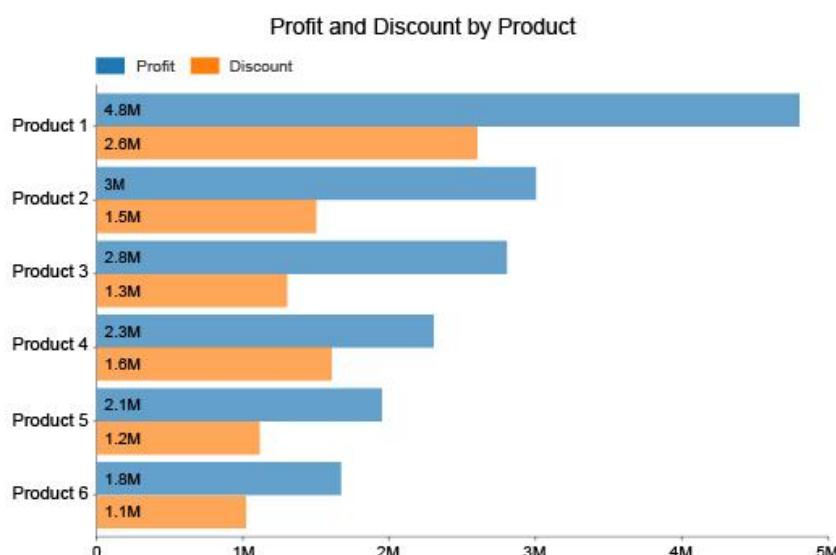
- The **X-axis** typically displays product categories.
- The **Y-axis** indicates the numeric value (like sales quantities or totals).



### 4.3 Clustered Bar Chart

A clustered bar chart is a graphical representation that uses bars to display and compare multiple sets of data across categories. Clustered bar charts are an effective tool for visualizing multi-dimensional data, making them valuable for business insights, performance tracking, and decision-making processes.

- **Multiple Data Series:** Represents different data series for each category, making comparisons straightforward.
- **Grouped by Category:** Categories are often grouped together on the x-axis, with separate colored bars for each series.
- **Orientation:** Bars can be horizontal or vertical, with vertical being more common for clustered bar charts.

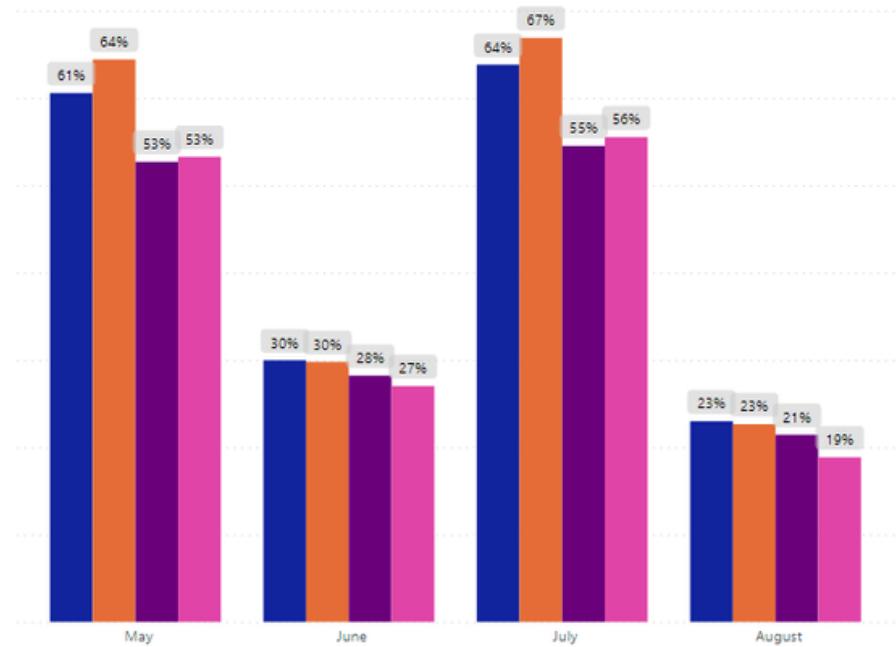


#### 4.4 Clustered Column Chart

A clustered column chart is commonly used for comparing values across different categories.

By understanding and utilizing clustered column charts effectively, businesses can gain valuable insights into performance trends and comparisons. Display multiple series of data for easy comparison within categories.

- **Horizontal Axis (X):** Displays different categories (e.g., product types, regions).
- **Vertical Axis (Y):** Represents the value of the data (e.g., quantity sold, total sales).



#### 4.5 Line Chart

The line chart is visually clear with color coding based on product category, facilitating easy identification of trends and data points. The line indicates fluctuating sales across the different categories, with notable values recorded for each category

- **Y-Axis:** Represents the sales figures, ranging from approximately 3600 to 4200.
- **X-Axis:** Displays product categories, including:



#### 4.6 Area Chart

An area chart is a graphical representation of data that uses filled areas to show the magnitude of values over a continuous interval. Certain categories may show higher sales than others (e.g., Clothing tends to have higher peaks) Fluctuations in sales can be visualized, allowing for quick analysis of which product categories are more popular or performing better.

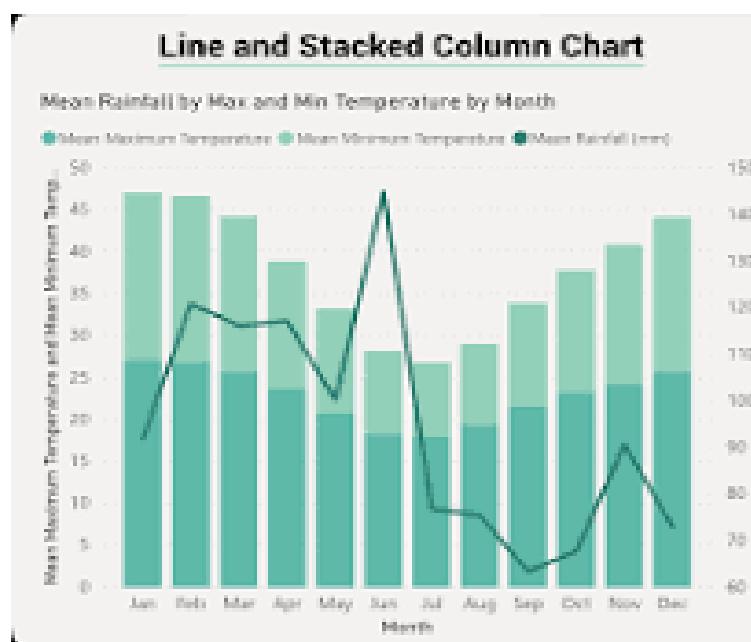
- **X-Axis:** Represents different product categories, such as Sports, Clothing, Toys, Electronics, Home & Kitchen, Books, and Beauty.
- **Y-Axis:** Displays the corresponding sales figures, ranging from a minimum of around 3600 to a maximum of approximately 4200.



## 4.7 Line Stacked Column Chart

A line stacked column chart combines two types of visualizations: stacked columns and a line chart. It is ideal for displaying both individual category values (in stacked columns) and the overall trend (in a line). The chart shows individual contributions of categories while also illustrating the trend over time or between different categories.

- **Categorical Data:** Utilizes categorical data for a clear comparison of parts to a whole.
- **Trend Analysis:** The line chart overlays the columns, making it easy to observe trends across different time periods or categories.



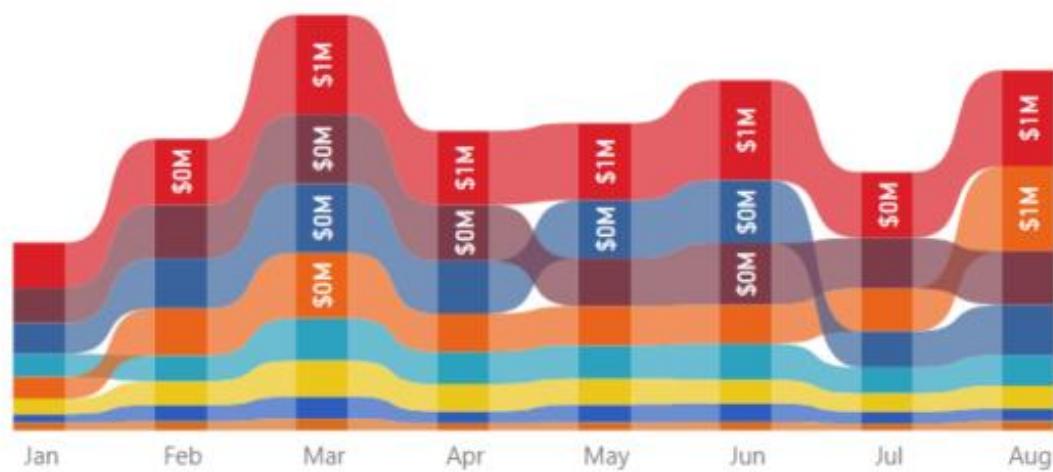
## 4.8 Ribbon Chart

A ribbon chart is a data visualization tool that allows users to see variations in data across multiple categories and how these categories relate to each other over time or across a dimension. Ribbon charts are effective in providing a complex overview of data dynamics, allowing businesses to visualize relationships and trends over time efficiently.

- **Data Relationship:** Illustrates the flow and connection between different categories over a timeline or in a categorical hierarchy
- **Visual Relationship:** Uses colored ribbons that connect various segments or categories, showing entire trends and making it easy to identify changes and relationships.

