TEAM ID	**PNT2022TMID19510**
PROJECT TITLE	**Retail Store Stock Inventory Analytics**

Retail Store Stock Inventory Analytics Report

1.INTRODUCTION

1.1 PROJECT OVERVIEW

The retail industry has gone through tremendous technological changes in the past few decades. The retail inventory management software can cut short your in-store inventory process cycles through analytics. The retail inventory management software can automatically count the items in your warehouse with better accuracy. Hence, it can provide you with updated inventory reports. Consumers benefit from retailing as retailers perform marketing functions that make it possible for customers to have access to a broad variety of products and services. A retail inventory management system can integrate sales and inventory data. Applied for all types of retail stores. Retail inventory management solutions automate your administration and documentation, raise accuracy, improve the customer experience, reduce costs and reveal valuable trends. Prioritize purchases based on an item's profitability, popularity and lead time. Then, create a purchase order.

1.2 PURPOSE

By managing inventory, retailers meet customer demand without running out of stock or carrying excess supply. In practice, effective retail inventory management results in lower costs and a better understanding of sales patterns.

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

S.NO	PAPER	AUTHOR	YEAR	METHOD AND ALGORITHM	ACCURACY/ PRECISION
1	Analyzing Retail Stocks	Glenn Curtis	2022	For an industry that's supposed to make shopping easy, retailers can sure make analyzing retail stocks hard. The good news is, despite the sector's surplus of investing metrics, the task gets easier once you know which ones really matter. Here's a nine-point checklist for sizing up a retail stock..	94%

2	*The Retailer's Ultimate Guide to Inventory Management*	Alix Fraser r.	2021	By taking what you learn from tracking your inventory and applying it to the economic order quantity (EOQ) formula, you can determine exactly how large an order should be to minimize storage and ordering costs. **Q=√[(2DS)/H]**	98%
3	Inventory management is one of the pillars of a successful retail operation. Retail inventory management techniques help stores and ecommerce sellers satisfy customers, reduce costs and increase profits.	David Luther	2020	This plan-ahead technique tells a retailer how much merchandise to buy in dollar terms for a fixed period. The goal is to ensure there's adequate supply and to generate positive cash flow. The formula is: Planned sales **+** projected end-of-period inventory on hand, in transit and on order **-** planned beginning of period inventory = **OTB at retail cost**	96%

2.2 REFERENCE

2.3 PROBLEM STATEMENT

This dataset contains a lot of historical sales data of a Brazilian top retailer

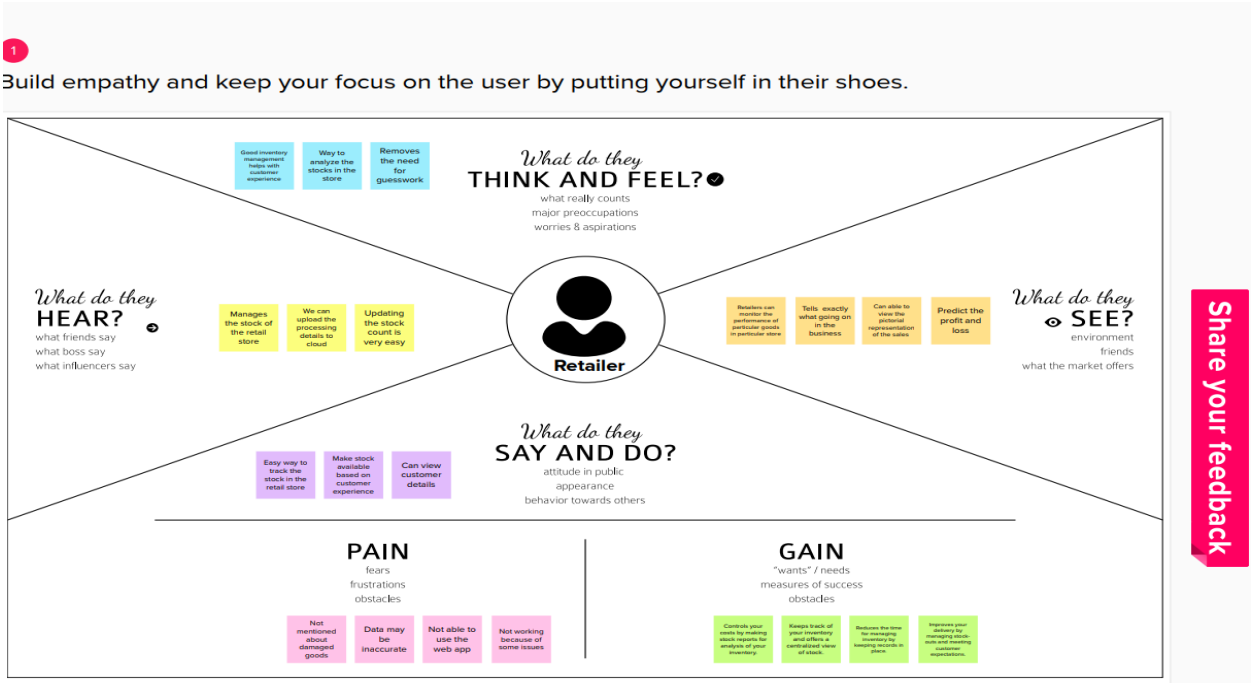
Basic Questions of every retailer : How much inventory should I carry? Too much inventory means working capital costs, operational costs and a complex operation, lack of inventory leads to lost sales, unhappy customers and a damaged brand.

