GLOBAL SALES DATA ANALYTICS

A PROJECT REPORT

SUBMITTED BY:

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IN PARTIAL FULFILLMENT FOR THE AWARD OF THE DEGREE

OF

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR (AUTONOMOUS)

KRISHNAGIRI-635104

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1. Introduction

For our IBM Project, we chose Data Analytics as our domain, for the Nalaiya Thiran initiative. Our topic is Corporate Employee Attrition

Data analytics is the science of analysing raw data to make conclusions about that information. Many of the techniques and processes of data analytics have been automated into mechanical processes and algorithms that work over raw data for human consumption.

We intend to analyze such organizations sales data, profits, quantity, pricings, customers, sales region, etc...Then find the Trends and prediction to improve the business.

1.1. Project Overview

To predict the sales data by analytics the dataset which given by the corporates. the dataset contains the sales data of the overall report about the sales, we analyse the data by given dataset and create interactive Dashboard, story, Report to improve the business

1.2. Purpose

The purpose of our project is to help the companies to improve their business by know about the trend and segments. The dashboard and report explain by the interactive interface so the user can understand their business easily.

2.LITERATURE SURVEY

2.1 Existing Problem

More along the lines of prediction, based on past behaviour and choices, probably effecting the organisation as well.

2.2 References

1. https://www.zendesk.com/in/blog/guide-sales-analytics/

2. https://www.pipedrive.com/en/blog/sales-data

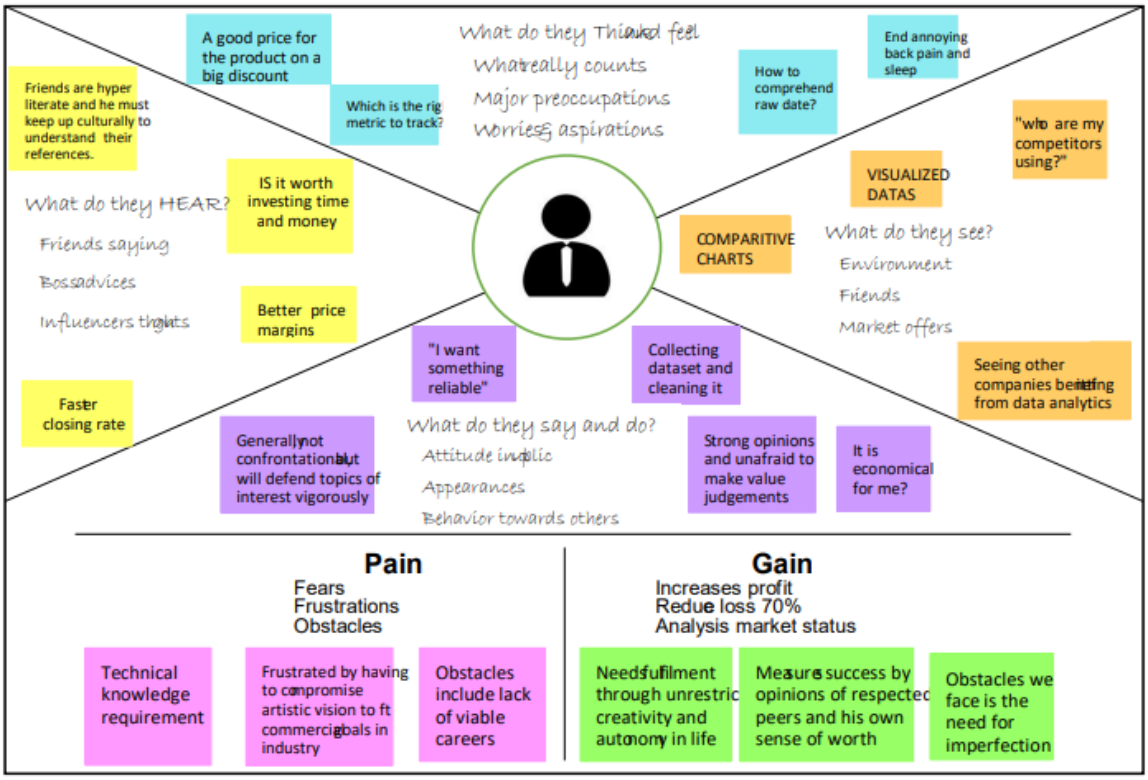
3. https://www.espatial.com/blog/sales-data-analysis

2.3 Problem state Definition

Problem. No	I'm a	I'm trying to	But	Because	Which Makes us
1	Company or Corporation	To enhance sales by making smarter business judgements.	The data have been interpreted incorrectly in several cases.	There is a wealth of information available, but it is crucial to properly evaluate it. We shall be in a terrible position if we read information incorrectly and behave accordingly.	Impede
2	Marketing Team	To develop a product marketing plan and strategy.	Time restrictions may apply	Data must be carefully gathered and analysed via a labour-intensive procedure called market research.	Obstruct
3	Retailer	Providing offers and gifts to attract customers	Not able to meet the requirements	People don't respond to offers	Frustrated
4	Super Market Owner	Find the key performance indicators to boost the sales	There is lot of customer churn	Of fluctuation in price over essential goods in market	Worried
5	Small scale Shop Keeper	Sell my product online	I can't able to manage my sales data	Of online sales data I can't able to define sales trends	Trouble in sales
6	Customer	Find and analyze the sales from various sources	There are no specifications or accuracy in sales	The sources are from various systems	Disappointed

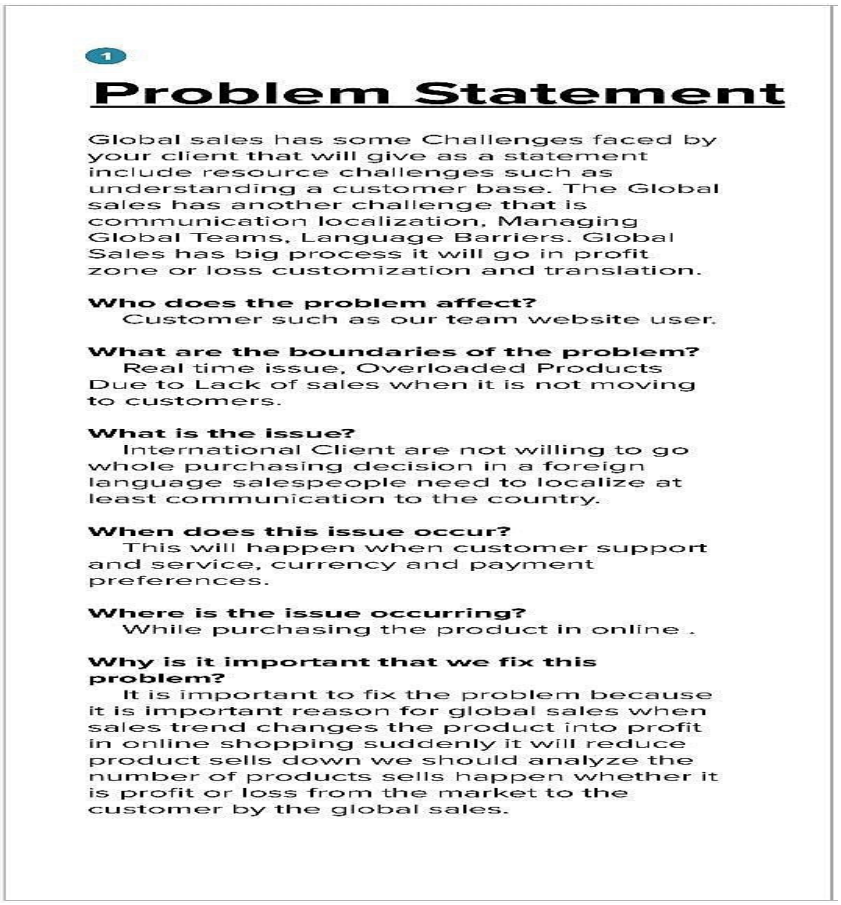
3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming

Step 1 : Team gathering and Problem statement analysis.



1

Problem Statement

Global sales has some Challenges faced by your client that will give as a statement include resource challenges such as understanding a customer base. The Global sales has another challenge that is communication localization, Managing Global Teams, Language Barriers. Global Sales has big process it will go in profit zone or loss customization and translation.

Who does the problem affect?
Customer such as our team website user.

What are the boundaries of the problem?
Real time issue, Overloaded Products Due to Lack of sales when it is not moving to customers.

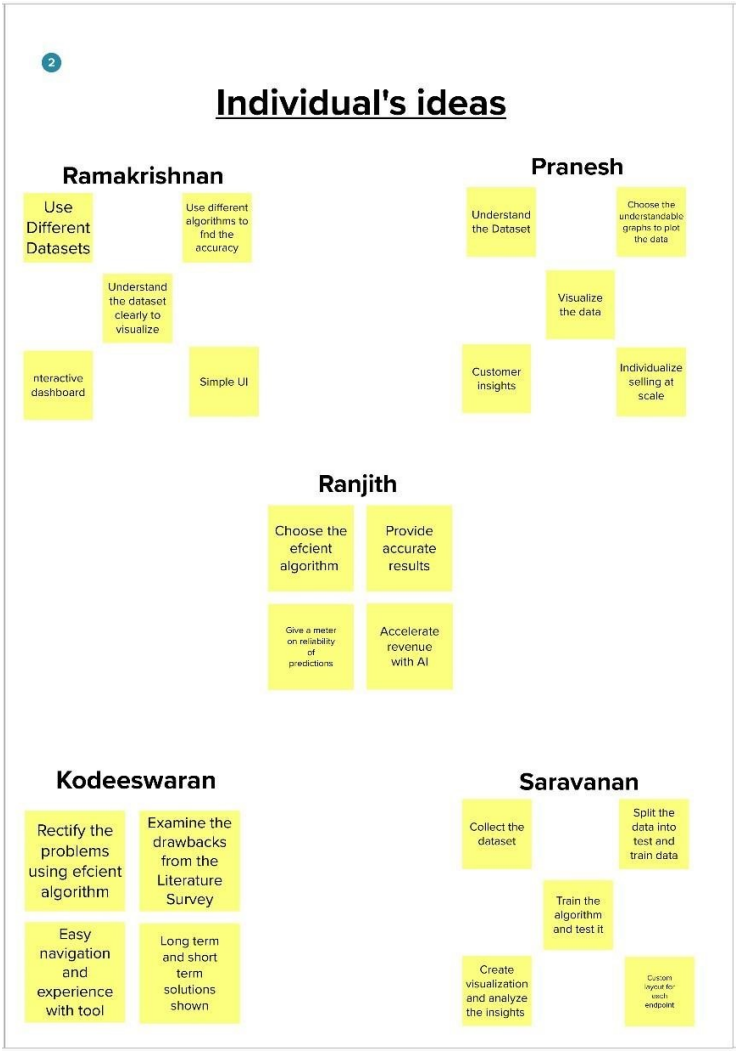
What is the issue?
International Client are not willing to go whole purchasing decision in a foreign language salespeople need to localize at least communication to the country.

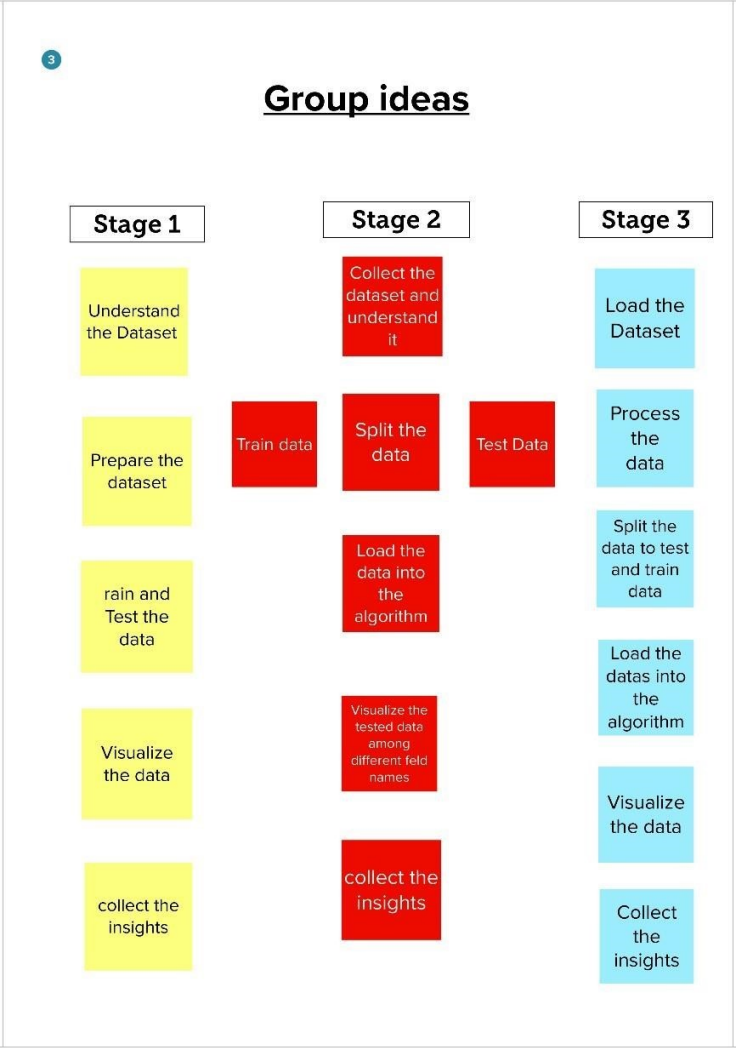
When does this issue occur?
This will happen when customer support and service, currency and payment preferences.

Where is the issue occurring?
While purchasing the product in online .

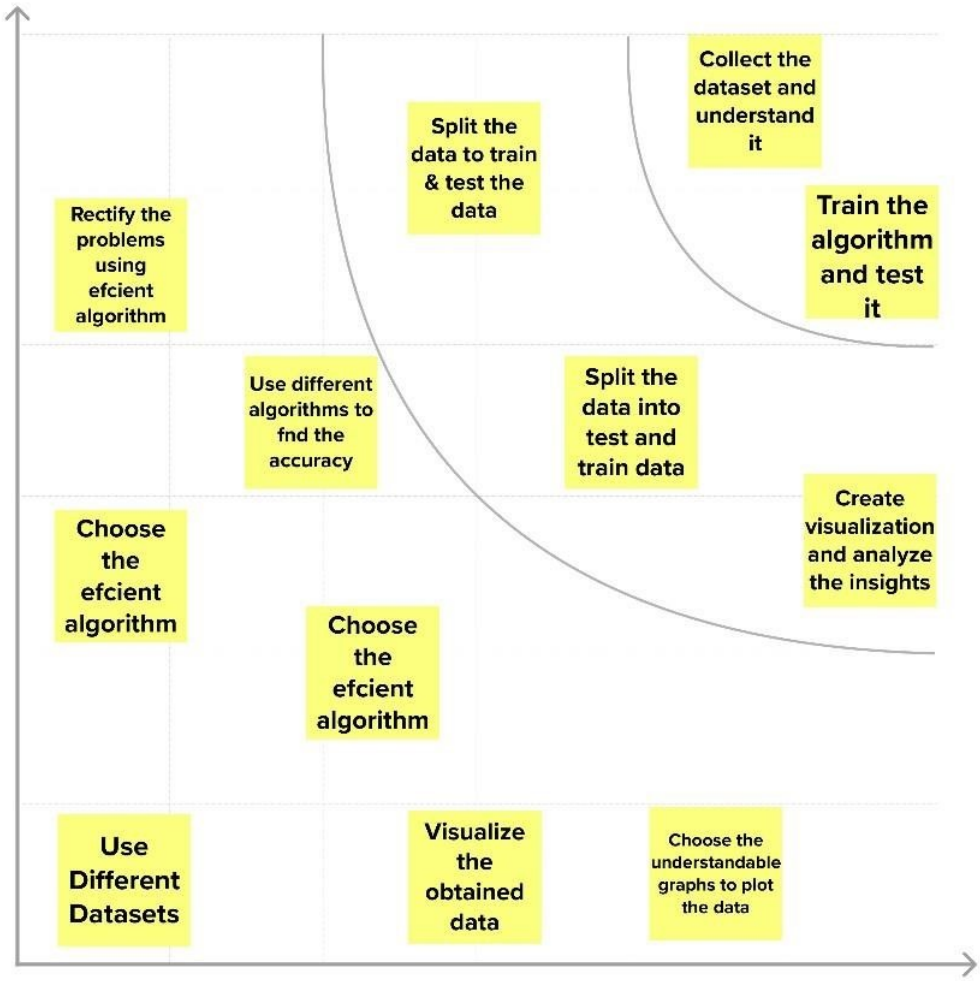
Why is it important that we fix this problem?
It is important to fix the problem because it is important reason for global sales when sales trend changes the product into profit in online shopping suddenly it will reduce product sells down we should analyze the number of products sells happen whether it is profit or loss from the market to the customer by the global sales.