### This Year Sales by FiscalMonth and Category

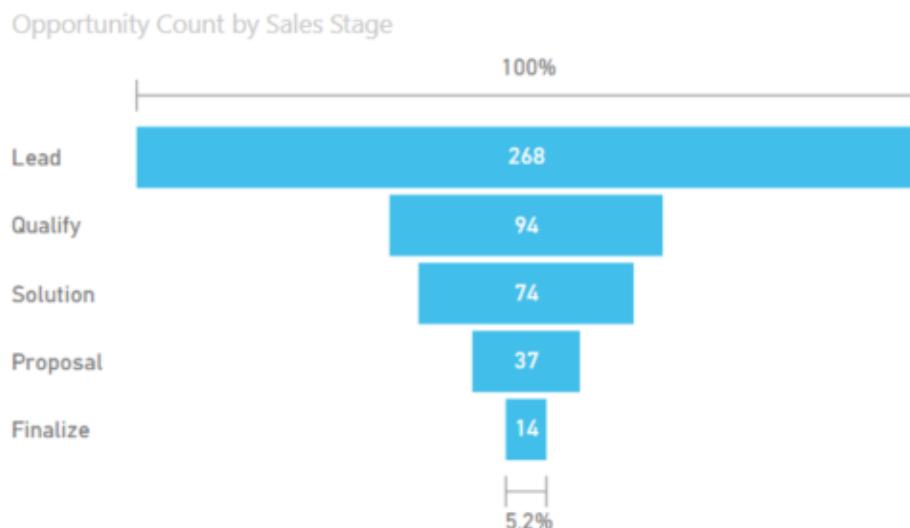
Category 010-Womens 020-Mens 030-Kids 040-Junior 060-Intimate 070-Hosiery



### 4.9 Funnel Chart

A funnel chart is a visualization tool commonly used in sales, marketing, or analytics to represent the progressive reduction of data as it passes through a defined process. Here's a breakdown based on the provided dashboard image. A funnel chart effectively summarizes complex data sets by visualizing transitions through stages, making it invaluable for performance analysis in sales and marketing.

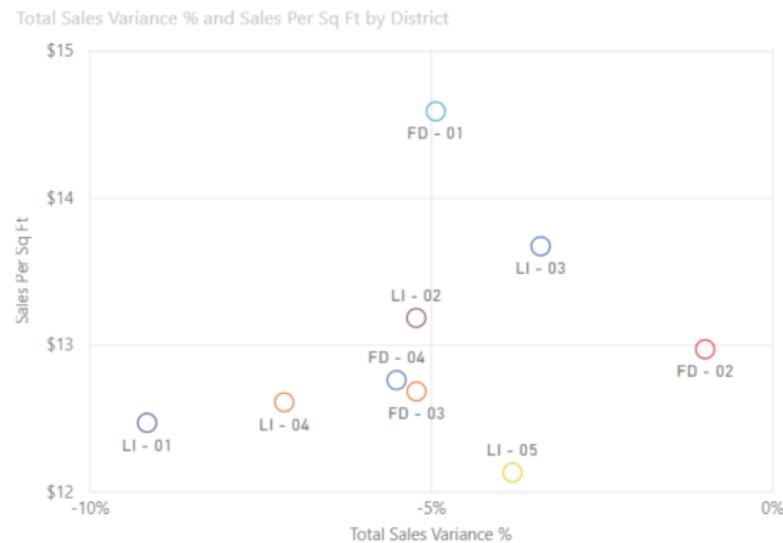
- Visual Representation:** Funnel charts visually depict stages in a process. Each segment of the funnel represents a stage where data is filtered down.
- Stage-by-Stage Analysis:** They provide insights into how many items pass from one stage to the next, helping identify drop-off points.



## 4.10 Scatter Chart

A scatter chart is a data visualization tool used to represent values for typically two different variables for a set of data. A scatter chart is an effective way to visualize complex relationships between variables, helping businesses make informed decisions based on data insights. Understanding the visual representation of data can drive strategic decisions and identify areas for growth.

- **Data Representation:** Each point on the scatter chart represents an individual data point. The chart can show trends, correlations, and distributions of the data points.
- **Interpretation:** Patterns may indicate relationships or correlations between variables. Clusters of points can highlight groupings or categorizations of data. Outliers can be identified as points that deviate significantly from the overall pattern.



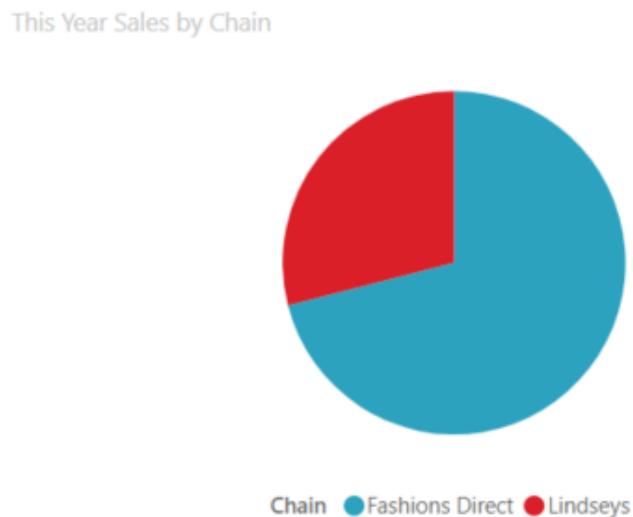
## 4.11 Gauge Chart

A gauge chart visually represents quantitative values within a defined range, typically used to indicate performance measures, such as sales figures or other KPIs (Key Performance Indicators). The gauge displays a numeric value (1.71K) which likely represents a key metric (e.g., sales, quantity sold) against a defined scale (0 to 6K). It facilitates easy visualization of progress towards a goal or target.



#### 4.11 Pie Chart

The pie chart illustrates the distribution of sales across different regions. This pie chart and the accompanying data provide a comprehensive overview of the sales performance across different regions, useful for strategic business decision-making.



#### 4.12 Waterfall Chart

A waterfall chart shows a running total as values are added or subtracted. It's useful for understanding how an initial value (for example, net income) is affected by a series of positive and negative changes. The columns are color coded so you can quickly tell increases and decreases. The initial and the final value columns often start on the horizontal axis, while the intermediate values are floating columns. Because of this "look", waterfall charts are also called bridge charts.

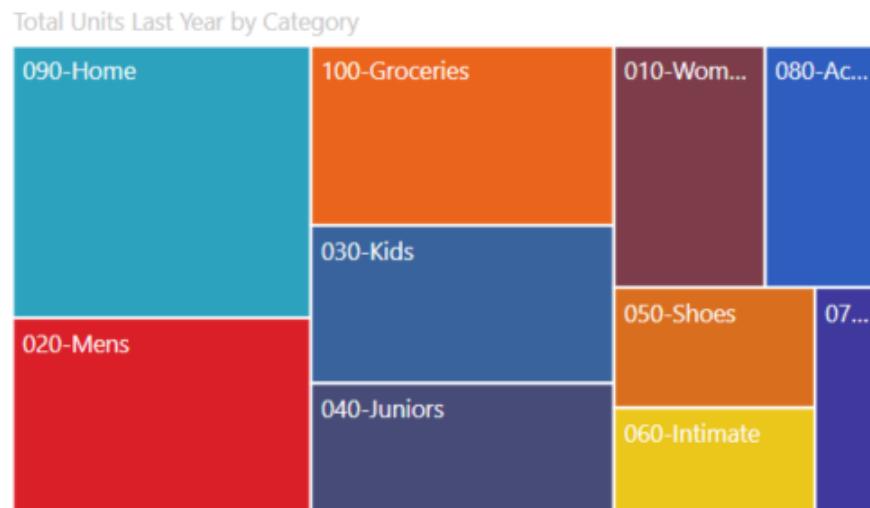
Total Units Last Year by Category

● Increase ● Decrease ● Total



#### 4.13 Tree-map

Tree-maps are charts of colored rectangles, with size representing value. They can be hierarchical, with rectangles nested within the main rectangles. The space inside each rectangle is allocated based on the value being measured. And the rectangles are arranged in size from top left (largest) to bottom right (smallest).

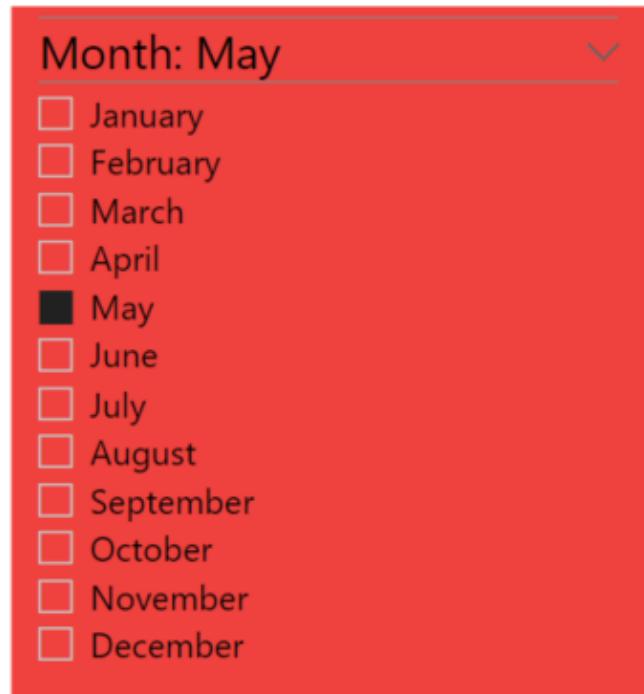


#### 4.14 Slicer Chart

The slicer chart allows users to filter and analyze various aspects of product sales data efficiently. The slicer chart is a valuable tool in the Product Sales Insights Dashboard, facilitating comprehensive analysis and decision-making based on visualized data metrics. Users can adjust the slicers to focus on specific regions, product categories, and order statuses.