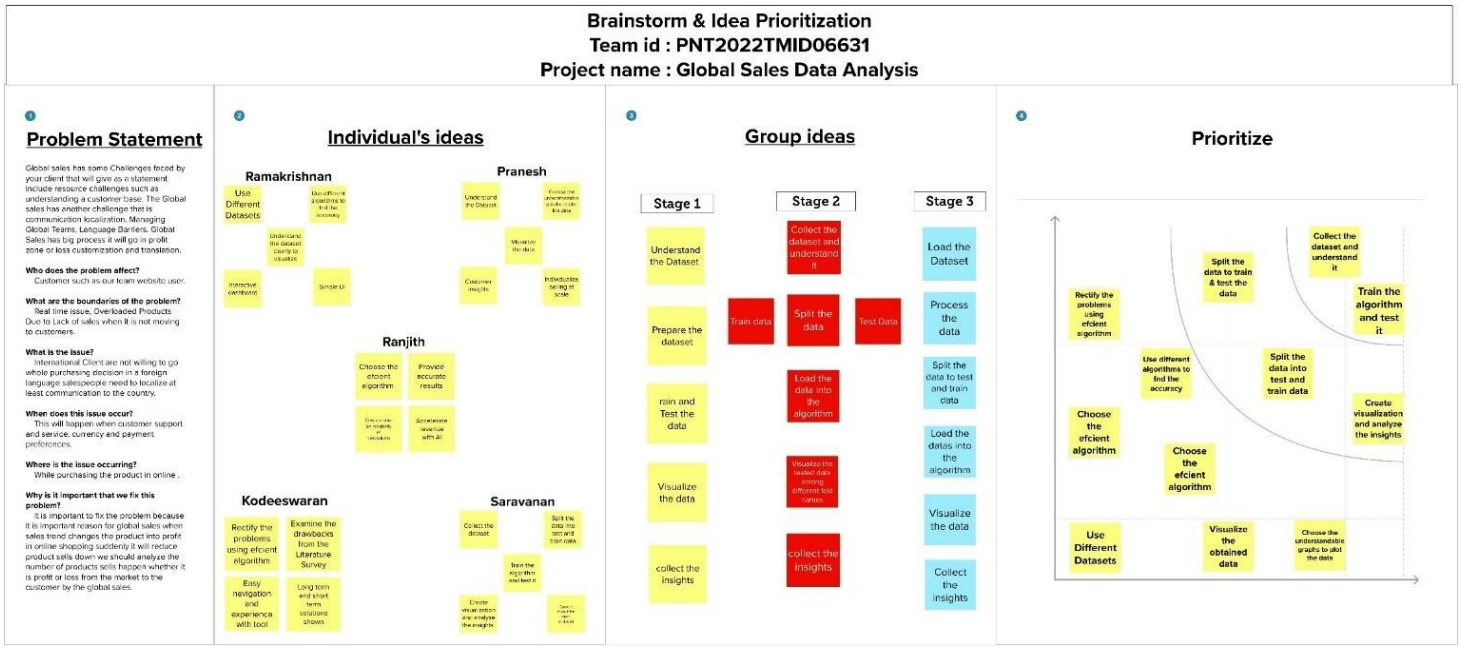
Step 2 : Brainstorm, Idea listing and Grouping





Step 3 : Prioritization





3.3 Proposed Solution

S. No	Parameter	Description
1.	Problem Statement (Problem to be solved)	Shopping online is currently the need of the hour. Because of this COVID, it's not easy to walk in a store randomly and buy anything you want. So, try to understand a few things like, Customer Analysis and Product Analysis of this Global Super Store.
2.	Idea / Solution description	The described solution is by using IBM Cognos we can display all the records and previous year global sales of product names, category and sub category as a graphical representation.
3.	Novelty / Uniqueness	1. Dynamic and real time analytics 2. Dashboard access through website 3. Interactive Dashboard and simple UI 4. Automated reports
4.	Social Impact / Customer Satisfaction	Make analysis of data patterns and trends very simple and helps in making data driven decisions and Visible profits driven by informed decisions and Optimize sales and marketing.
5.	Business Model (Revenue Model)	Two tier pricing- Standard, Premium 1. Standard: Limited Dashboard features. 2. Premium: Customized Dashboard features with automated reports
6.	Scalability of the Solution	Using this approach, the price of products across the world are kept same so the customers will be reliable.

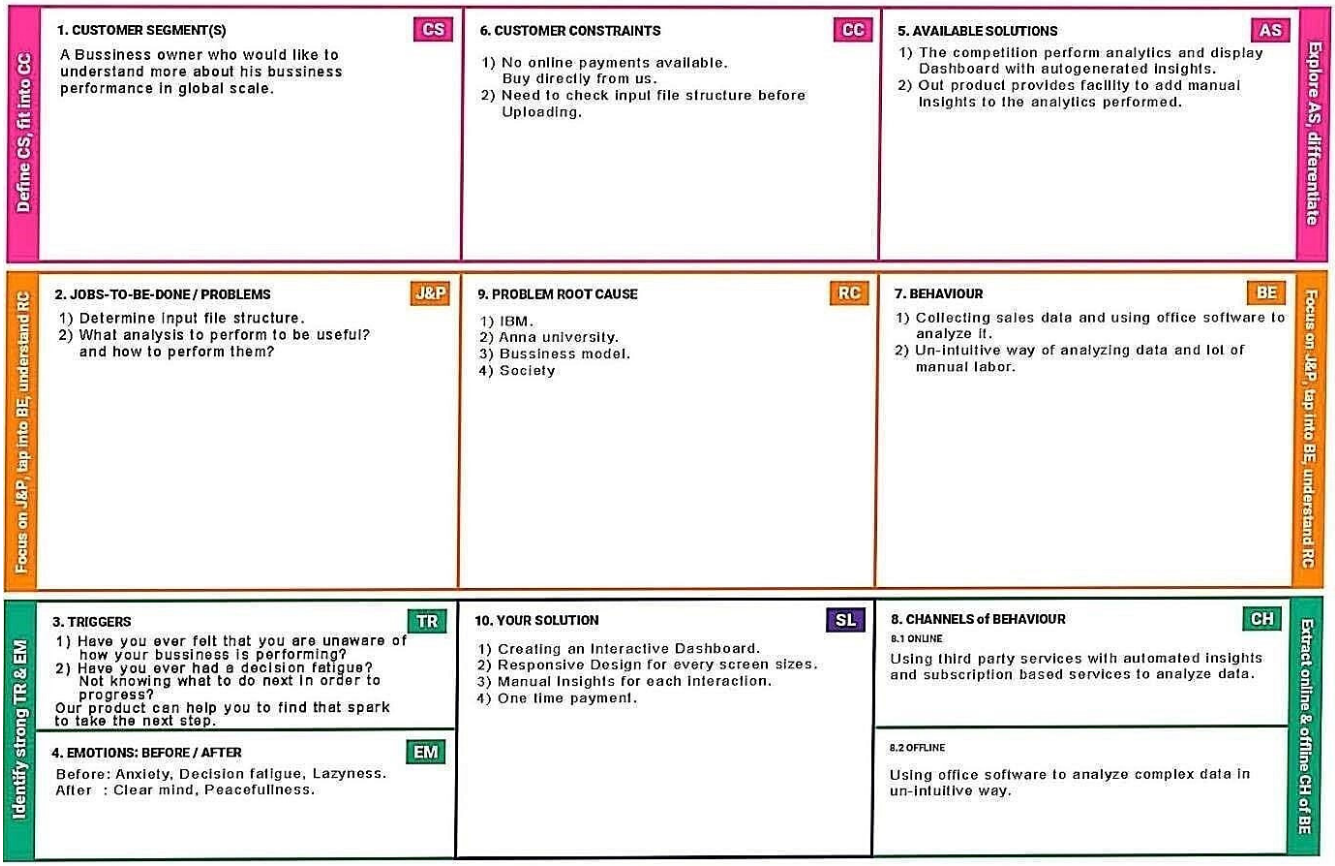
3.3 Problem Solution fit:

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioural patterns and recognize what would work and why

Purpose:

- **A.** Solve complex problems in a way that fits the state of your customers.
- **B.** Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behaviour.
- **C.** Sharpen your communication and marketing strategy with the right triggers and messaging.
- **D.** Increase touch-points with your company by finding the right problem-behaviour fit and building trust by solving frequent annoyances, or urgent or costly problems. We understand the existing situation in order to improve it for your target group.

Solution fit:



4. REQUIREMENTS ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

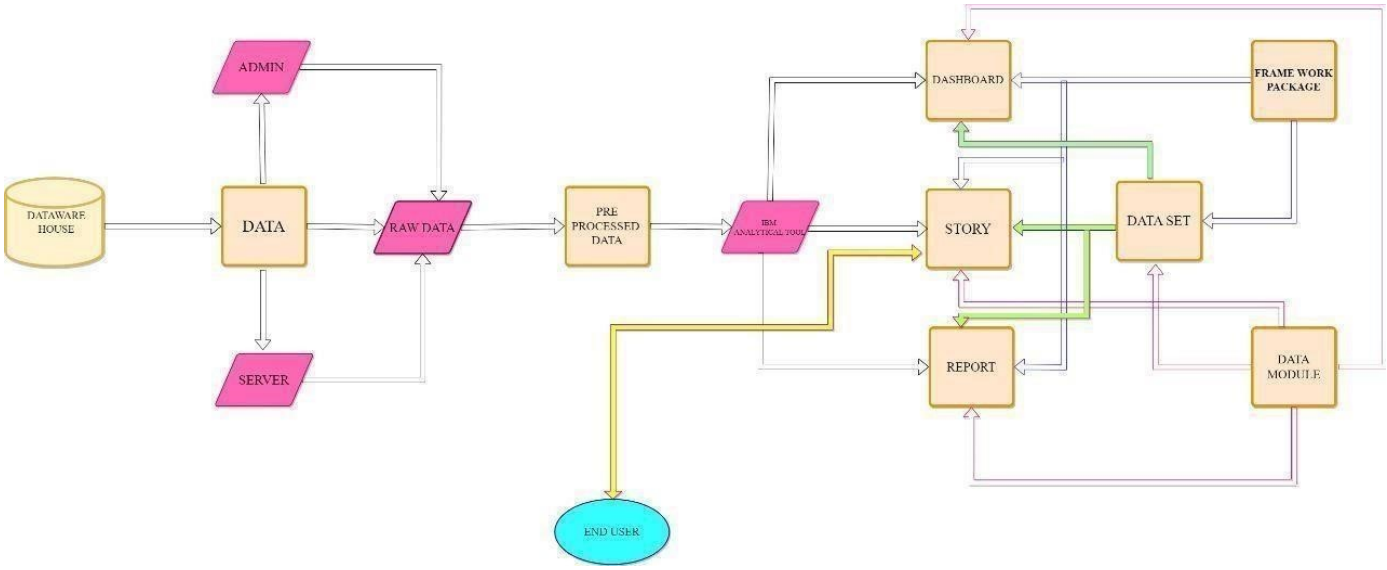
FR No.	FunctionalRequirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Store Registration	Registration through Form Registration through Gmail Registration through Store Name
FR-2	Store Confirmation	Confirmation via Email
FR-3	Free Trial and Access	Need to add card Details
FR-4	Subscription Plan and payment	Choose the preferred plan (monthly and yearly).
FR-5	Data Upload and Preparation	Upload the store-prepared data Confirm the data Uploaded with the message Cleaning the outliers, duplication and void data.
FR-6	Useful Insights Dashboard	UI shows useful Insights to improve the sales Dashboard for Store includes Sale-products, Customer Interest, category wise sales, and Useful insight to improve sales.
FR-7	User Registration	Registration through Form Registration through Gmail.
FR-8	User Confirmation	Confirmation via Email Confirmation via OTP.
FR-9	User Login	Login via Email and password.
FR-10	User uploading data(administrative)	To store the data set through the cloud.
FR-11	End user benefits	Getting higher state of efficiency and also to know entire data analysis.

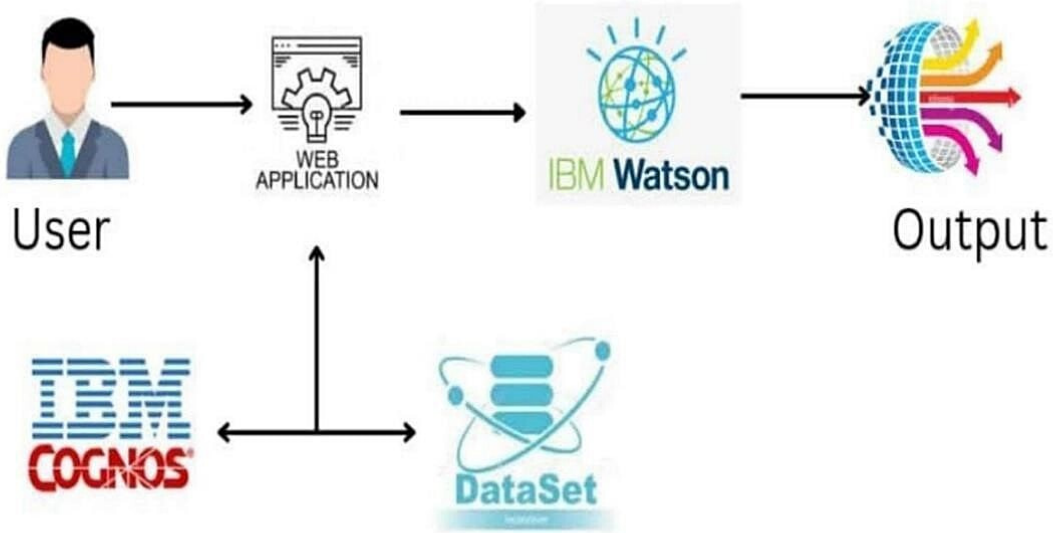
4.2 Non-functional Requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	To suggest very good insights and simplify the Dashboard to understand the products easily.
NFR-2	Security	It has securable because it has end to end encryption.
NFR-3	Reliability	A robust type of application can be deployed to ensure reliability.
NFR-4	Performance	It has high state of performance and efficiency.
NFR-5	Availability	It must be available to all users both who accessed the subscription and the free trial.
NFR-6	Scalability	The ability of a hardware and software parallel System to exploit increasing computing resources efficiency in the analysis of the (very)large datasets.

5. PROJECT DESIGN

5.1 Data Flow Diagrams





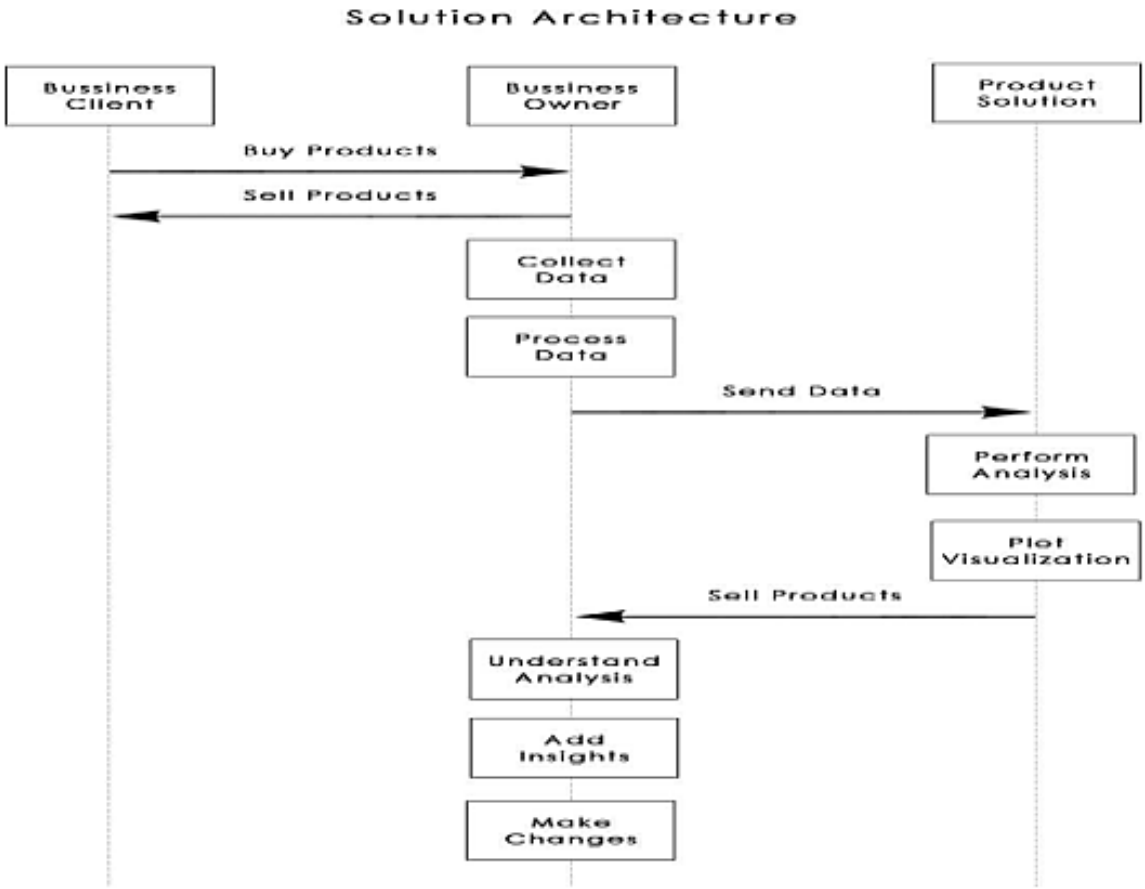
5.2 Solution & Technical Architecture

Solution Architecture:

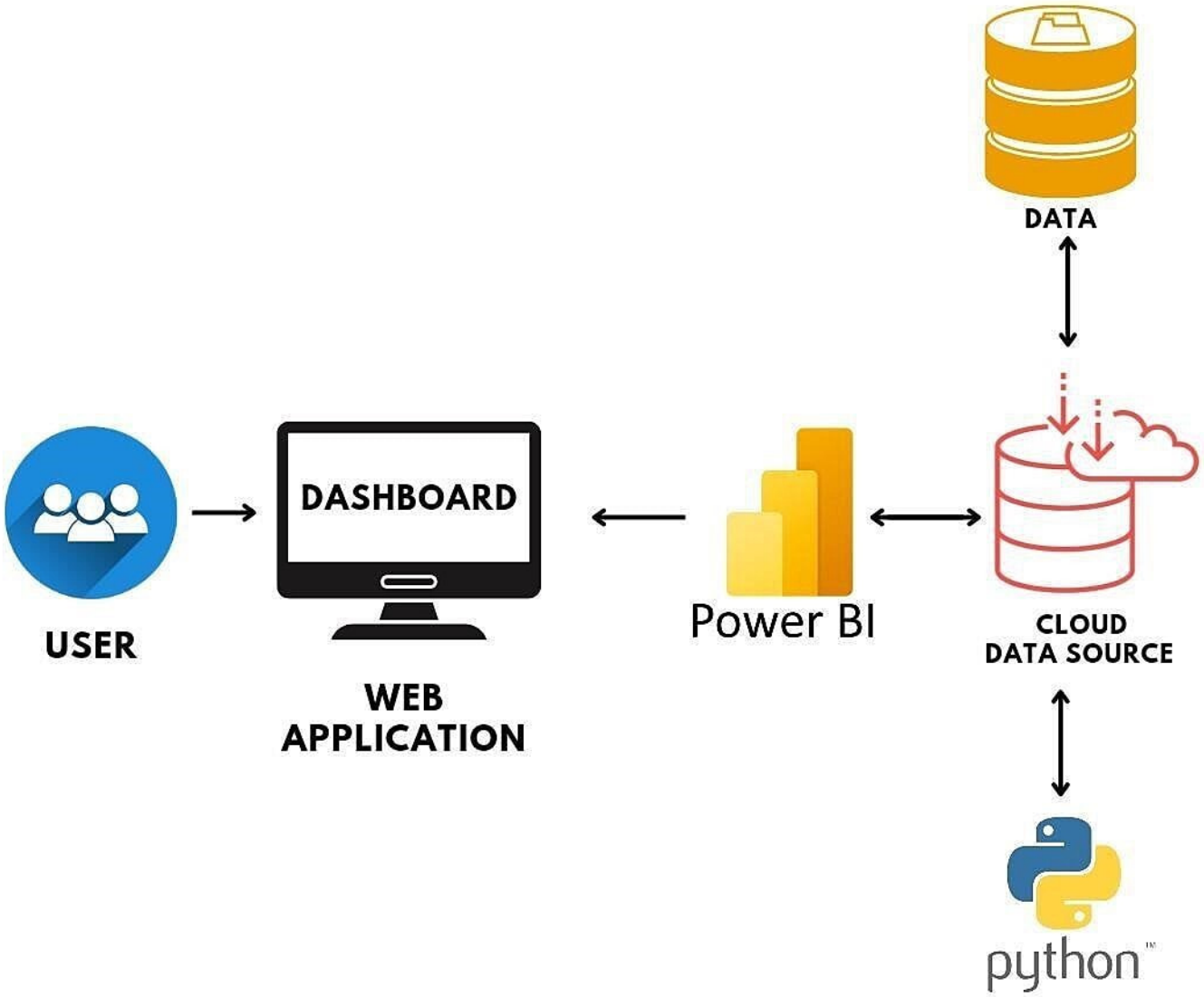
Solution architecture is a complex process with many sub-processes that bridges the gap between business problems and technology solutions. Its goals are to:

1. Find the best tech solution to solve existing business problems.
2. Describe the structure, characteristics, behaviour, and other aspects of the software to project stakeholders.
3. Define features, development phases, and solution requirements.
4. Provide specifications according to which the solution is defined, managed, and delivered.

Solution Architecture Diagram:



Technical Architecture:



5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN -1	As a user, I can register for the application by entering my email, password, and confirming my password	I can access my account / dashboard	High	Sprint-1
		USN -2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm		Sprint-1
		USN -3	As a user, I can register for the application through Store name	I can register & access the dashboard with Store details		Sprint-2
		USN -4	As a user, I can register for the application through Gmail	If Gmail and allows the access	Low	Sprint-4
	Login	USN -5	As a user, I can log into the application by entering email & password	By correct credentials compared with registered storage	High	Sprint-1
	Dashboard	USN -6	As a User I can access the dashboard using the data uploaded.	I valid user then access the dashboards and insights	Medium	Sprint-3
Customer	Registration	USN -7	As a user, I register and login through any browser	If credentials are correct then allow the user	High	Sprint-2
Customer Care Executive	Login	USN -8	As an executive, I clear the customer's doubts by chats and if need through voice	As customer feedback their problem solved.	Low	Sprint-4
Administrator	Login	USN -9	As an admin, I login the system Initially	If credentials correct then allow access all.	High	Sprint-4
	Registration Confirm	USN -10	Admin need to confirm the registering user	If details are enough and correct	Medium	Sprint-3
	Data Collection	USN -11	Collect the data from User	Data are correct format	Low	Sprint-4
	Insight's return	USN -12	Insights to increase the sales and customer feedback to improve overall	Insights are reliable then allow to users	High	Sprint-2

6.PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration and login	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	05	High	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	05	Medium	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-1		USN-3	As a user, I can log into the application by entering email & password	05	High	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-1		USN-4	Insights to increase the sales and customer feedback to improve overall	05	High	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-2		USN-5	As a user, I can register for the application through Store name.	10	Medium	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-2	Registration and login	USN-6	As a user, I register and login through any browser	10	High	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan

Sprint-3	Dashboard	USN-7	Admin need to confirm the registering user	10	Medium	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-3	Registration and Confirmation	USN-8	As an Admin, I can authenticate the registration and login credentials of the customer	10	High	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-4	Registration	USN-9	As a user, I can register for the application through Gmail	05	High	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-4	Login	USN-10	As an executive, I clear the customer's doubts by chats and if need through voice.	05	High	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-4		USN-11	As an admin, I login the system Initially	05	Medium	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan
Sprint-4	Data Collection	USN-12	Collect the data from User	05	Medium	Kodeeswaran Pranesh Ramakrishnan Ranjith Saravanan

Project Tracker, Velocity & Burndown Chart:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

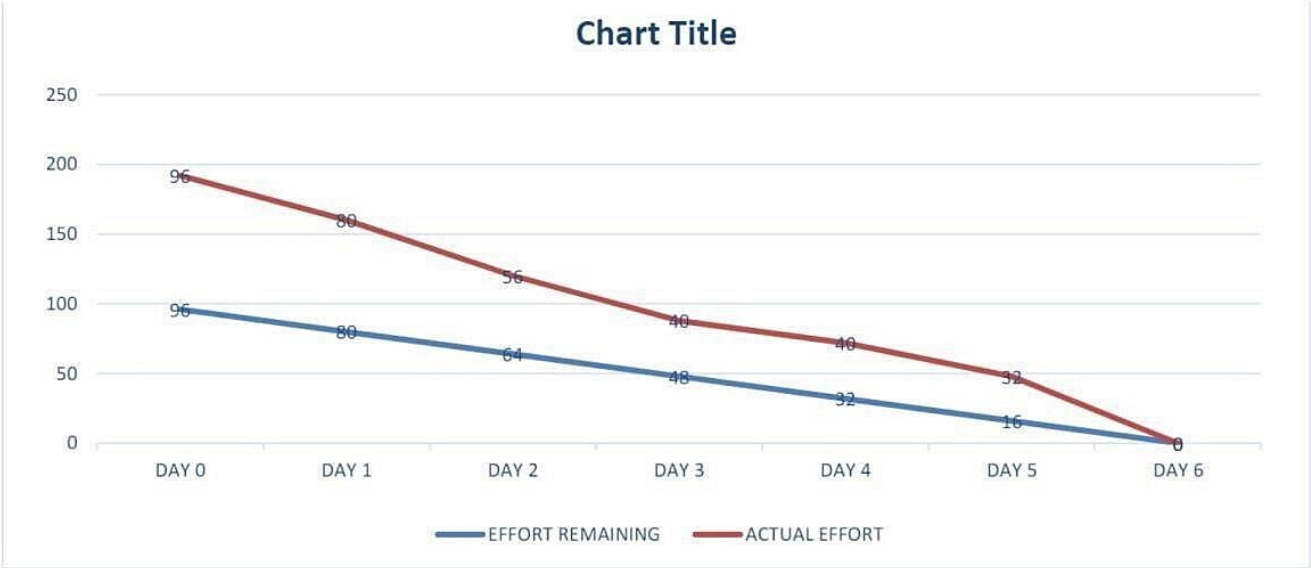
Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

AV = sprint duration / velocity = 24/20 = 1.2

Burndown Chart:

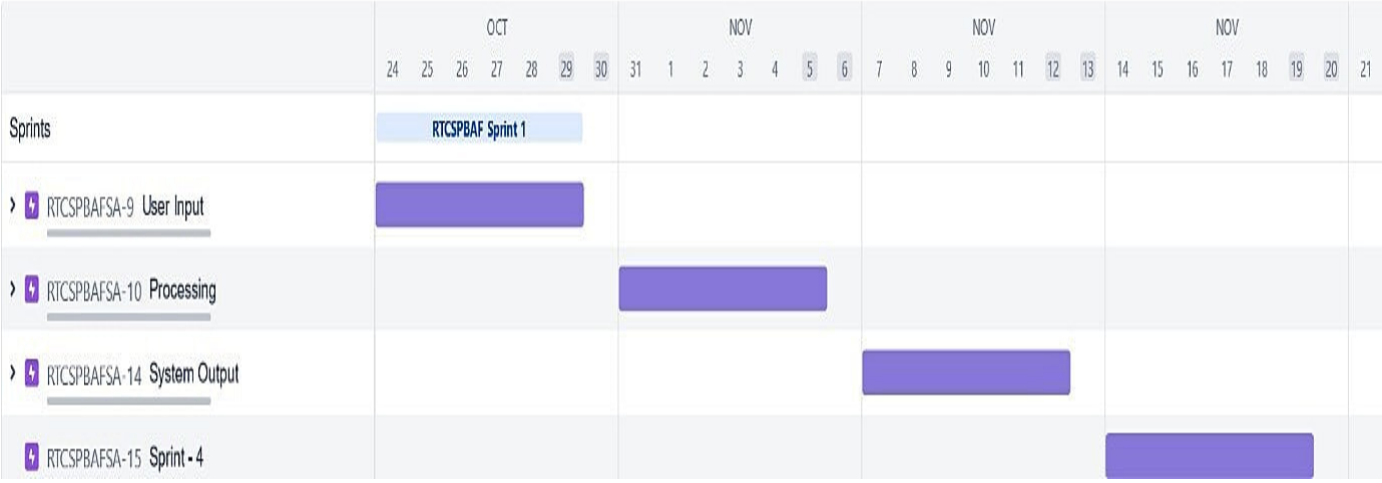
A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