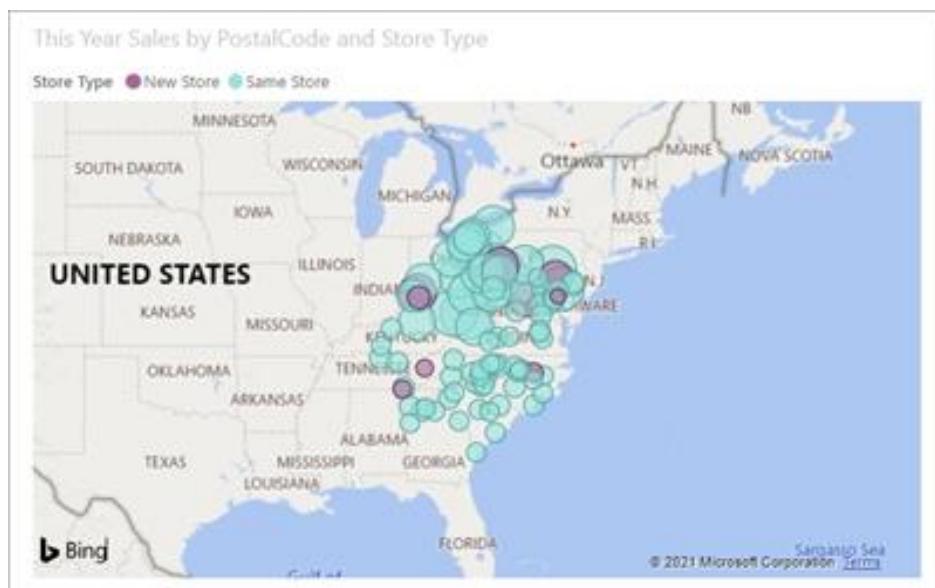
- **Visual Representation:** Different types of charts are used (e.g., pie charts, bar graphs) to visualize sales quantities and financial metrics.

- **Region Filter:** Categories: Asia, Australia, Europe, North America, South America
- **Order Status:** Options: Cancelled, Completed, Pending, Returned

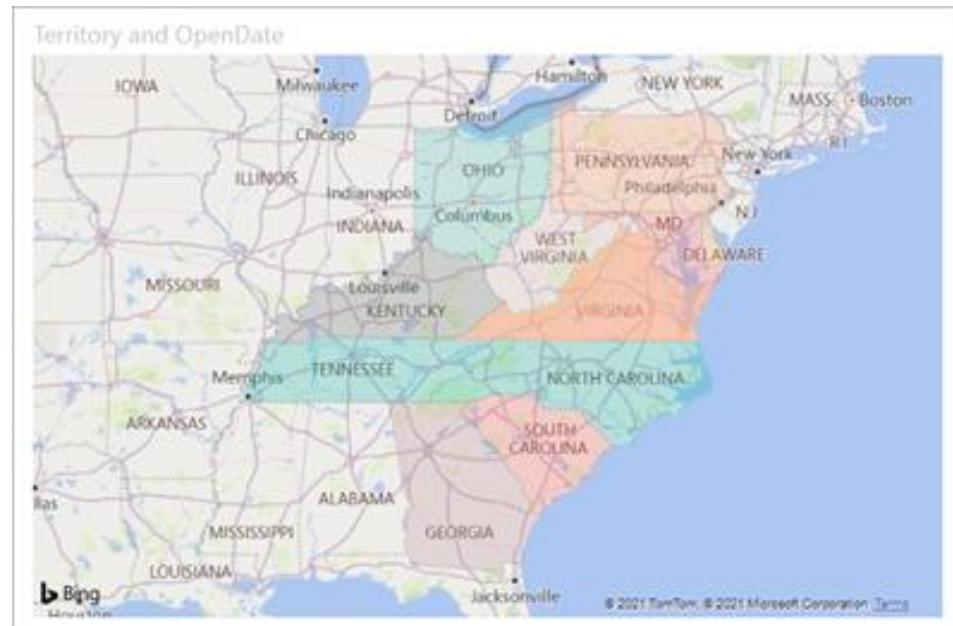


#### 4.15 Maps

**Basic Maps:** Use a basic map to associate both categorical and quantitative information with spatial locations.



**Filled map:** A filled map uses shading or tinting or patterns to display how a value differs in proportion across a geography or region. Quickly display these relative differences with shading that ranges from light (less-frequent/lower) to dark (more-frequent/more).



## 5. SCREENSHOTS

First Dashboard :

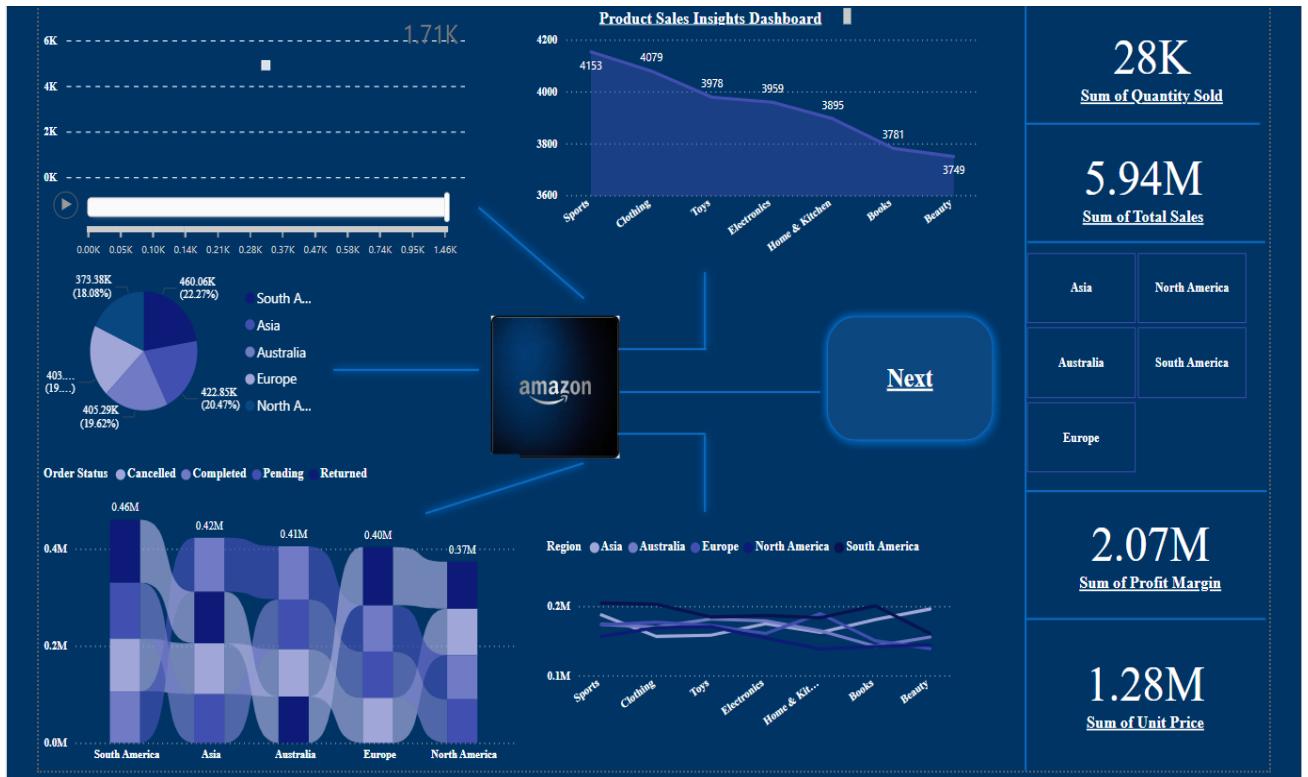


Fig. 1

First dashboard using Scatter chart, Pie chart, Ribbon chart, Line chart, Area chart , Cards, Buttons, Logos