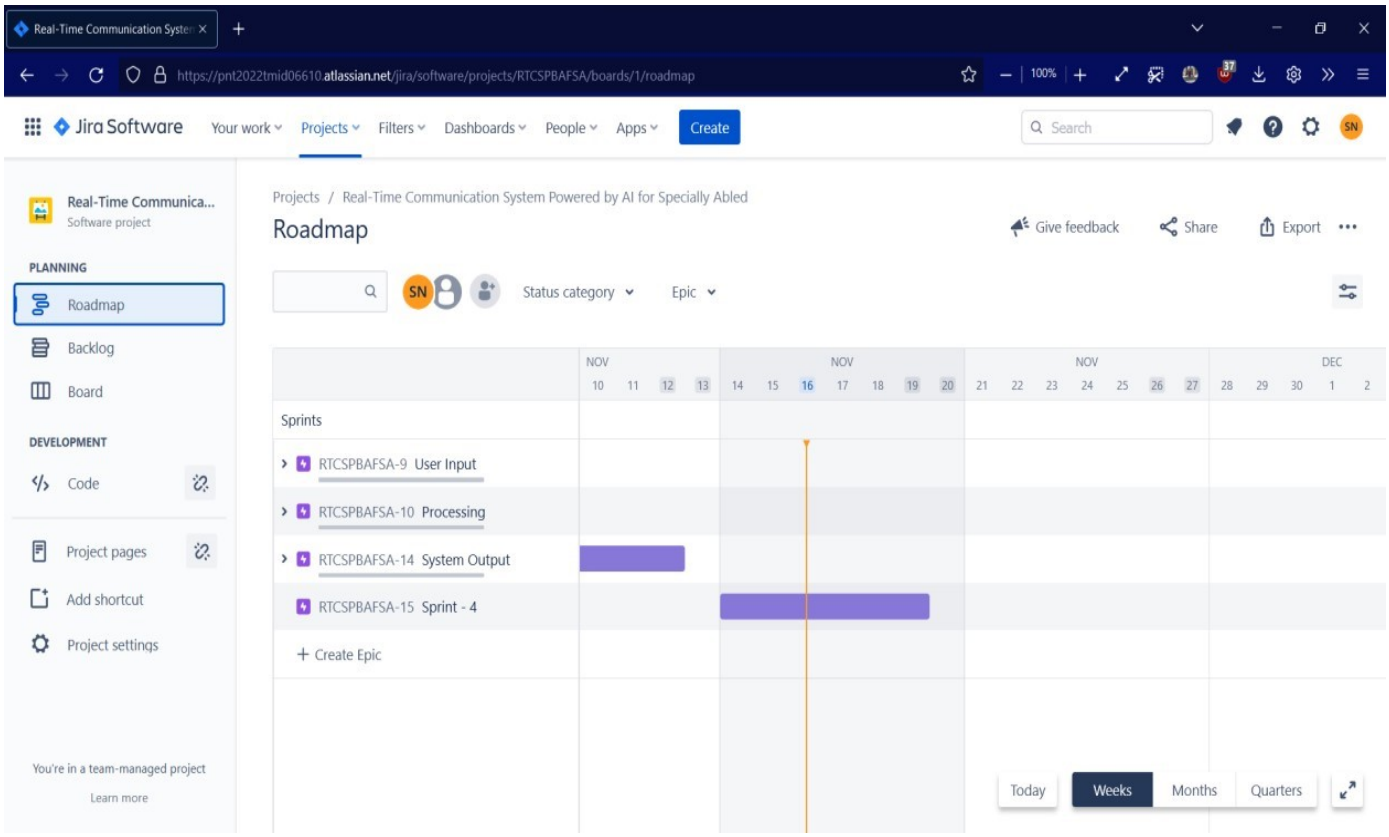


Milestone and Activity List

Title	Description	Date
Literature Survey and Information Gathering	Gathering Information by referring the technical papers, research publications etc	19 September 2022
Prepare Empathy Map	To capture user pain and gains Prepare List of Problem Statement	19 September 2022
Ideation	Prioritize a top 3 ideas based on feasibility and Importance	26 September 2022
Proposed Solution	Solution include novelty, feasibility, business model, social impact and scalability of solution.	1 October 2022
Problem Solution Fit	Solution fit document	2 October 2022
Solution Architecture	Solution Architecture	4 0ctober 2022
Customer Journey	To Understand User Interactions and experiences with application	9 0ctober 2022
Data flow Diagrams	Data flow diagram	15 October 2022
Functional Requirement	Prepare functional Requirement	16 October 2022
Technology Architecture	Technology Architecture diagram	16 October 2022
Milestones and activity list	List of done things from the scratch	29 October 2022
Sprint Delivery Plan	Schedule for submission of sprints	29 October 2022
Project Development-Delivery of sprint 1,2,3 &4	Develop and submit the developed code by testing it	24 October 2022 – 19 November 2022

6.2 Reports from JIRA





7. CODING & SOLUTIONING

7.1 Feature

Data Preparation Set:

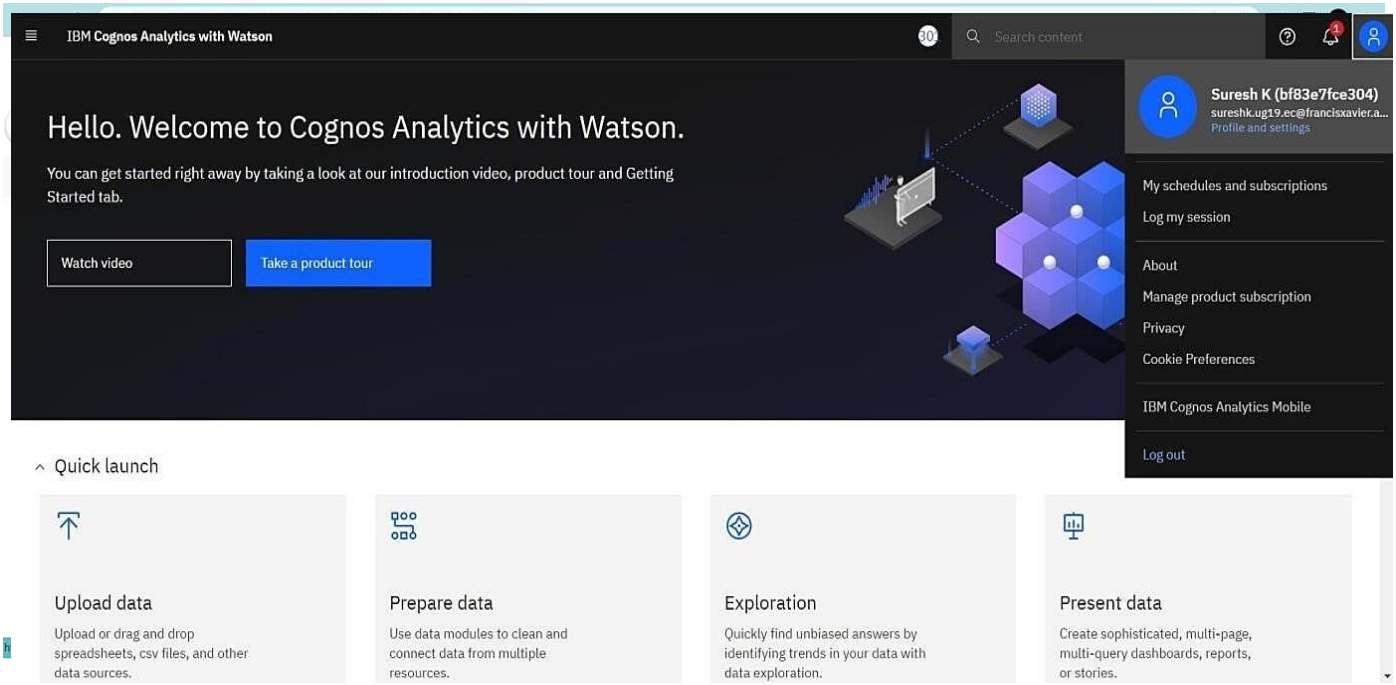
```
import pandas as pd
data = pd.read_excel('C:\Temp\Sample Dataset.xlsx')
#print(data) data.drop_duplicates()
NewData = data.dropna(how='all', inplace=True)
```

7.2.1 Feature

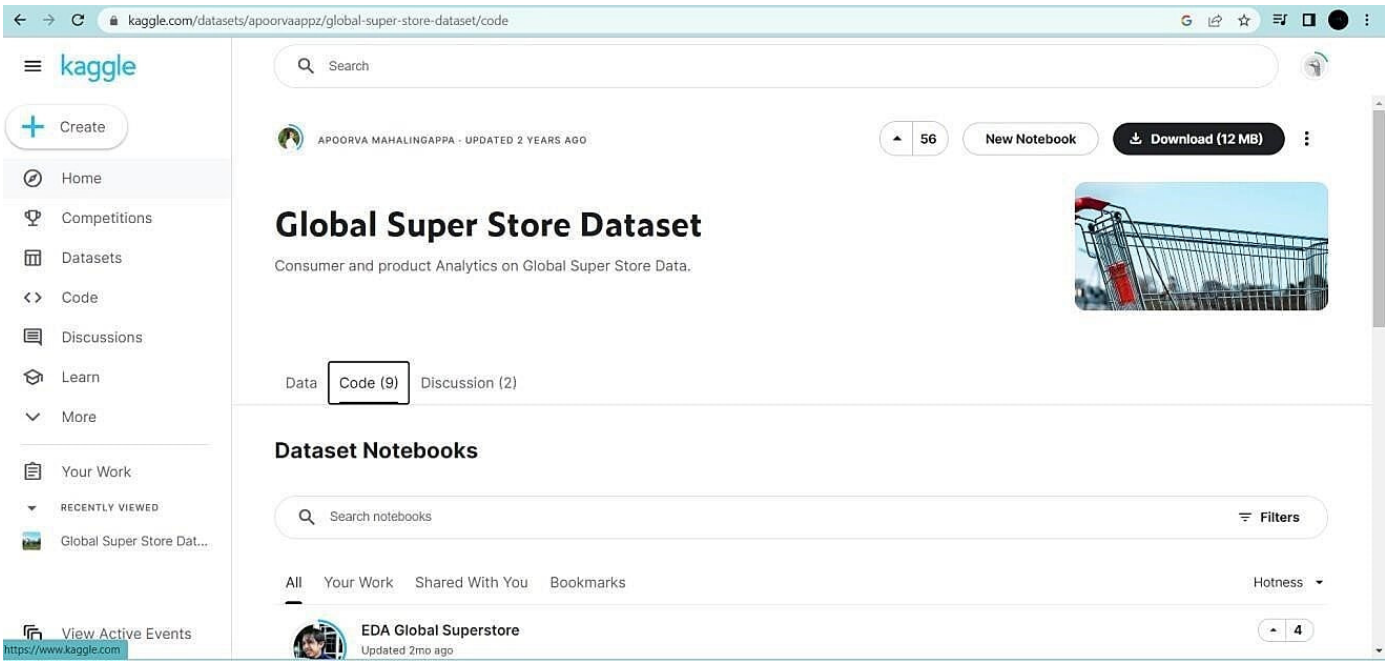
TOOLS USED:

IBM Cognos Analytics

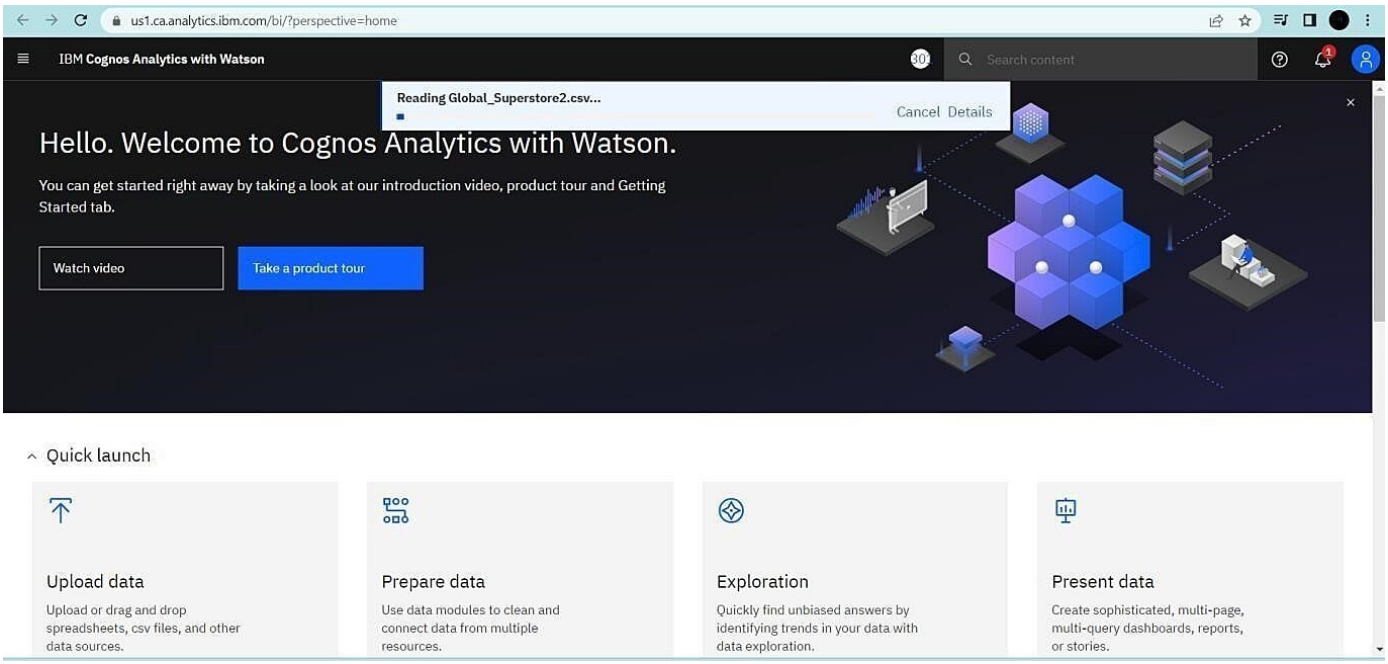
LOGGED IN ACCOUNT :



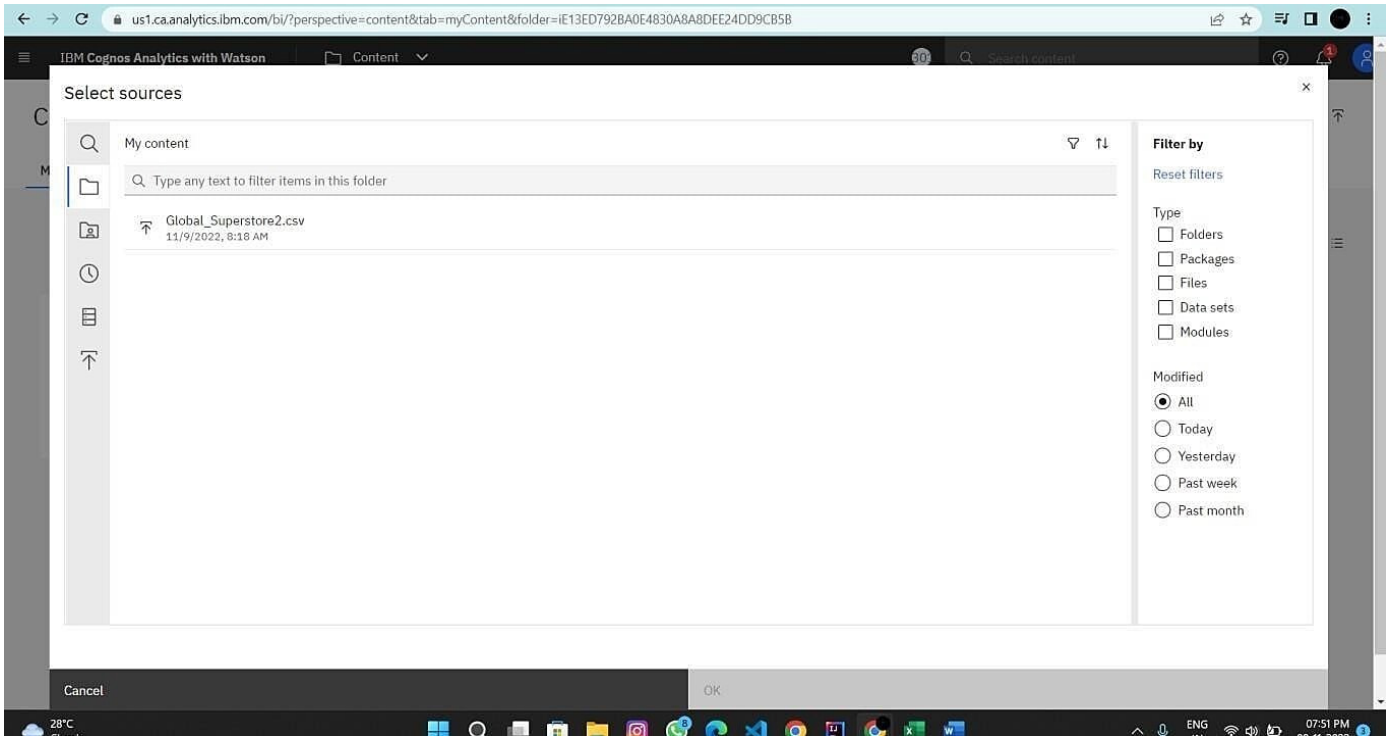
DOWNLOADING FROM KAGGLE:



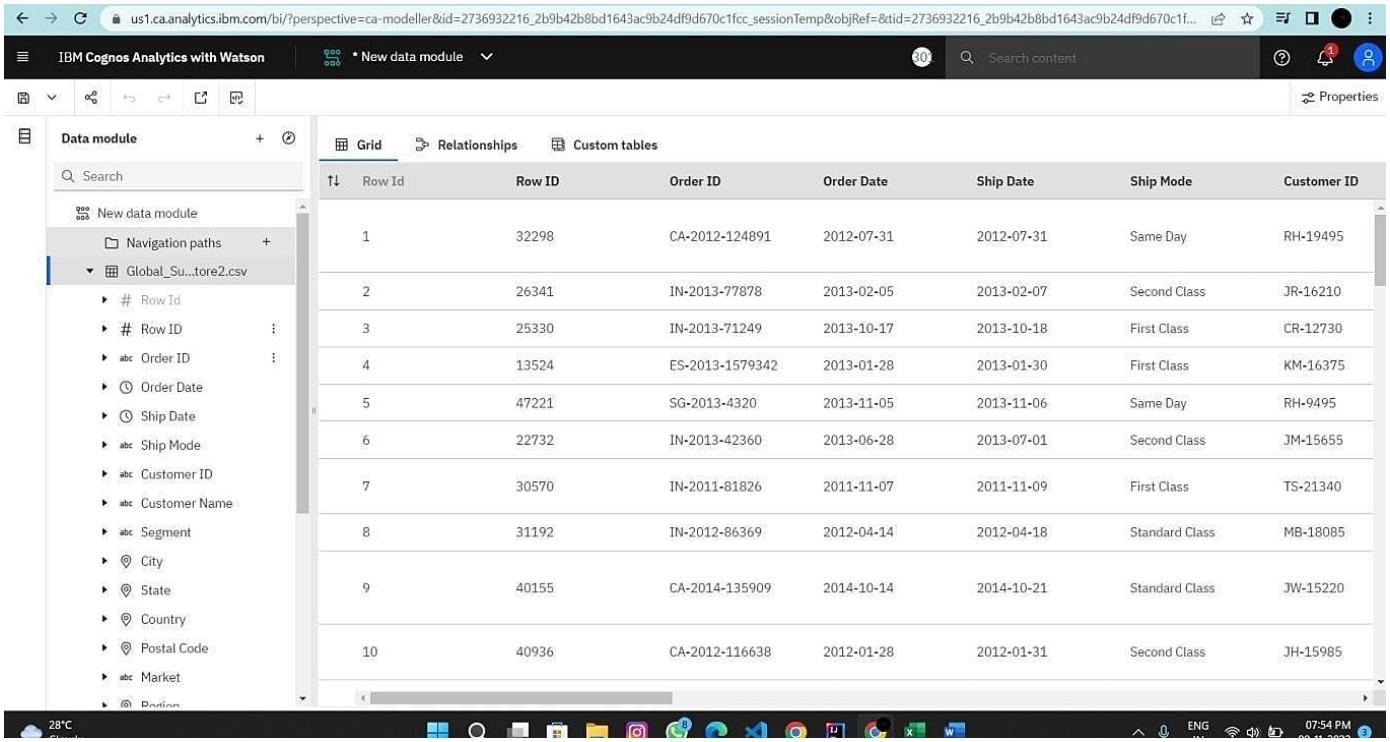
DATA UPLOADING:



MY CONTENTS:

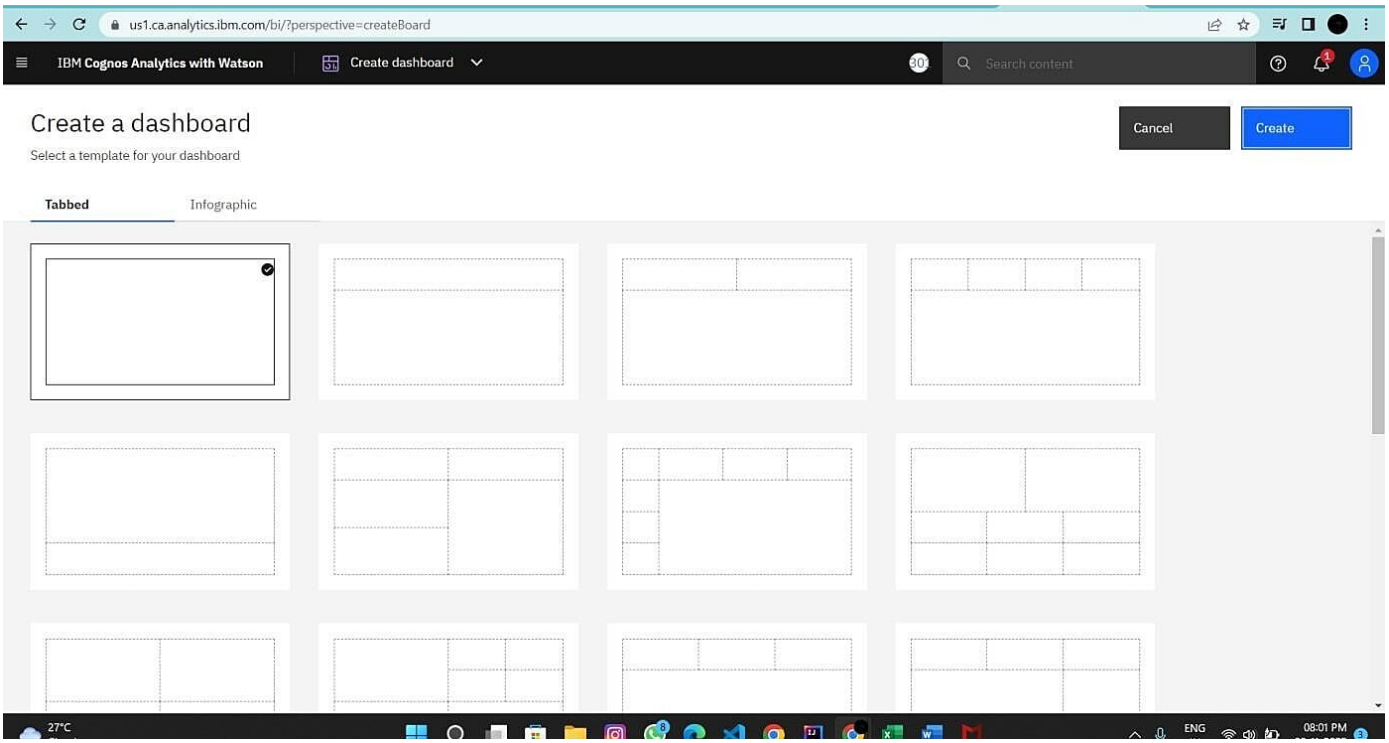


DATA COLLECTION:

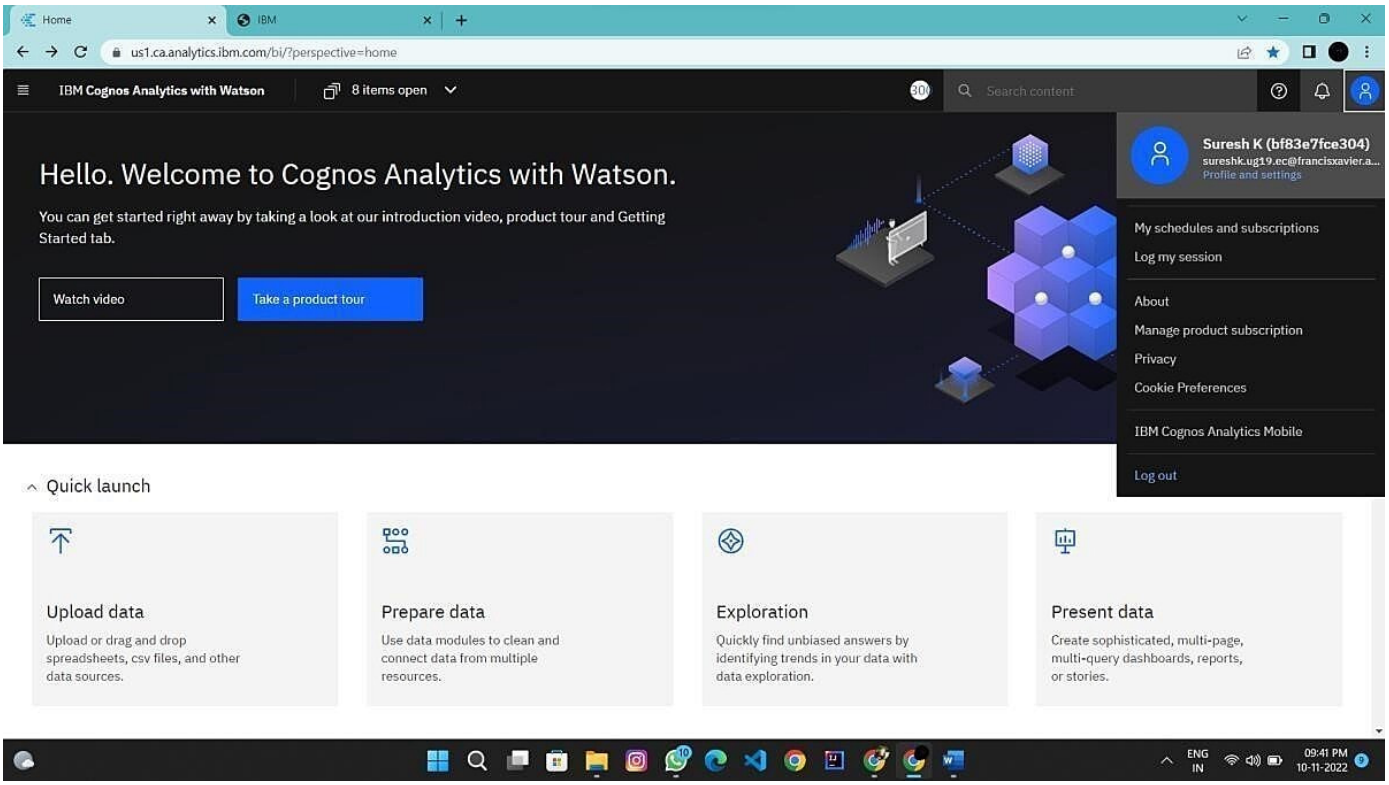


Row Id	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID
1	32298	CA-2012-124891	2012-07-31	2012-07-31	Same Day	RH-19495
2	26341	IN-2013-77878	2013-02-05	2013-02-07	Second Class	JR-16210
3	25330	IN-2013-71249	2013-10-17	2013-10-18	First Class	CR-12730
4	13524	ES-2013-1579342	2013-01-28	2013-01-30	First Class	KM-16375
5	47221	SG-2013-4320	2013-11-05	2013-11-06	Same Day	RH-9495
6	22732	IN-2013-42360	2013-06-28	2013-07-01	Second Class	JM-15655
7	30570	IN-2011-81826	2011-11-07	2011-11-09	First Class	TS-21340
8	31192	IN-2012-86369	2012-04-14	2012-04-18	Standard Class	MB-18085
9	40155	CA-2014-135909	2014-10-14	2014-10-21	Standard Class	JW-15220
10	40936	CA-2012-116638	2012-01-28	2012-01-31	Second Class	JH-15985

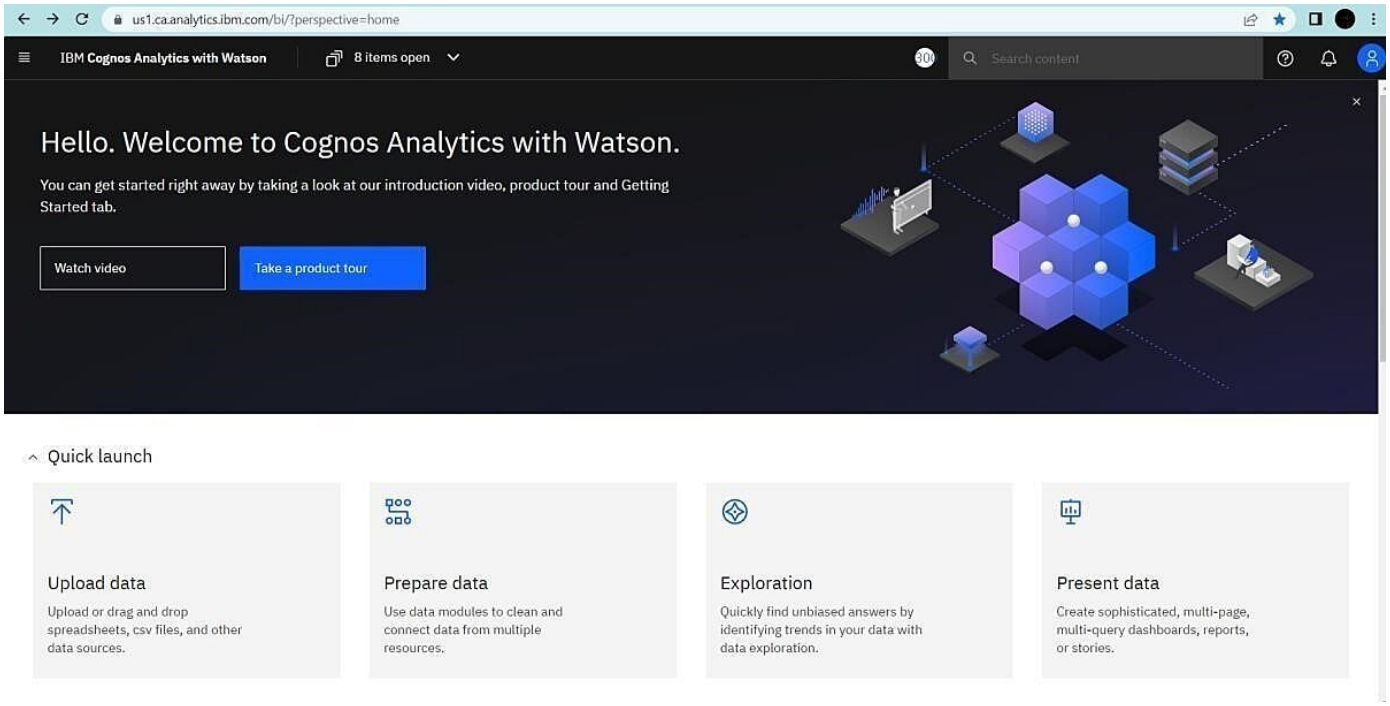
CREATING NEW DASHBOARDS:



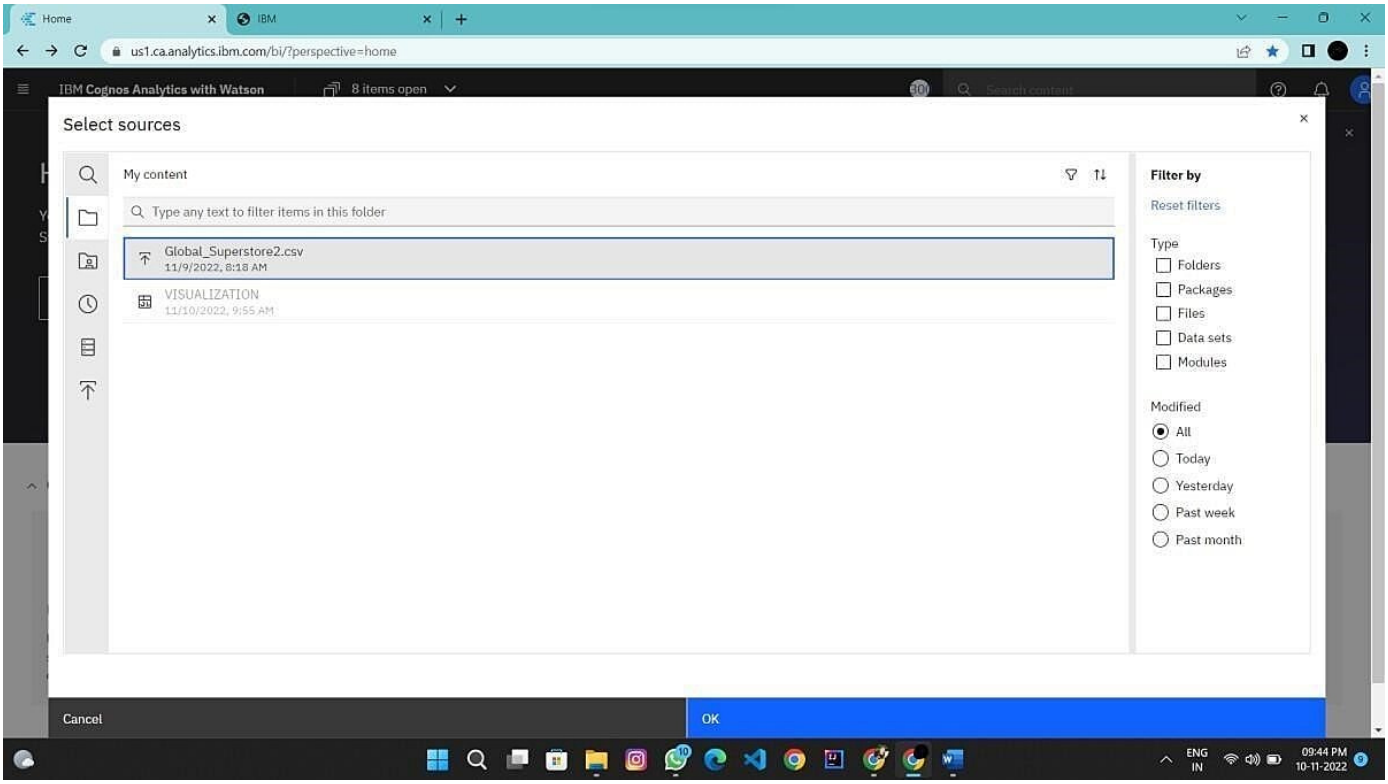
7.2.2FEATURE
OPEN IBM COGNOS ANALYTICS:



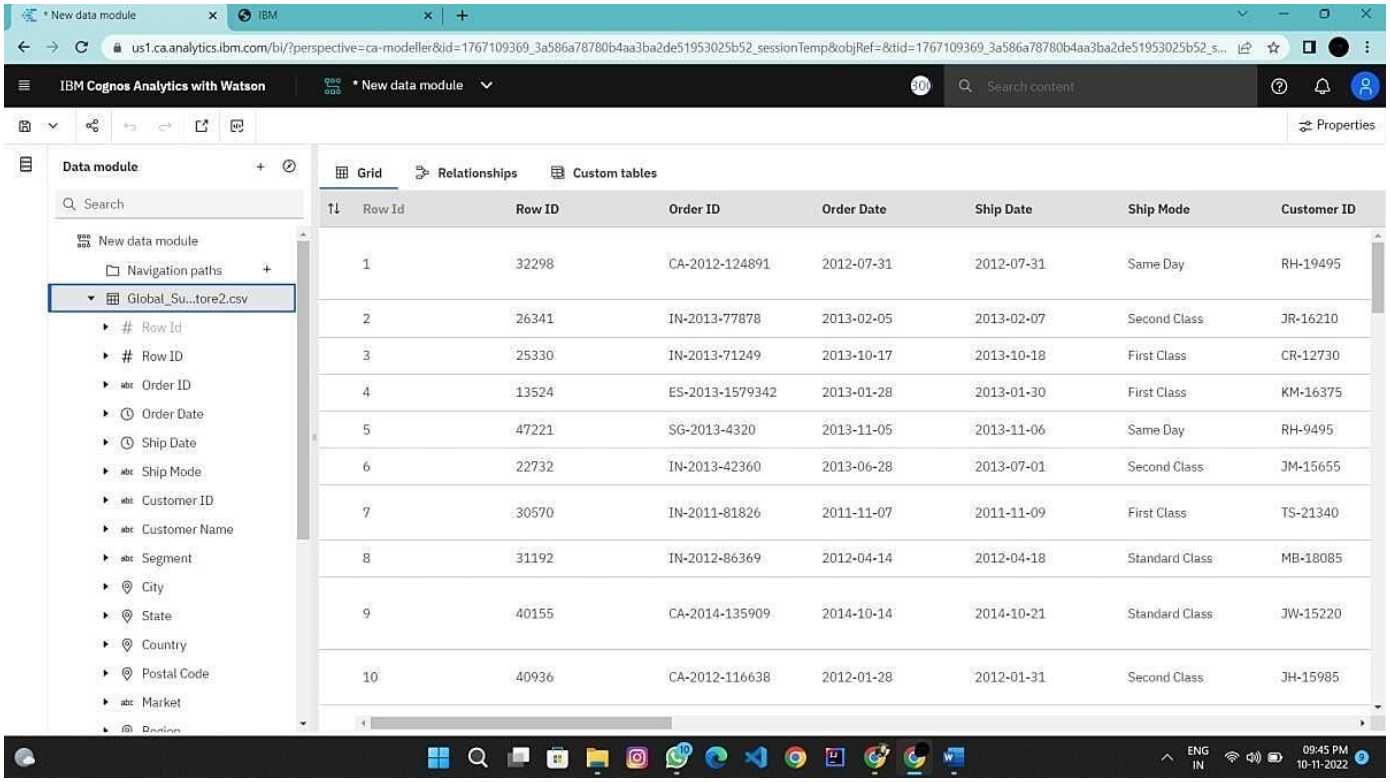
DATA PREPARATION:



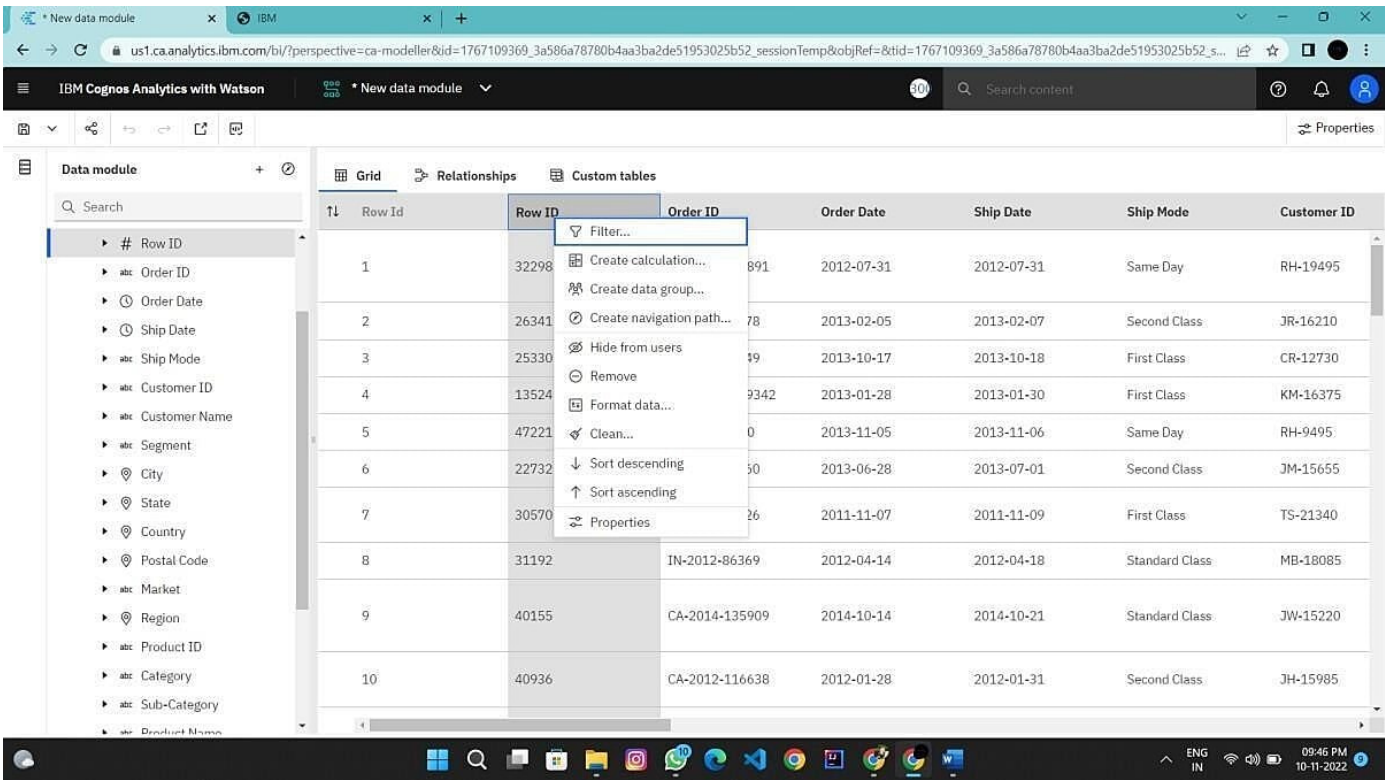
SELECT THE UPLOADED DATA:



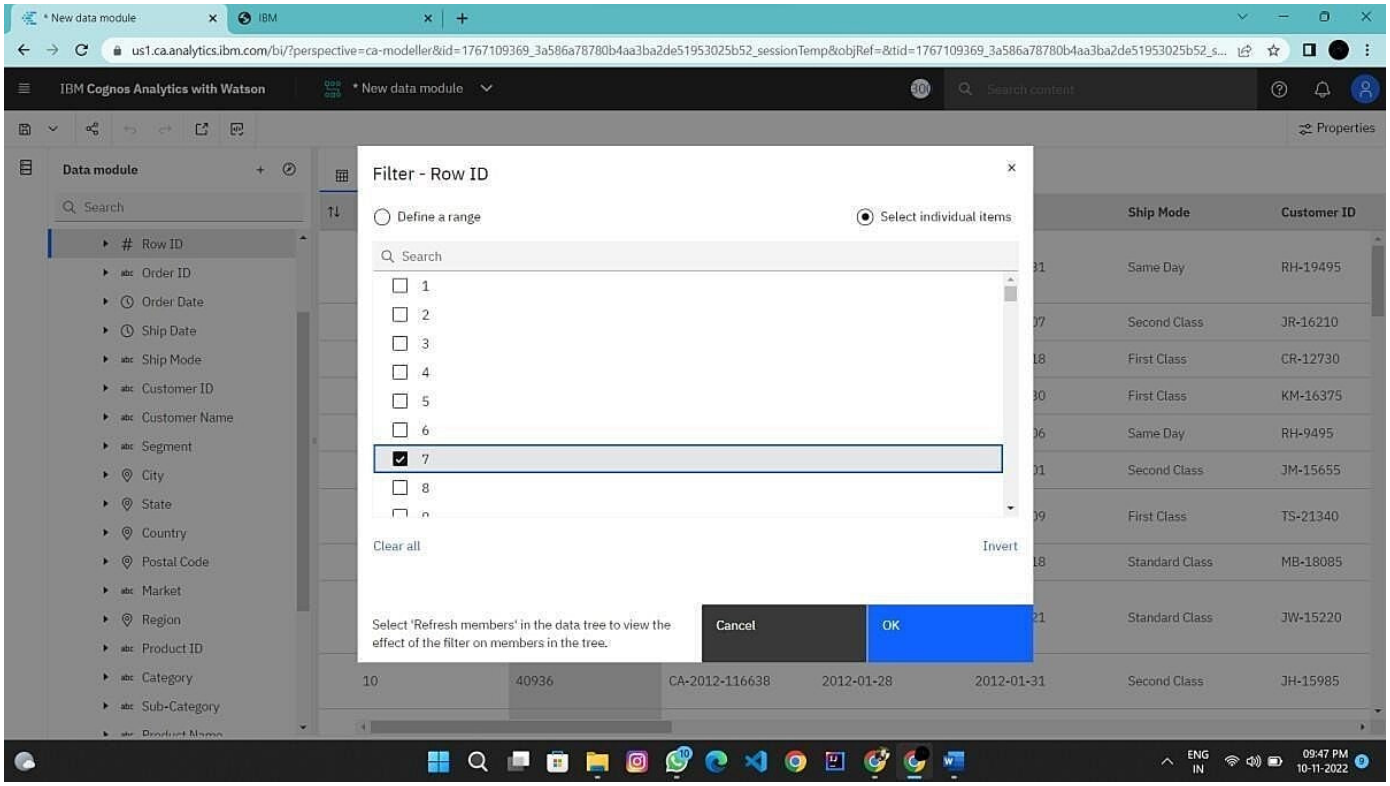
UNDERSTANDING THE DATASET:



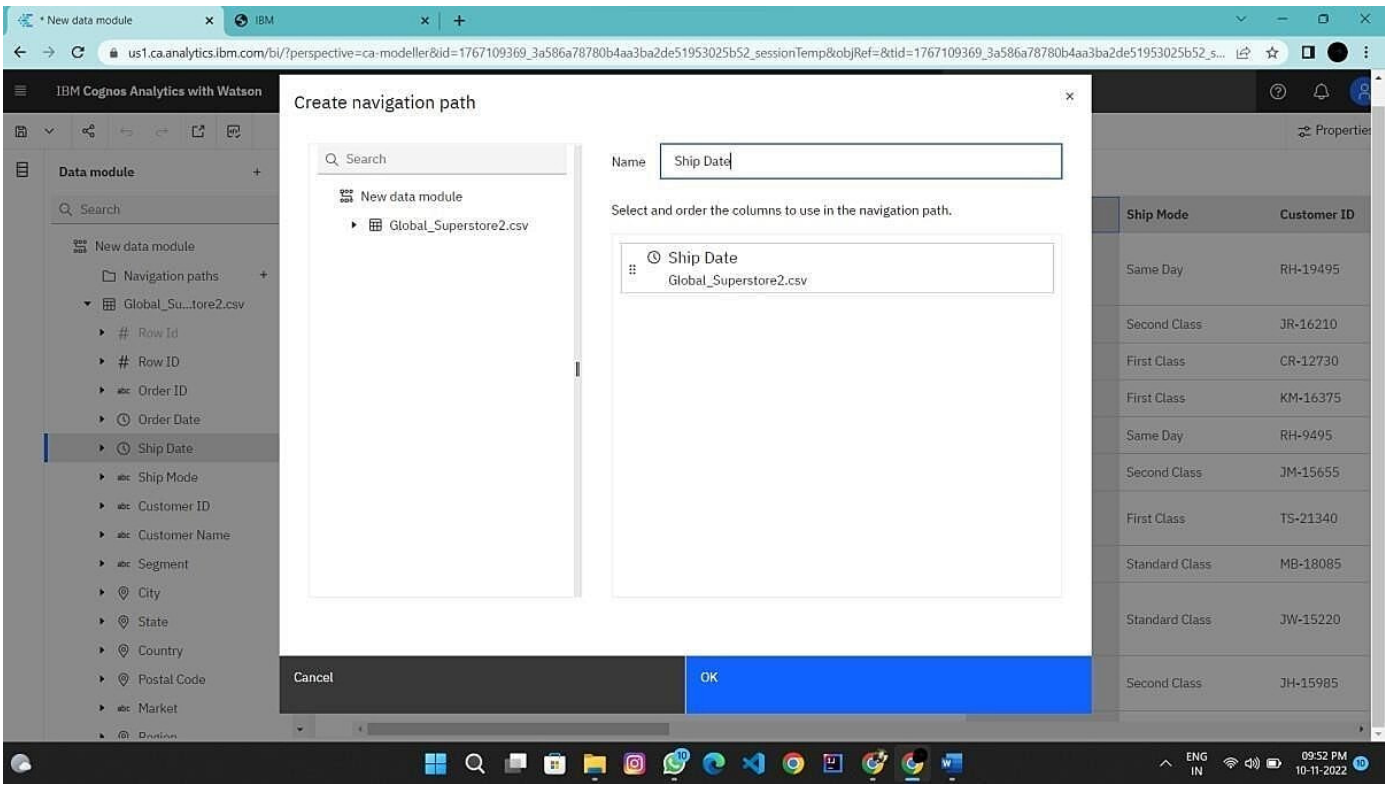
FILTERING THE DATA :