## Second Dashboard :

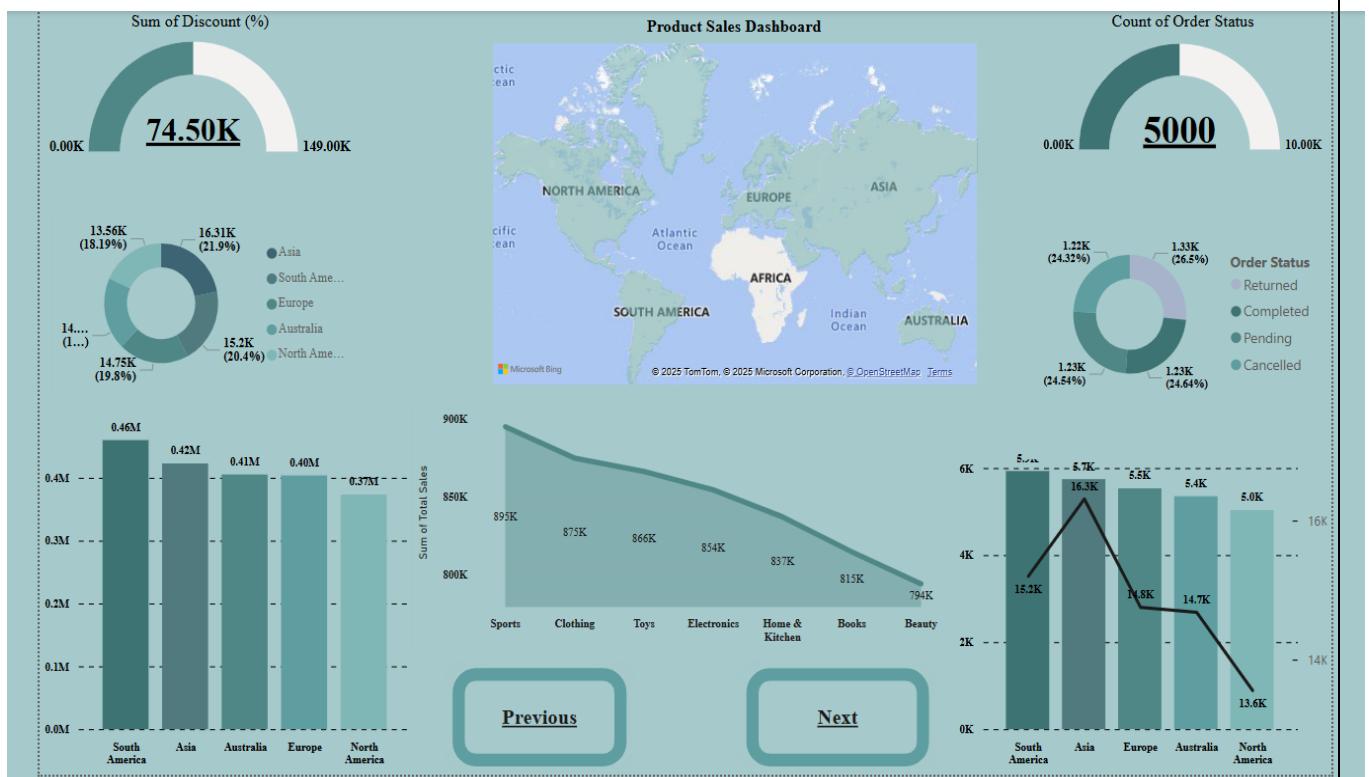


Fig. 2

Second dashboard using Gauge, Donut chart, Stacked column chart, Stacked area chart, Buttons, Line and stacked column chart, Maps

### Third Dashboard :

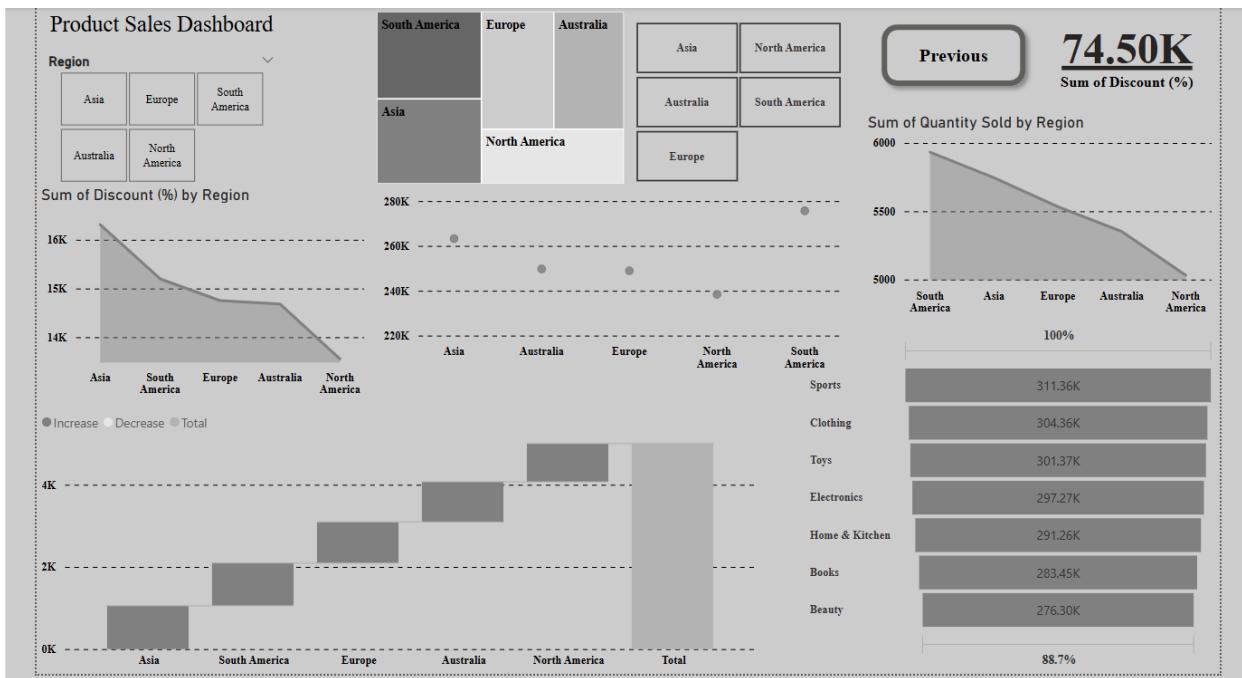


Fig. 3

Third dashboard using Slicer, Treemap, Waterfall chart, Funnel chart, Stacked area chart, Slicer, Button, Card

## 6. TASK COMPLETION

### EXCEL

Introduction to Excel Interface, Data Types in Excel, Applying Calculations Relative and Absolute Cell Reference, Calculation Order Preference, Cell Errors

Function and Modifying Spreadsheets

1. *Formatting the Spreadsheets, Conditional Formatting, Illustrations*

Student Data							
Student	s1	s2	s3	s4	percentage		
DBMS	55	40	42	57	0.268867925	subjects	
SE	30	51	38	45	0.212264151		
PA	57	49	32	29	0.136792453		
CG	53	56	45	35	0.16509434		
M3	50	52	41	46	0.216981132		
Total	245	248	198	212			
avg	49	49.6	39.6	42.4			
min	30	40	32	29			
aggregate function	max	57	56	45	57		
	count	5	5	5	5		
	gst	18%	44.1	44.64	35.64	38.16	

2. *Filters, Sub-Totals and Custom Sort*

Subtotal		
Buyers	Products	Price
Saurabh	A	15
Pratibha	A	36
Rushi	A	10
<b>A Total</b>	0	61
Siddhant	B	18
Akshada	B	65
<b>B Total</b>	0	83
Amruta	C	74
Rahul	C	52
<b>C Total</b>	0	126
<b>Grand Total</b>	0	270



### 3.Format as Table, Duplicate Rows Treatment

ID	NAME
1	A
2	B
3	C
4	D
5	E
2	B
6	T
4	D

ID	NAME
1	A
2	B
3	C
4	D
5	E

### 4.DSUM I.DSUM II, and Other functions

ID	PRODUCT	COUNTRY	PRICE
1	S	q	12
2	A	w	52
3	U	e	14
4	R	t	16
5	A	y	74
7	H	i	16
8	S	m	15
9	A	p	21
10	U	e	20
unhide			259
hide			240

DSUM	
PRODUCT	PRICE
S	27

DSUM		
PRODUCT	COUNTRY	PRICE
S	m	15

Column	D AVG
A	49

Column	Column	Column
A	p	21

DCOUNT	
PRODUCT	PRICE
A	3

PRODUCT	COUNTRY	PRICE
U	e	2

D MIN	
PRODUCT	PRICE
A	21

PRODUCT	COUNTRY	PRICE
U	e	14

D MAX	
PRODUCT	PRICE
A	74

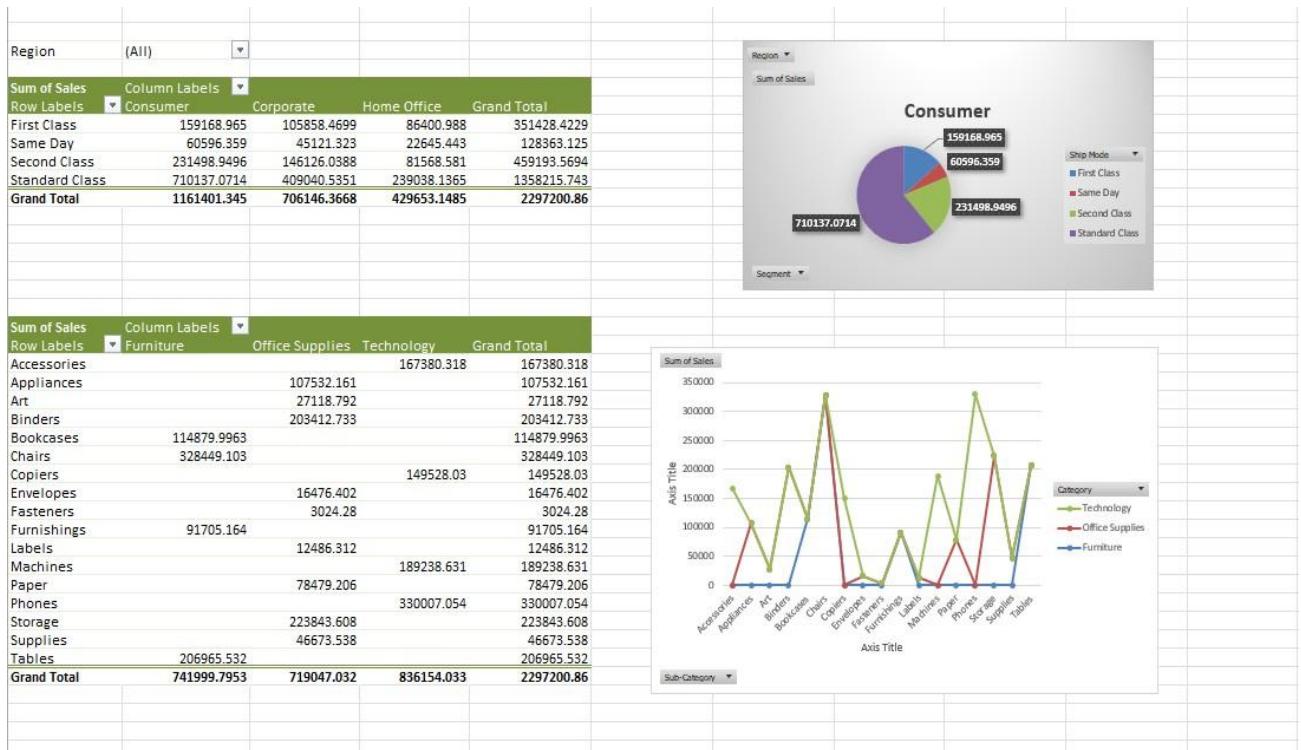
  

PRODUCT	COUNTRY	PRICE
U	e	20

### 5.Pivot Table

Grouping and Modifying Pivot tables, Freeze panes

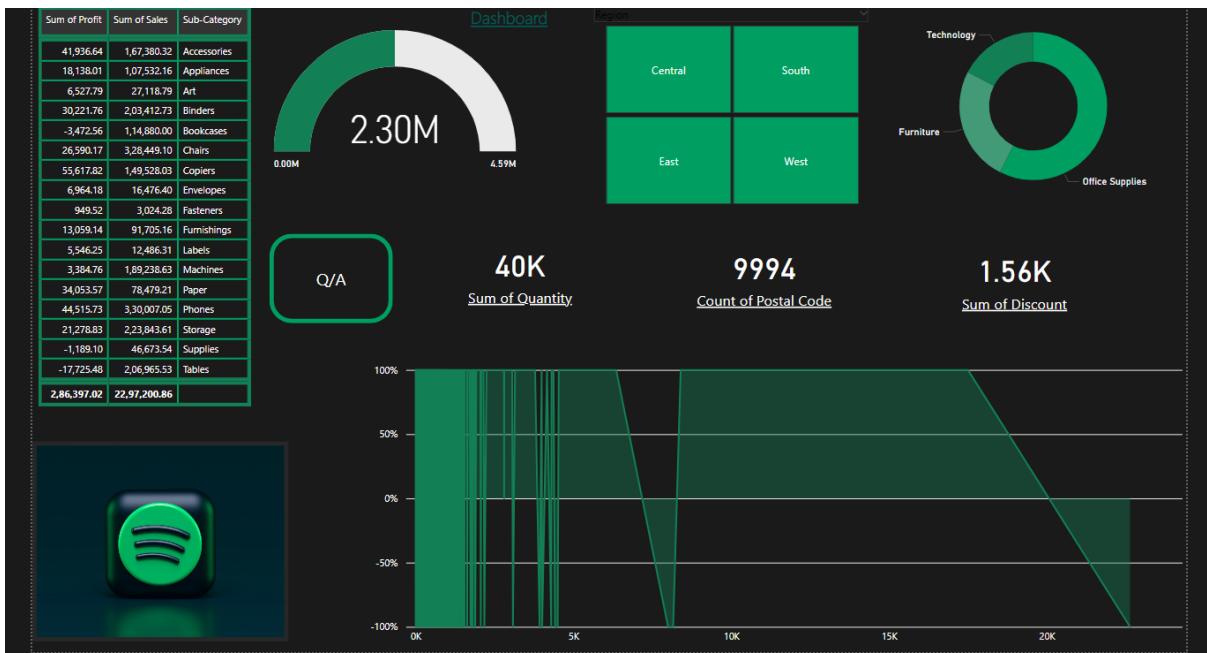
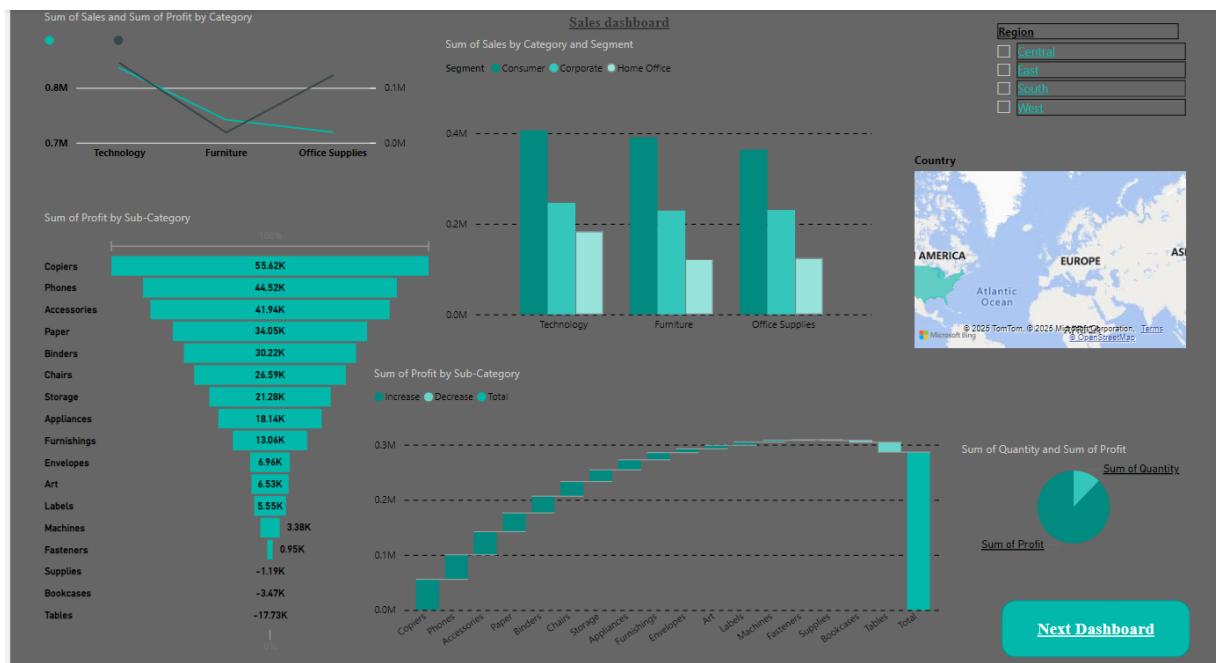
Sum of Sales		Column Labels				
Row Labels	Central	East	South	West	Grand Total	
Consumer	252031.434	350908.167	195580.971	362880.773	1161401.345	
Corporate	157995.8128	200409.347	121885.9325	225855.2745	706146.3668	
Home Office	91212.644	127463.726	74255.0015	136721.777	429653.1485	
<b>Grand Total</b>	<b>501239.8908</b>	<b>678781.24</b>	<b>391721.905</b>	<b>725457.8245</b>	<b>2297200.86</b>	

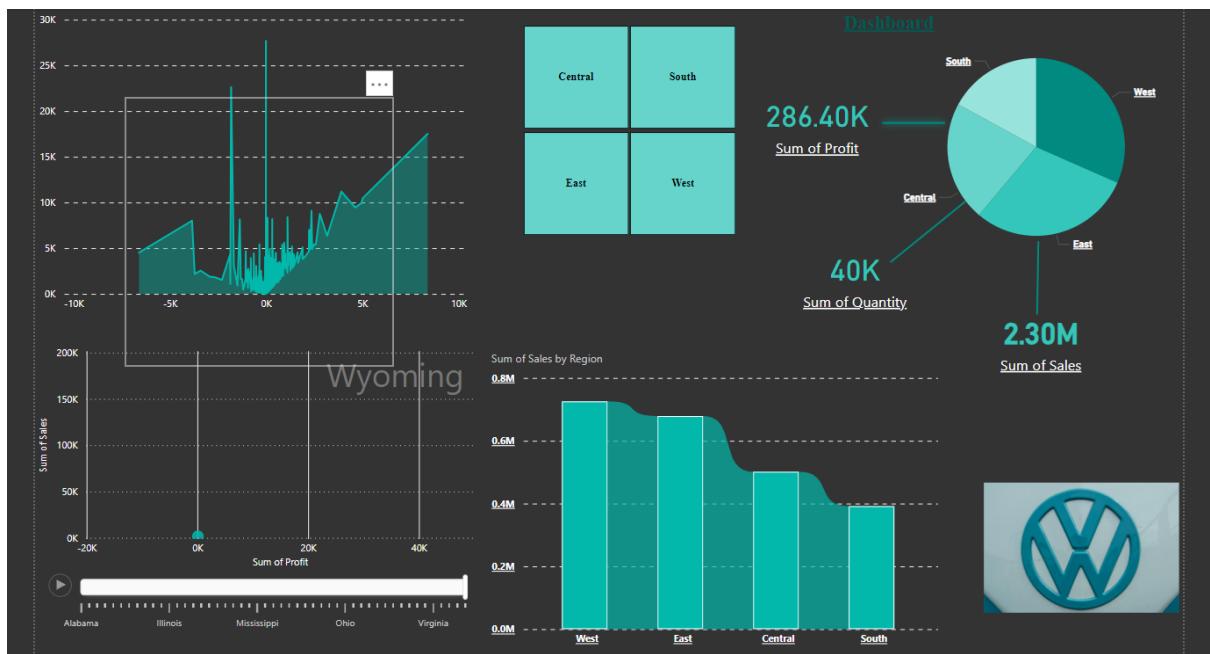


# POWER BI

Introduction to Power-BI, Basic Visuals: Bar, Pie, Donut , Funnel Charts. Advances chart Ribbon, Line, Area, Combo, Scatter and Maps all charts, Button, Drill through , All action buttons, Shapes. Formatting, Power view, Dashborad creation