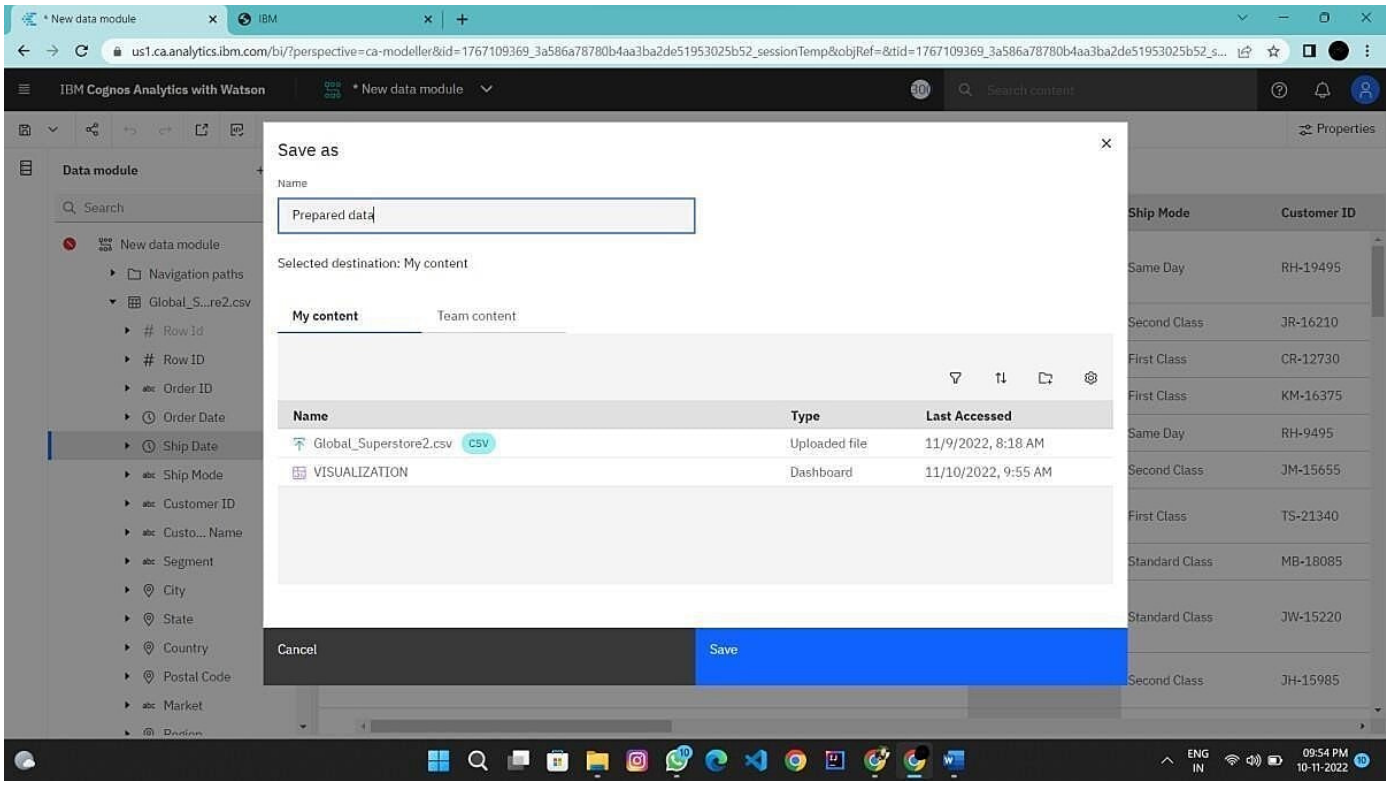
FILTER THE REQUIRED FIELD :



CREATING NAVIGATION PATH AMONG DATA :

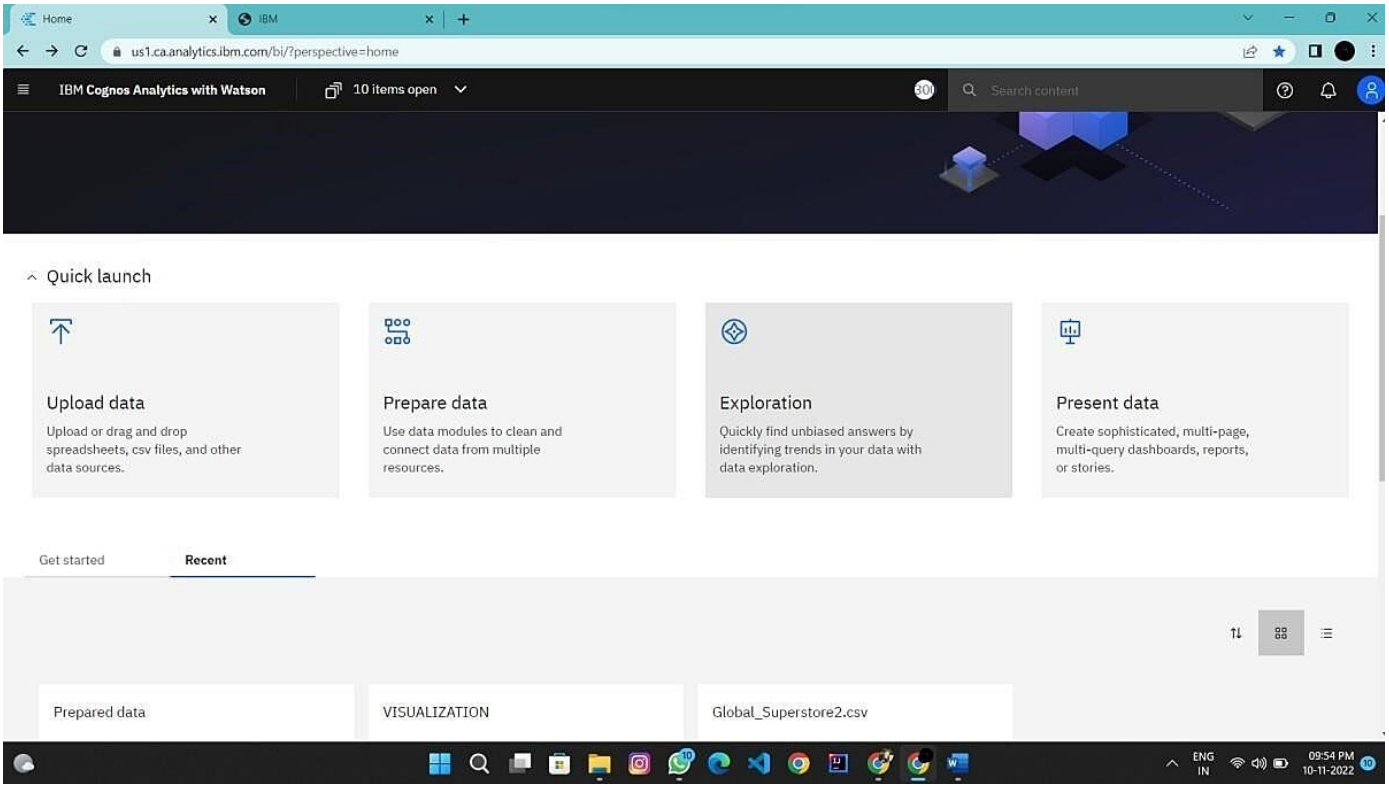


SAVE THE PREPARED DATA :

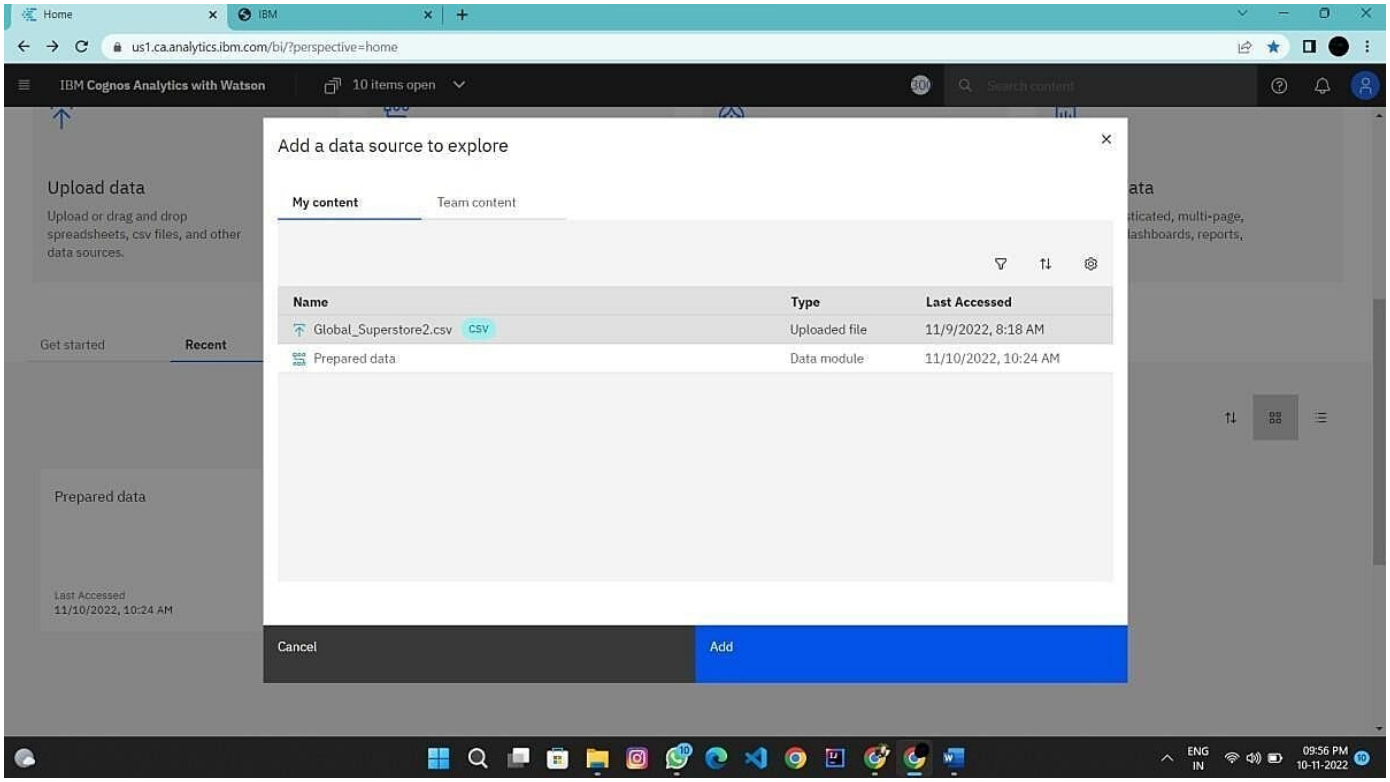


<u>DATA EXPLORING PHASE</u> :

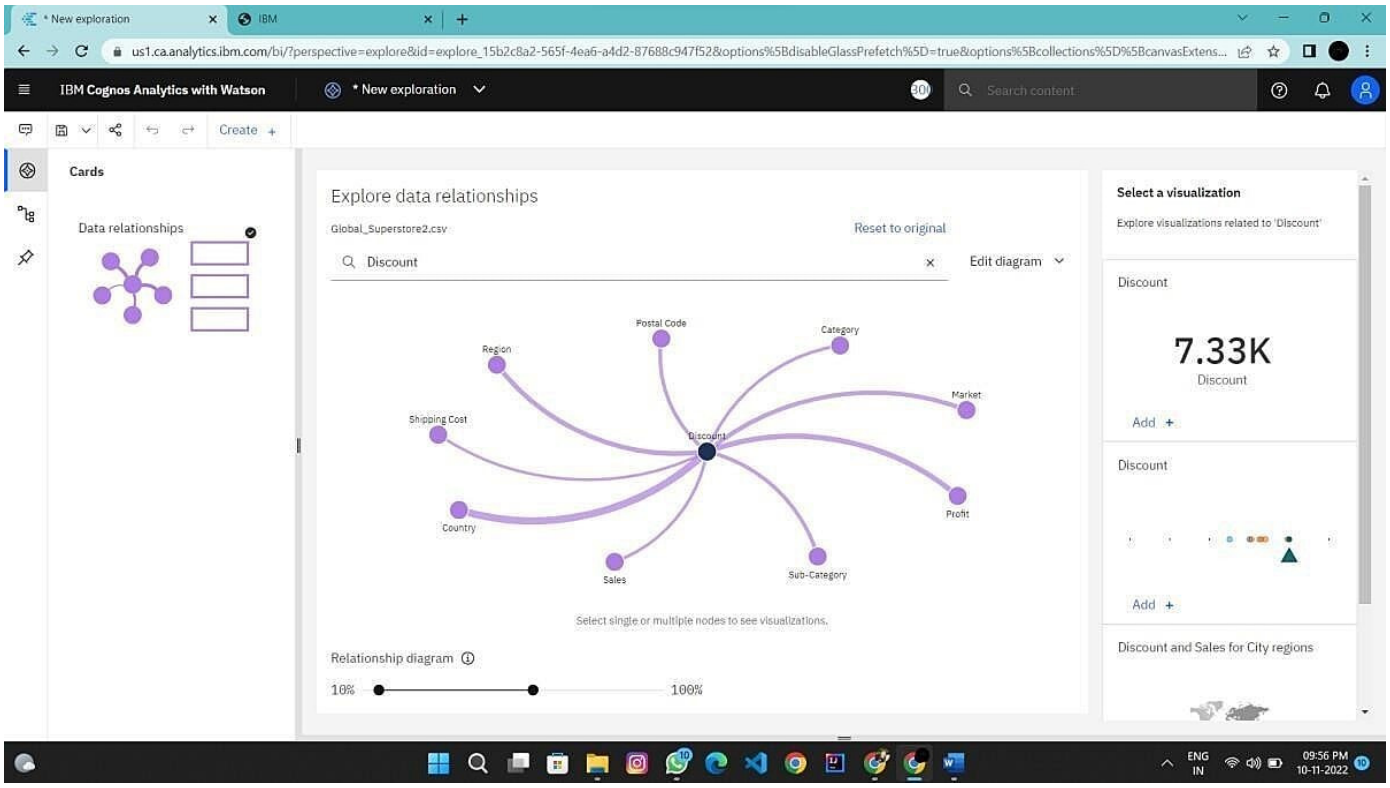
OPEN EXPLORE DATA :