## Final Dashboards

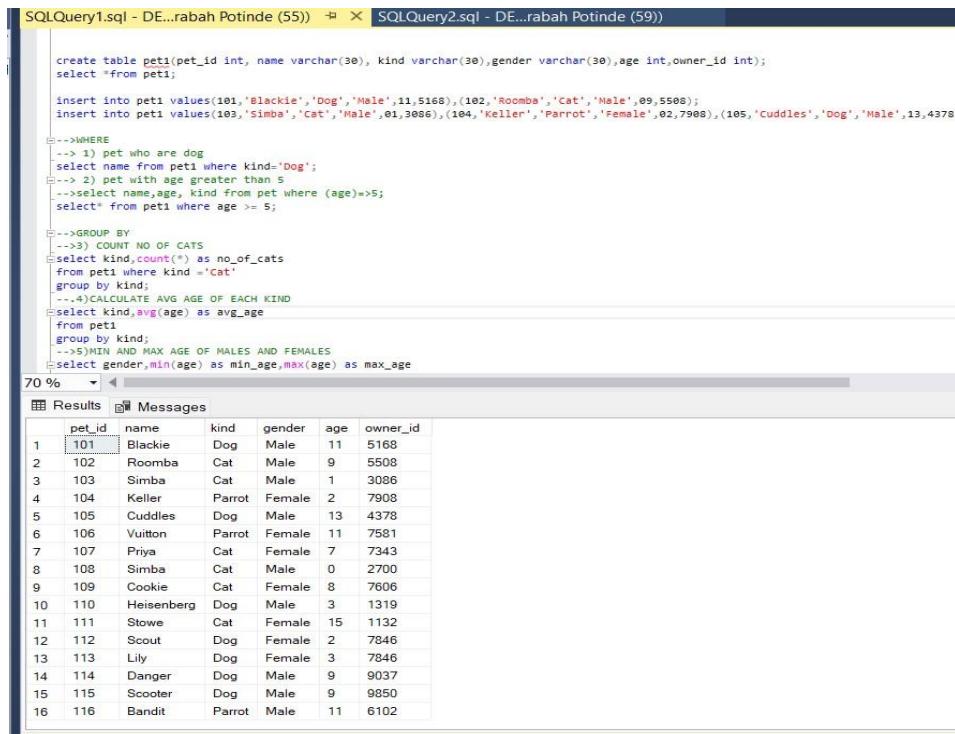




# SQL

Introduction to Databases ,Installation of MS SQL SERVER ,ACID properties

*DDL operations: Create,Alter,Drop,Truncate;SQL constraints*



The screenshot shows a SQL Server Management Studio interface. The top window is titled "SQLQuery1.sql - DE...rabah Potinde (55)" and contains a complex SQL script. The bottom window is titled "Results" and displays a table of pet data.

```
create table pet1(pet_id int, name varchar(30), kind varchar(30),gender varchar(30),age int,owner_id int);
insert into pet1 values(101,'Blackie','Dog','Male',11,5168),(102,'Roomba','Cat','Male',9,5508);
insert into pet1 values(103,'Simba','Cat','Male',1,3086),(104,'Keller','Parrot','Female',2,7908),(105,'Cuddles','Dog','Male',13,4378);

-->WHERE
--> 1) pet who are dog
select name from pet1 where kind='Dog';
--> 2) pet with age greater than 5
-->select name,age, kind from pet where (age)>=5;
select* from pet1 where age >= 5;

-->GROUP BY
-->> COUNT NO OF CATS
select kind,count(*) as no_of_cats
from pet1 where kind = 'Cat'
group by kind;
-->CALCULATE AVG AGE OF EACH KIND
select kind,avg(age) as avg_age
from pet1
group by kind;
-->>MIN AND MAX AGE OF MALES AND FEMALES
select gender,min(age) as min_age,max(age) as max_age
```

pet_id	name	kind	gender	age	owner_id
1	101	Blackie	Dog	Male	11
2	102	Roomba	Cat	Male	9
3	103	Simba	Cat	Male	1
4	104	Keller	Parrot	Female	2
5	105	Cuddles	Dog	Male	13
6	106	Vuitton	Parrot	Female	11
7	107	Priya	Cat	Female	7
8	108	Simba	Cat	Male	0
9	109	Cookie	Cat	Female	8
10	110	Heisenberg	Dog	Male	3
11	111	Stowe	Cat	Female	15
12	112	Scout	Dog	Female	2
13	113	Lily	Dog	Female	3
14	114	Danger	Dog	Male	9
15	115	Scooter	Dog	Male	9
16	116	Bandit	Parrot	Male	11

```

---right join
select student.name, Studentcourse.course_id, student.roll_no,
Studentcourse.course from student_final student
right join Studentcourse
on student.roll_no=Studentcourse.roll_no;

---Full Outer Join

select student.name, Studentcourse.course_id, student.roll_no,
Studentcourse.roll_no from student_final student
full join Studentcourse
on Studentcourse.roll_no=student.roll_no;

---Cross Join

select * from student_final cross join Studentcourse;

---self join
CREATE TABLE self (
    emp_id INT,
    emp_name VARCHAR(50),
    salary INT,
    manager_id INT
);

```

98 %

Results Messages

roll_no	name	city	age	course_id	roll_no	course
1	Harsh	Delhi	18	1	1	Data Science
2	Pratik	Bihar	19	1	1	Data Science
3	Riyanka	Bihar	20	1	1	Data Science
4	Deep	Bihar	18	1	1	Data Science
5	Saptarhi	Bihar	19	1	1	Data Science

```

---Give Name & ID of pets who have been treated by Vet

select pet_id, name from pets
where pet_id in(select pet_id from Vet);

---Display name,kind and age of pets
---whose age is equal to average age of all pets

select name,kind,age from pets
where age in (select avg(age) from pets);

select name,kind,age from pets
where age=(select avg(age) from pets);

---Give name and occupation of owners who have a pet treated for
---ear or skin infection

select name,occupation from Owners
where owner_id in(select owner_id from pets
where pet_id in (select pet_id from vet
where disease='Ear Infection' or disease='Skin Infection'));

```

98 %

Results Messages

name	occupation
Hasan Ansari	chef
Tanishka Ahire	teacher
Stanley Dsouza	lawyer
Gagan Sharma	businessman

```

enter the number:
Number is even

In [1]: a = int(input("Enter a:"))
b = int(input("Enter b:"))
c = int(input("Enter c:"))

if a>b and a>c:
    print("a is largest")
if b>a and b>c:
    print("b is largest")
if c>a and c>b:
    print("c is largest")

Enter a: 45
Enter b: 45
Enter c: 34
b is largest

In [2]: number = int(input("Enter the number"))
if number==10:
    print("number is equal to 10")
elif number==50:
    print("number is equal to 50")
elif number==100:
    print("number is equal to 100")
else:
    print("number is not equal to 10, 50 or 100")

Enter the number:
number is not equal to 10, 50 or 100

```

```

In [8]: #variable_name[start:stop:step]
# start->included
# stop->excluded
# step->1

In [16]: ll = [123, "string", 6.265, True, None]

In [18]: ll[0] = "Abcd"
         i

In [19]: ll
Out[19]: ['Abcd', 'string', 6.265, True, None]

In [ ]:

```

BREAK	CONTINUE	PASS
<pre>s = "python" for i in s:     if i == 'h':         break print(i)</pre>	<pre>s = "python" for i in s:     if i == 'h':         continue     print(i)</pre>	<pre>s = "python" for i in s:     if i == 'h':         pass     print(i)</pre>

```

def student(name,age,*args):
    print("Name: ", name)
    print("Age: ", age)

    for i in args:
        print("printing")
        print(i)

student("Raj",20,10,20,30,40)

```

Name: Raj  
Age: 20  
printing  
10  
printing  
20  
printing  
30  
printing  
40

```

def student(name,age,**kwargs):
    print("Name: ", name)
    print("Age: ", age)

    for key,value in kwargs.items():
        print(key,"-",value)

student("Raj",20,maths=90,science=100,history=80)

```

Name: Raj  
Age: 20  
maths : 90  
science : 100  
history : 80

```

In [5]: try:
    a = int(input("Enter a:"))
    b = int(input("Enter b:"))
    c = a/b
    print(c)
except:
    print("Can't divide with zero")
Enter a:12
Enter b:2
6.0

```

```

In [6]: try:
    a = int(input("Enter a:"))
    b = int(input("Enter b:"))
    c = a/b
    print("a/b = %d"%c)
# using Exception with except statement. If we print(Exception) it will return exception class
except :
    print("can't divide by zero")
else:
    print("Hi I am else block")
Enter a:12
Enter b:4
a/b = 3
Hi I am else block

```

```

]: f = open("abc.txt","w")
f.write("hellow good afternoon everybody")
f.close()
f = open("abc.txt", "r")
print(f.read())
f.close()

hellow good afternoon everybody

```

```

]: #Write to an Existing File
f = open("abc.txt", "w")
f.write("Now the file has more content!")
f.close()

#open and read the file after the appending:
f = open("abc.txt", "r")
print(f.read())

```

Now the file has more content!

Introduction to 1D,2D Arrays, Array indexing ,Arithmetic and Logical operations

*Pandas: Series Dataframe, Merging dataframes , Data input and output Matplotlib: Data visualization, Ploting ,Grids, Labells , Colors*

```
In [1]: import numpy as np  
# as-> Alias
```

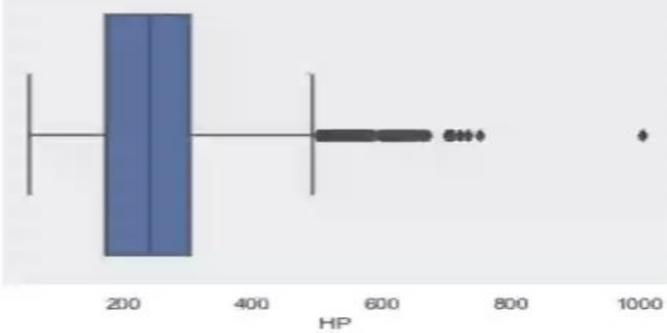
```
In [6]: a = np.array(10) #0-Dimension -> Scalar  
b = np.array([1,2,3]) #1-D -> Vector  
c = np.array([[1,2],[3,4]]) #2-D -> Matrix  
d = np.array([[1, 2, 3], [4, 5, 6]], [[1, 2, 3], [4, 5, 6]]))  
#3-D -> Tensor
```

```
In [9]: print(a)  
print("-"*25)  
print(b)  
print("-"*25)  
print(c)  
print("-"*25)  
print(d)
```

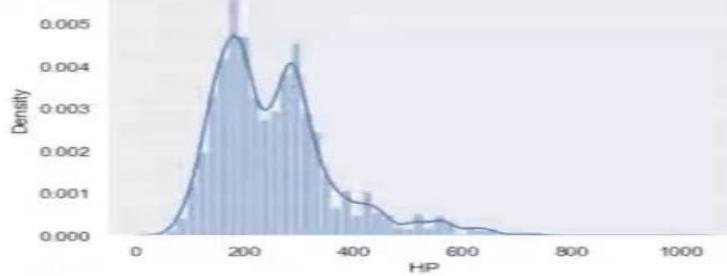
```
10  
-----  
[1 2 3]  
-----  
[[1 2]  
 [3 4]]
```



```
## Plot a boxplot for 'HP' columns in dataset  
sns.boxplot(x=df['HP'])  
plt.show()
```

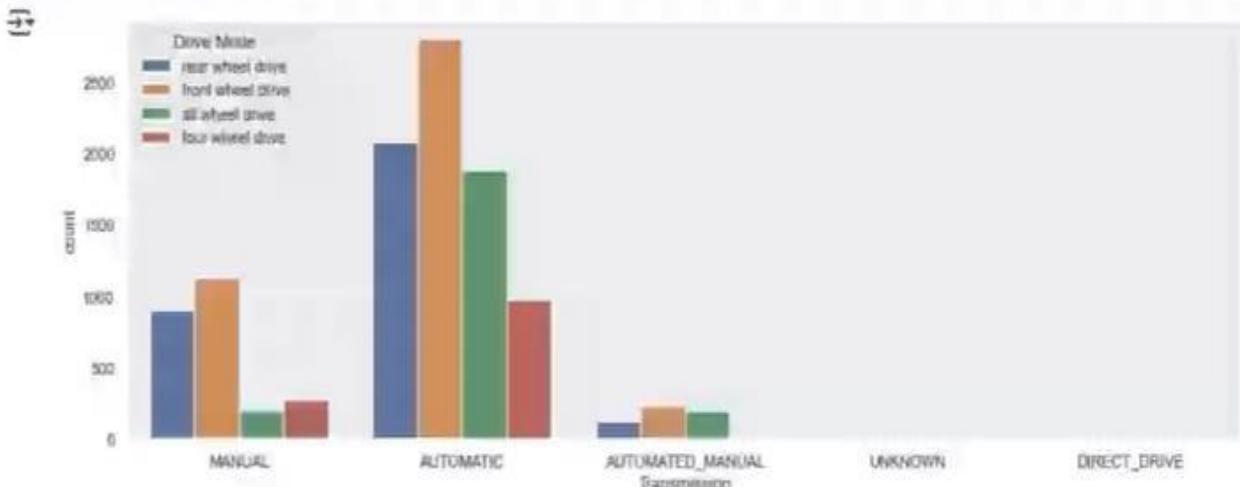


```
#ploting distplot for variable HP  
sns.distplot(df['HP'])  
plt.show()
```



```
❸ plt.figure(figsize=(15,5))
df = df.dropna()
# plot countplot on transmission and drive mode
sns.countplot(x='Transmission',hue='Drive Mode',data=df)
plt.show()

# 'Cylinders', y='Price'
```



## Data Cleaning using Pandas

```
#create d1
d1 = pd.DataFrame( {'Temperature' : [1, np.nan, 3, 2, 3] ,
                    'Humidity' : [22, np.nan, 2, np.nan, 20]})
```

Print the dataframe d1

```
#print d1
print(d1)
```

```
   Temperature  Humidity
0           1.0      22.0
1           NaN       NaN
2           3.0      2.0
3           2.0       NaN
4           3.0     20.0
```

```
# imputing mean
d1.fillna(d1.mean())
```

```
   Temperature  Humidity
0          1.00  22.000000
1          2.25  14.666667
2          3.00  2.000000
3          2.00  14.666667
4          3.00  20.000000
```

```
#drop E
df.drop(["E"], axis=1, inplace=True)
df = df.drop(["E"], axis=1)
```

Check if column E is removed by printing head of df

```
#df head
df.head()
```

```
   A   B   C   D
0  9  15  64  28
1 93  29   8  73
2 40  36  16  11
3 88  62  33  72
4 49  51  54  77
```

# Machine Learning

## 1. Feature Engineering

```
: data[mask].shape
: (7, 3)

: mask1 = (data['Height']>=Lower_limit) & (data['Height']<=Upper_limit)
new_df = data[mask1]

: new_df
:   Gender    Height    Weight
: 0  Male  73.847017  241.893563
: 1  Male  68.781904  162.310473
: 2  Male  74.110105  212.740856
: 3  Male  71.730978  220.042470
: 4  Male  69.881796  206.349801

: standard_deviation = data['Height'].std()
: mean = data['Height'].mean()
: standard deviation, mean
: (3.8475281207732324, 66.36755975482124)

: Upper_limit = mean + (3*standard deviation)
: Lower_limit = mean - (3*standard deviation)
: print(Upper_limit)
: print(Lower_limit)
: 77.91014411714094
: 54.82497539250154

: mask = (data['Height']<Lower_limit) | (data['Height']>Upper_limit)
data[mask]

:   Gender    Height    Weight
: 994  Male  78.056007  256.090035
: 1317  Male  78.462053  227.342565
: 2014  Male  78.998742  269.989099
: 3285  Male  78.528210  253.889004
```

### Outlier Removal using Z-score

```
: def z_score(df,column):
:     x = df[column].values #data['Height']
:     mean = df[column].mean()
:     standard deviation = df[column].std()
:     return (x-mean) / standard deviation

: data['z score'] = z_score(data,'Height')

: data.head()
:   Gender    Height    Weight    z score
: 0  Male  73.847017  241.893563  1.943964
: 1  Male  68.781904  162.310473  0.627505
: 2  Male  74.110105  212.740856  2.012343
: 3  Male  71.730978  220.042470  1.393991
: 4  Male  69.881796  206.349801  0.913375

: mask = (data['z score']<-3) | (data['z score']>3)
data[mask]
```

### Outlier Removal using IQR

```
: q1 = np.quantile(data['Height'],0.25)
: q3 = np.quantile(data['Height'],0.75)
: IQR = q3-q1

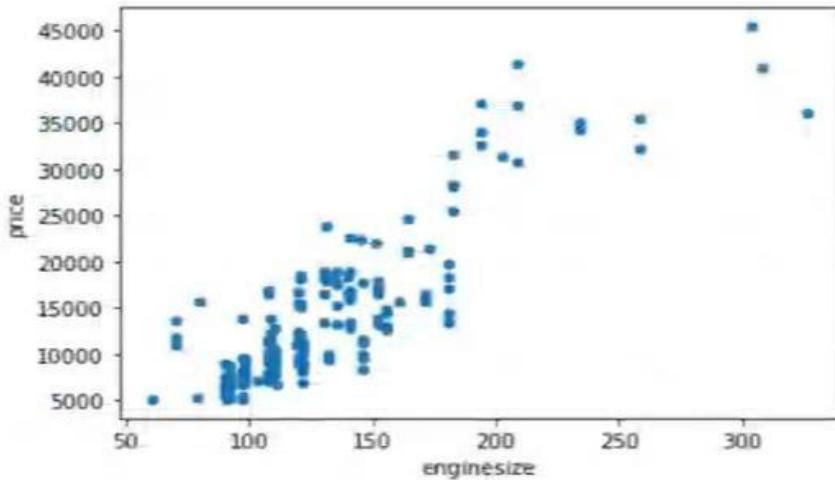
: Upper_limitIQR = q3 + (1.5*IQR)
: Lower_limitIQR = q1 - (1.5*IQR)
: print(Upper_limit)
: print(Lower_limit)
: 77.91014411714094
: 54.82497539250154

: mask2 = (data['Height']>=Lower_limitIQR) & (data['Height']<=Upper_limitIQR)
new_df = data[mask2]

: new_df.shape
: (9992, 3)
```