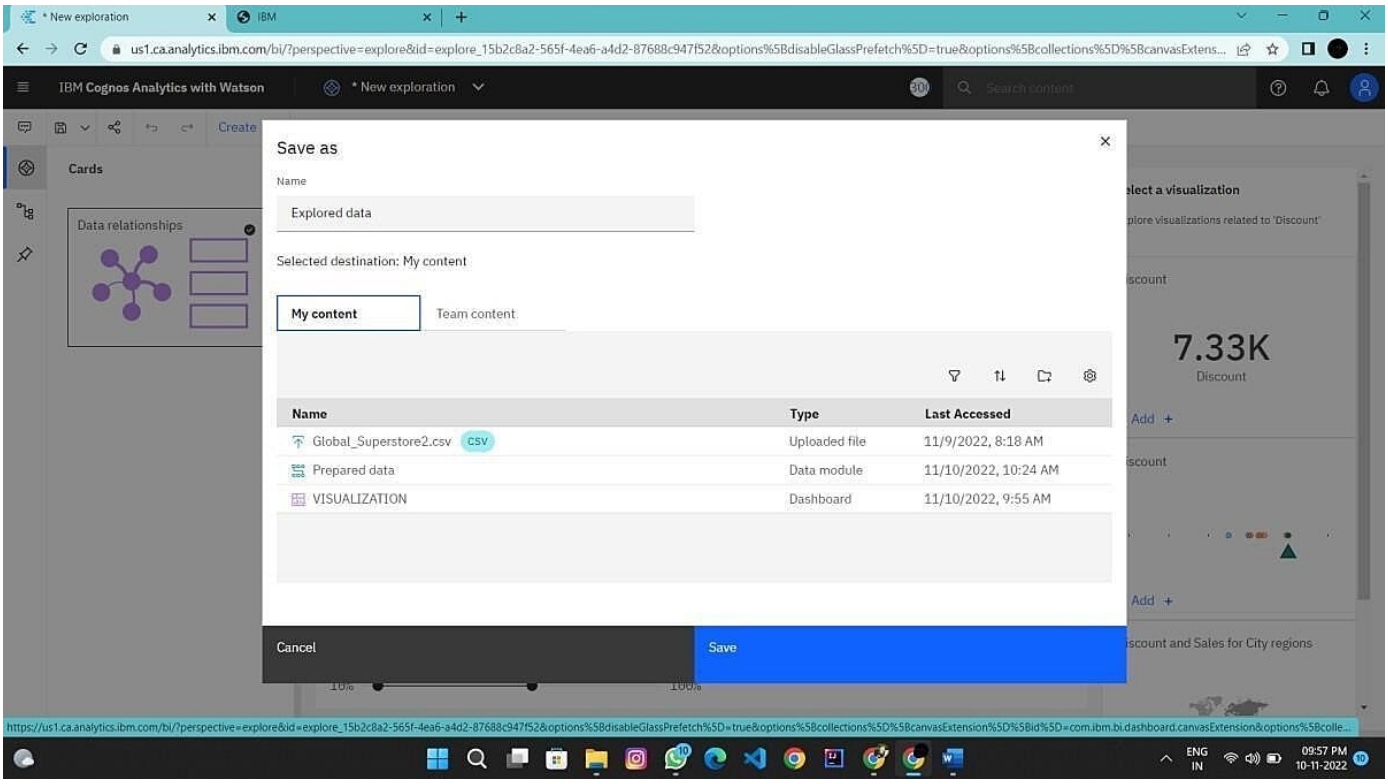
SELECT THE DATA TO BE EXPLORED :



START EXPLORING THE DATA AND CREATE RELATIONSHIPS BETWEEN THEM



SAVE THE EXPLORED DATA :



8. Testing

8.1 Test Cases

S.No	Test Cases	Pass/Fail
1	Using Year Filter and verifying all visualization charts and cards response	Pass
2	Using Customer Gender Filter and verifying all visualization charts and cards response	Pass
3	Using Customer Age Filter and verifying all visualization charts and cards response	Pass
4	Using Location Filter and verifying all visualization charts and cards response	Pass
5	Using Product Category Filter and verifying all visualization charts and cards response	Pass
6	Using Delivery Type filter and verifying all visualization charts and cards response	Pass
7	Using Delivery Status Filter and verifying all visualization charts and cards response	Pass
8	Using Star Rating Filter and verifying all visualization charts and cards response	Pass
9	Using Clear All Filter and verifying all visualization charts and cards response	Pass

8.2 User Acceptance Testing

S.No	Test Cases	Pass/Fail
1	Verify user is able to login to the website using different browsers	Pass
2	Verify user is able to access sign-up and login page perfectly	Pass
3	Verify working of all navigation bars on the website	Pass
4	Verify user is able to access the PowerBI Sales Dashboard after successful login	Pass
5	Veriify user is able to use all the features of the Dashboard seamlessly	Pass
6	Verify Managing multiple users	Pass

9. Results

9.1 Performance Metrics

S.No	Performance Metrics	Performance
1	Total Revenue KPI card	Validation Accuracy - 100%
2	Total Customers KPI card	Validation Accuracy - 100%
3	No. of Products KPI card	Validation Accuracy - 100%
4	Avg. Delivery Days KPI card	Validation Accuracy - 100%
5	Total Return Products KPI card	Validation Accuracy - 100%
6	Avg. Star Ratings KPI card	Validation Accuracy - 100%
7	Top 3 Most Ordered Products Chart	Validation Accuracy - 100%
8	Top 3 Most Ordered Product Categories Chart	Validation Accuracy - 100%
9	Top 3 Most Ordered Products by Sub Categories Chart	Validation Accuracy - 100%
10	Total Customers by Year, Quarter, Month and Day Chart	Validation Accuracy - 100%
11	Total Revenue by Year, Quarter, Month and Day Chart	Validation Accuracy - 100%
12	Ratings by Product Category and Sub Category Table	Validation Accuracy - 100%
13	Products sold over Year, Quarter, Month and Day Chart	Validation Accuracy - 100%
14	Revenue by products Chart	Validation Accuracy - 100%
15	Revenue by Locations Scroller	Validation Accuracy - 100%

10.Advantages & Disadvantages

Advantages

1.Creating a interactive Dashboard

2.Easy to understand

3.Helps to improve the business

4.Help the user to understand the marketing segments

5.Helps to predict a Trends

Disadvantages

1.It is only based on a Dataset

2.The Dashboard, Reports only based on the dataset

11. CONCLUSION

Historically, sales success has relied on intuition and subjectivity. Sales reps conduct in-depth research on prospects and then chase the most suitable fits. This process relies on trial and error to figure out prospects' expectations and apply the rep's intuitions to understand prospects' pain points. Reps use sales data analysis to make critical decisions. Adopting a data-driven sales approach takes subjectivity out of the equation and makes the whole process of selling more predictable and efficient. sales data and proper sales data analysis tools can speed up your growth rapidly.

12.FUTURE SCOPE

Visualization is quickly growing in importance in the world of big data. Businesses can no longer afford to operate without graphs and dashboards in their arsenal since they're extremely useful for presenting and understanding complex information. All the technology surrounding us, and mobile devices, in particular, has turned into data sources that changed the way organizations collect and crunch numbers with the goal of generating actionable insights. The best way for humans to perceive complex data is by means of sight. The ever enhancing, more visual and better representation of unstructured data. It could also be integrated into custom applications within individual organisation. As the use of such techniques increases and more better solutions are identified, after a certain point, the underlying analysing pattern can even be automated.

13 . Appendix

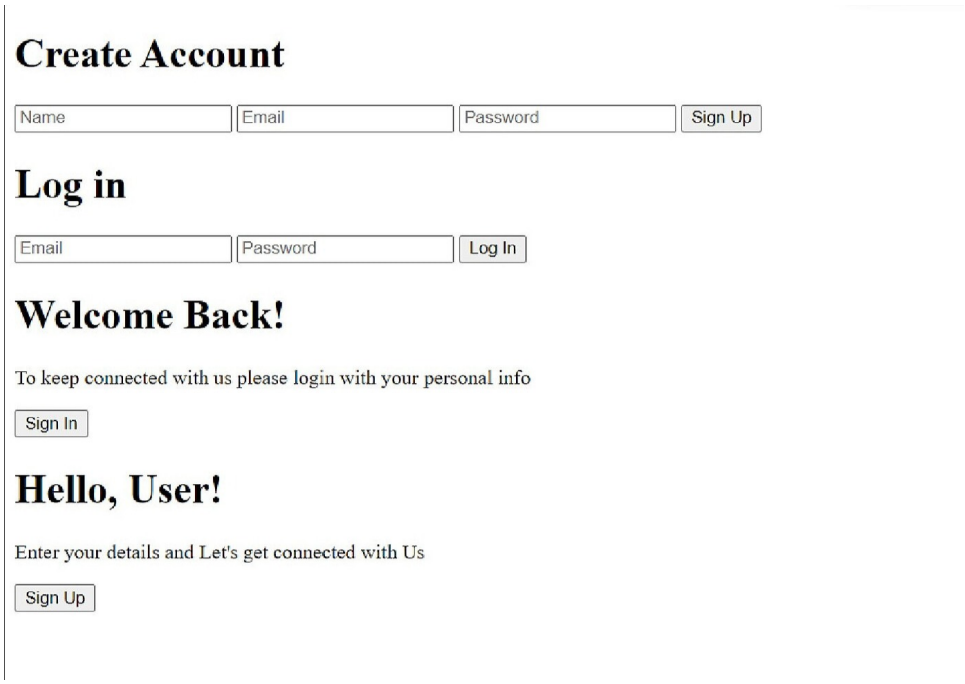
13.1 Source code

```
<!DOCTYPEhtml>
<htmllang="en">
 <head>
  <metacharset="utf-8" />
  <linkrel="icon" href="%PUBLIC_URL%/favicon.ico"/>
  <metaname="viewport" content="width=device-width, initial-scale=1" />
  <metaname="theme-color" content="#000000"/>
  <metaname="description" content="Social webpage for developers" />
  <linkrel="apple-touch-icon"href="%PUBLIC_URL%/logo192.png"/>
  <link rel="manifest" href="%PUBLIC_URL%/manifest.json" />
  <script src="https://kit.fontawesome.com/2ccbb879c2.js"
crossorigin="anonymous"></script>

  <title>Welcome to DevTon</title>
 </head>
 <body>
  <divid="root"></div>
 </body>
</html>
<!DOCTYPEhtml>
<htmllang="en">
<head>
  <metacharset="UTF-8">
  <metahttp-equiv="X-UA-Compatible"content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Document</title>
  <linkrel="stylesheet" href="./login-style.css">

</head>
<body>
<divclass="container" id="container">
 <divclass="form-container sign-up-container">
  <formaction="#">
   <h1>Create Account</h1>

   <inputtype="text" placeholder="Name"required/>
   <inputtype="email" placeholder="Email"required/>
```

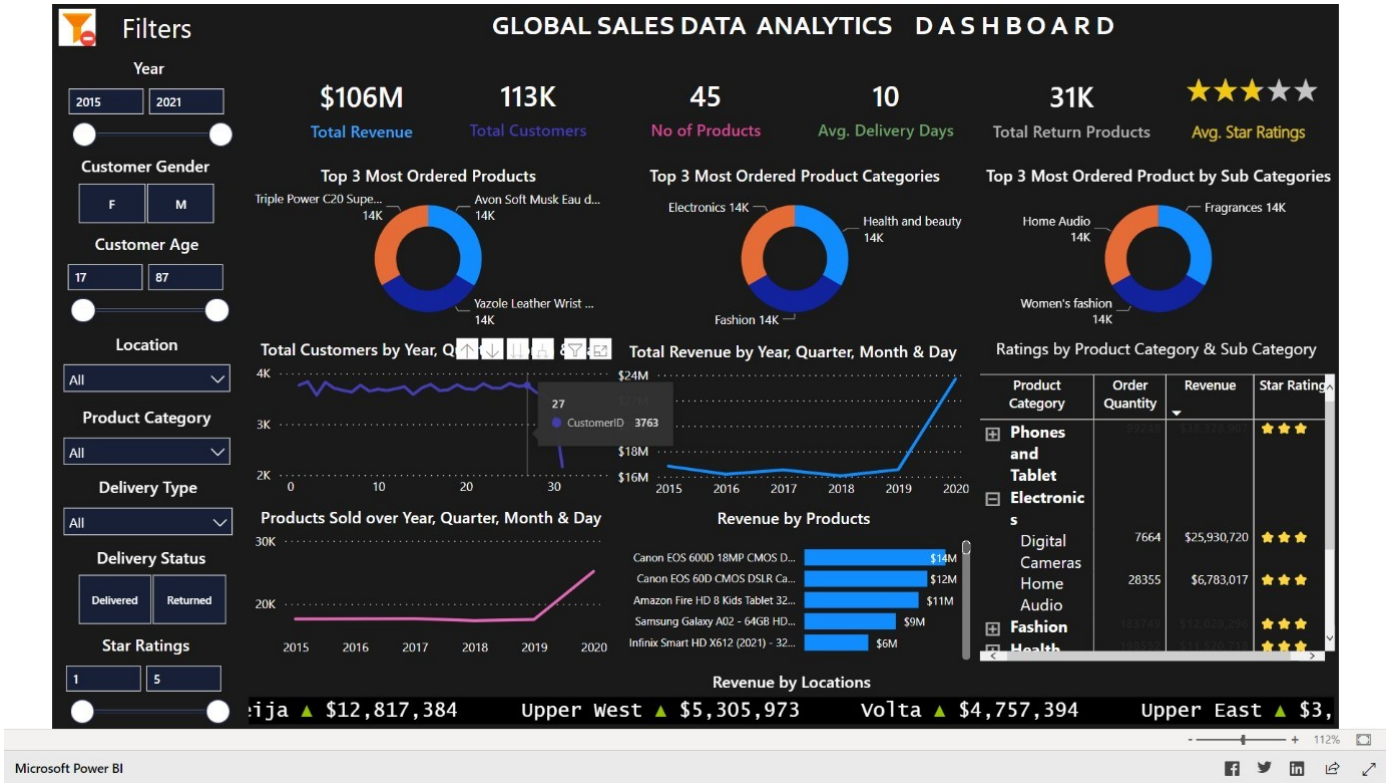
```
<inputtype="password" placeholder="Password"required/>
<buttonid="signIn">Sign Up</button>     </form>
```

```
 </div>
 <divclass="form-container sign-in-container">
  <form action="https://tinyurl.com/skysales-powerbi">
<h1>Log in</h1>
    <inputtype="email" placeholder="Email"required/>
    <inputtype="password" placeholder="Password"required/>
    <button>Log In</button>
  </form>
 </div>
 <divclass="overlay-container">
  <divclass="overlay">
    <divclass="overlay-panel overlay-left">
      <h1>Welcome Back!</h1>
      <p>To keep connected with us please login with your personal info</p>
      <buttonclass="ghost" id="signIn">Sign In</button>
    </div>
    <divclass="overlay-panel overlay-right">
      <h1>Hello, User!</h1>
      <p>Enter your details and Let's get connected with Us</p>
<button class="ghost" id="signUp">Sign Up</button>
    </div>
  </div>
 </div>
</div>

<script>    const signUpButton =
document.getElementById('signUp');    const signInButton =
document.getElementById('signIn');    const container =
document.getElementById('container');
          signUpButton.addEventListener('click', () => {
container.classList.add("right-panel-active");
  });
  signInButton.addEventListener('click', () => {
container.classList.remove("right-panel-active");
  });
</script>
</body>
</html>
```

DATA PREPARATION SET SOLUTION:



SOURCE CODE EXECUTION:



13.2 GITHUB AND PROJECT DEMO:

GitHub Details

Project Title : Global Sales Data Analytics

GitHub Link :

https://github.com/IBM-EPBL/IBM-Project-35473-1660285010

Project Video

Platform: Youtube, Google Drive

Video Link:
https://drive.google.com/drive/folders/1--jnJTcAnYiWEOMhpshMBpR6BUdcnfv4
https://youtu.be/GOL-HsYnXpg
https://youtu.be/BbUR6hX4NgU