## 2.Linear Regression

```
: # check the distribution of data by plotting as scatter
new_df.plot(x='enginesize', y='price', kind='scatter')→
: <AxesSubplot:xlabel='enginesize', ylabel='price'>
```



```
: # import ML related packages of sklearn
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, mean_absolute_error, r2_score

: # split the data as train and test
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=0)

: # shapes of splitted data - sizes of the X_train and Y_train should be same. Also, tests.
print("X_train:",x_train.shape)
print("X_test:",x_test.shape)
print("Y_train:",y_train.shape)
print("Y_test:",y_test.shape)

X_train: (164,)
X_test: (41,)
Y_train: (164,)
Y_test: (41,)

: # create a linear regression model
model = LinearRegression()

: # train the model using training data
# since we have only one independent variable, you should use 'values.reshape(-1,1)'. otherwise, x_train is enough.
model.fit(x_train.values.reshape(-1,1), y_train)

: LinearRegression()
```

```

# print y_intercept / bias
model.intercept_
-7613.3709394898

# make predictions using test data
y_pred = model.predict(x_test.values.reshape(-1,1))

# let's calculate the metrics
# MSE
mse = mean_squared_error(y_test, y_pred)
print("MSE --> ", mse)
MSE --> 16835544.03813768

# RMSE
import math
rmse = math.sqrt(mse)
print("RMSE --> ", rmse)
RMSE --> 4103.113944084137

# MAE
mae = mean_absolute_error(y_test, y_pred)
print("MAE --> ", mae)
MAE --> 3195.031239500043

# R2
r2 = r2_score(y_test, y_pred)
print("R2 --> ", r2)

```

### 3. Logistic Regression

```

import pandas as pd
from matplotlib import pyplot as plt
%matplotlib inline

df = pd.read_csv("insurance_data.csv")
df.head()

age bought_insurance
0 22 0
1 25 0
2 47 1
3 52 0
4 46 1

plt.scatter(df.age, df.bought_insurance, marker='+', color='red')
<matplotlib.collections.PathCollection at 0x20a8cb15d30>

import math
def sigmoid(x):
    return 1 / (1 + math.exp(-x))

def prediction_function(age):
    z = 0.042 * age - 1.53 # 0.04150133 ~ 0.042 and -1.52726963 ~ -1.53
    y = sigmoid(z)
    return y

age = 35
prediction_function(age)
0.4850044983805899

0.485 is less than 0.5 which means person with 35 age will not buy insurance

age = 43
prediction_function(age)
0.568565299077705

0.485 is more than 0.5 which means person with 43 will buy the insurance

```

```

from sklearn.datasets import load_digits
import pandas as pd

dataset = load_digits()
dataset.keys()

dict_keys(['data', 'target', 'frame', 'feature_names', 'target_names', 'images', 'DESCR'])

dataset.data.shape

(1797, 64)

dataset.data[0]

array([ 0.,  0.,  5., 13.,  9.,  1.,  0.,  0.,  0., 13., 15., 10.,
       15.,  5.,  0.,  0.,  3., 15.,  2.,  0., 11.,  8.,  0.,  0.,  4.,
      12.,  0.,  0.,  8.,  8.,  0.,  0.,  5.,  8.,  0.,  0.,  9.,  8.,
      0.,  0.,  4., 11.,  0.,  1., 12.,  7.,  0.,  0.,  2., 14.,  5.,
     10., 12.,  0.,  0.,  0.,  6., 13., 10.,  0.,  0.,  0.])

dataset.data[0].reshape(8,8)

array([[ 0.,  0.,  5., 13.,  9.,  1.,  0.,  0.],
       [ 0.,  0., 13., 15., 10., 15.,  5.,  0.],
       [ 0.,  3., 15.,  2.,  0., 11.,  8.,  0.],
       [ 0.,  4., 12.,  0.,  0.,  8.,  8.,  0.],
       [ 0.,  5.,  8.,  0.,  0.,  9.,  8.,  0.],
       [ 0.,  4., 11.,  0.,  1., 12.,  7.,  0.],
       [ 0.,  2., 14.,  5., 10., 12.,  0.,  0.],
       [ 0.,  0.,  6., 13., 10.,  0.,  0.,  0.]])

```

Use components such that 95% of variance is retained

```

: from sklearn.decomposition import PCA

: pca = PCA(0.95)
X_pca = pca.fit_transform(X)
X_pca.shape

: (1797, 29)

: pca.explained_variance_ratio_

: array([0.14890594, 0.13618771, 0.11794594, 0.08409979, 0.05782415,
       0.0491691 , 0.04315987, 0.03661373, 0.0353248, 0.03078806,
       0.02372341, 0.02272697, 0.01821863, 0.01773855, 0.01467101,
       0.01409716, 0.01318589, 0.01248138, 0.01017718, 0.00905617,
       0.00889538, 0.00797123, 0.00767493, 0.00722904, 0.00695889,
       0.00596081, 0.00575615, 0.00515158, 0.0048954 ])

: pca.n_components_

: 29

PCA created 29 components out of 64 original columns

: X_pca

: array([[-1.25946645,  21.27488348, -9.46305462, ...,  3.67072108,
       -0.9436688 , -1.13250195],
       [ 7.9576113 , -20.76869896,  4.43959604, ...,  2.18261819,
       ...])

```

Let's now select only two components

```

: pca = PCA(n_components=2)
X_pca = pca.fit_transform(X)
X_pca.shape

: (1797, 2)

: X_pca

: array([[ -1.25946639,  21.27487891],
       [ 7.95760922, -20.76869518],
       [ 6.99192341, -9.95598163],
       ...,
       [ 10.80128435, -6.96025523],
       [ -4.87210315,  12.42395926],
       [ -0.34438701,  6.36554335]])
```

```

: pca.explained_variance_ratio_

: array([0.14890594, 0.13618771])

```

You can see that both combined retains  $0.14+0.13=0.27$  or 27% of important feature information

```

: X_train_pca, X_test_pca, y_train, y_test = train_test_split(X_pca, y, test_size=0.2, random_state=30)

model = LogisticRegression(max_iter=1000)
model.fit(X_train_pca, y_train)
model.score(X_test_pca, y_test)

```

## 5. SVM

```
: # categorize wine quality
# 2-6.5 are "bad" quality, and wines that are between 6.5 - 8 are "good"
bins = (2,6.5,8) # range type for good bad
group_names = ['bad', 'good']
categories = pd.cut(df['quality'], bins, labels = group_names)
df['quality'] = categories

: #after categorize
df['quality'].value_counts()

: bad      1382
  good     217
Name: quality, dtype: int64

: #barplot of quality vs alcohol.
# more alcohol, better red wine
sns.barplot(x='quality', y='alcohol',data=df)
plt.show()

: <Axes: xlabel='quality', ylabel='alcohol'>
```

```
# more alcohol, better wine
sns.barplot(x='quality', y='alcohol', data=df)
plt.show()

# axes xlabel='quality', ylabel='alcohol'

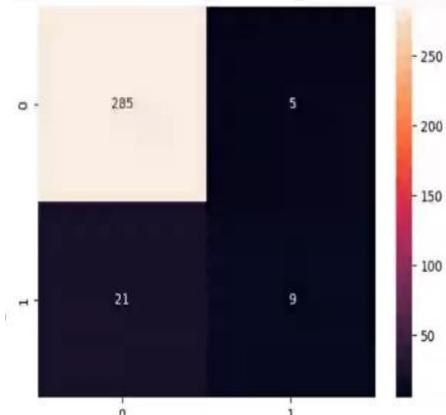
X = df.drop(['quality'], axis = 1)
y = df['quality']

#Now quality is categorical i.e. good or bad . So to convert it into class 1 and 0 following step is taken
from sklearn.preprocessing import LabelEncoder
labelencoder_y = LabelEncoder()
y = labelencoder_y.fit_transform(y)

y
array([0, 0, 0, ..., 0, 0, 0])

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2, random_state = 0)
```

```
: from sklearn.preprocessing import StandardScaler  
sc = StandardScaler()  
X_train = sc.fit_transform(X_train)  
X_test = sc.transform(X_test)
```



```
from sklearn import metrics  
print("Accuracy: {:.2f}%".format(metrics.accuracy_score(y_test, predictions)))
```

Accuracy: 0.91875

```
new_pred= list(result.predict([[11.1,0.100,0.99,4,0.99,1,2,0.1,1,0.50,9]]))  
new_pred
```

## **7. CONCLUSION**

In conclusion, Power BI dashboards are an essential component of modern data analytics and business intelligence strategies. They empower organizations to visualize data effectively, derive insights, and make data-driven decisions. By leveraging the capabilities of Power BI, businesses can enhance their analytical capabilities, improve operational efficiency, and ultimately drive better outcomes. As organizations continue to embrace data-driven cultures, the role of Power BI dashboards will only become more significant in facilitating informed decision-making and strategic planning.

By leveraging the capabilities of Power BI, businesses can enhance their analytical capabilities, improve operational efficiency, and ultimately drive better outcomes. As data continues to play a critical role in decision-making, mastering Power BI dashboards will be increasingly valuable for professionals across various industries.

## **8. REFERENCE**

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