This is why short-term forecasting is so important in the retail and consumer goods industry.

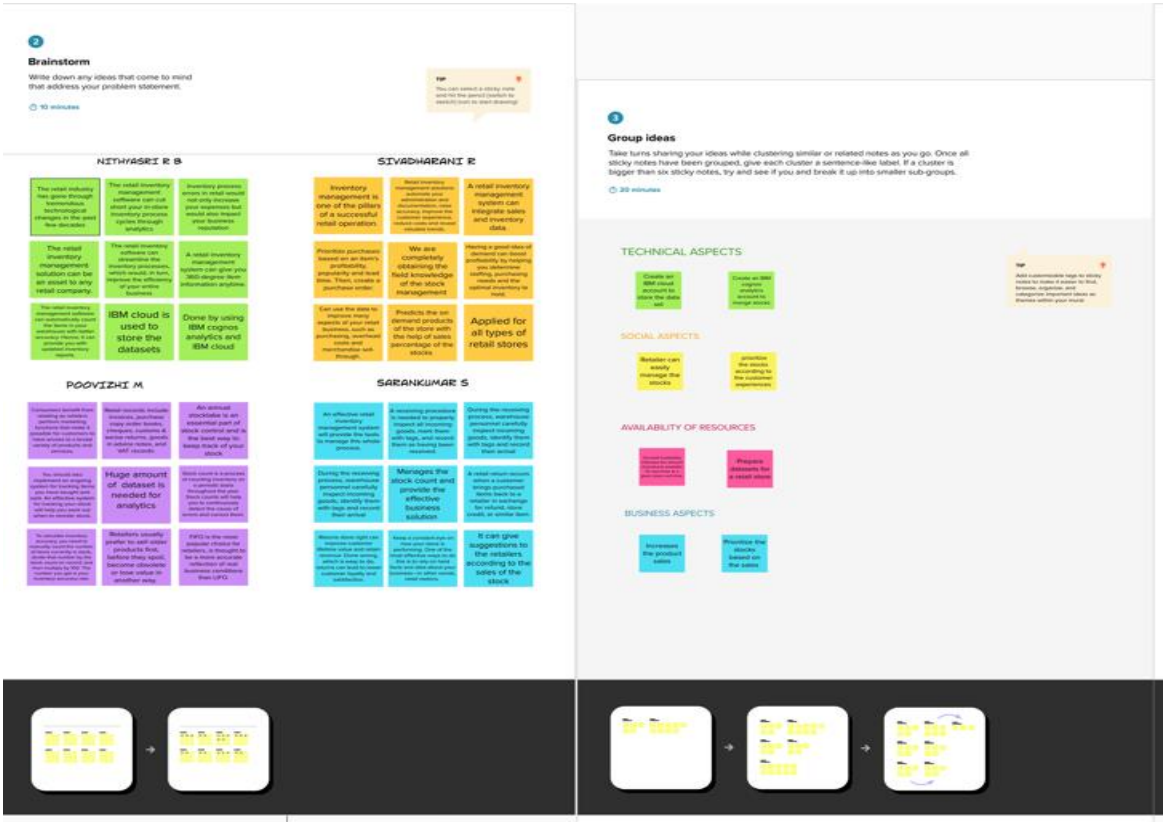
Technical Architecture:

3. IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION AND BRAINSTORMING



Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

Share the mural
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

Export the mural
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.
Open the template →

Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template →

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template →

Share template feedback

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	This dataset contains a lot of historical sales data of a Brazilian top retailer. Basic Questions of every retailer : How much inventory should I carry? Too much inventory means working capital costs, operational costs and a complex operation, lack of inventory leads to lost sales, unhappy customers and a damaged brand. This is why short-term forecasting is so important in the retail and consumer goods industry.
2.	Idea / Solution description	This analytics model manages the stocks of the retail store. Provide analytics of the sales of the stocks. Produce sales trend by analysing the selling of the product. It prioritize the stocks according to the customer sales. Also create monthly sales rate of the sales. It suggests special discounts for regular customers to attract the customers.
3.	Novelty / Uniqueness	• Accuracy in the analytics of the stocks. • It gives solutions to the unsold stocks. • It produces good user experience and also provides suggestions based on trends. • It manages the profit and loss of the retail store. • Provides data integrity.
4.	Social Impact / Customer Satisfaction	• Effortless access: Users on this platform will be able to use this model with just One-click . • Easy to understand the customer's needs • It saves time and maintain the dataset of the complex sales and customer details efficiently.
5.	Business Model (Revenue Model)	
6.	Scalability of the Solution	This project is based on retailing. There are huge number of retail stores are running over. So, it will be on demand as it is helpful to analyse the complex datasets.

3.4 PROBLEM SOLUTION FIT

DefineCS, fitintoCC

1.CUSTOMER SEGMENT(S)

Inventory Manager who is responsible to track the inventory status, inorder to meet the consumer's demand neither running out of the stocks nor carrying the excess of supply and also responsible to provide right goods to the consumers in right quantity at right place in right time

6.CUSTOMER

Data in accuracies cause labeling mistakes, productquality issues and can become very costly when it comes to a monetary value or damage to the brand.

Managing inventory spaces to accommodate new inventory stock scan be a daunting task.

5.AVAILABLE SOLUTIONS

Traditionally,businesses manage inventory is available, through which the forecasting and maintaining safety stock levels to support emergencies and surprise business can achieved.

ExploreAS,differentiate

Focuson J&P, tapinto BE,understand RC

2.JOBS-TO-BE-DONE/PROBLEMS J&P

9. PROBLEM ROOT CAUSE RC

- The poor inventory management is the real reason behind the failure of stock maintenance.
- Beyond having too little or too much inventory, poor inventory management can also causes inefficiencies and increases the risk of mistakes in reordering inventory from suppliers or of selling nonexistent inventory.
- Inorder to eliminate such issues,an effective retail store stock inventory analysis is needed.

7.BEHAVIOUR BE

- Overstocking-Track and manage the high-demand inventory using cycle counting data to set automatic reorder points and optimize shipments by average lead time.
- Poor Communication-Introduce integrated dashboards with real-time inventory data and a simple user interface to communicate and manage workflows across accounting, sales and warehouse operations.
- Poor Production Planning-Track and manage the availability of the top 20% of the inventory that generates 80% of the demand using an inventory management system with advanced demand forecasting and reporting features.

Focuson J&P, tapinto BE,understand RC

Identifystrong TR &EM

3.TRIGGERS TR

- A reorder point is the unit quantity that triggers the purchase of a particular stock item and exhibits always being beware of the market predictions as well as possible using most accurate stock prediction-MASD.
- Ensure how to familiar with fillings and replenishment optimization.
- Customers wDho can satisfied with their demands and met the availability of the products.

4. EMOTIONS: BEFORE/ AFTER EM

BEFORE:

- Due to imbalanced inventory,it becomes hard to maintain the balanced stock which pays a way to lose the profit of that sale and also making the risk of losing the customers.
- A low rate of inventory, high cost of shortage, high amount of obsolute inventory may happens.

After:

- Enble to ensure that there are sufficient goods so that demand can be met without overstocking or understocking.
- It improves consumer retention and engagement and offers centralized view of stock.

10.YOUR SOLUTION SL

- Using "Modern inventory systems" can help to track inventory levels and raise red flags when the stock levels decline. This allows retailers to re-stock before they running-out-of stock.
- Based on "Analysis of Safety Stock Customer Service Level",it can reduce high inventory levels of stocks.
- Improve the decision making process oriented at reducing costs and increase revenues.

8.CHANNELS OF BEHAVIOUR

8.1 ONLINE: CH

- Modern Omnichannel inventory allows businesses to handle complex supply chains while ordering from multiple vendors .
- As well as multichannel inventory track orders from various sales sources on inventory that is stored at multiple locations, such as marketplaces, ecommerce retail,and wholesale.

8.2 OFFLINE:

- Enables to keep check on the warehouses where you have actually store product.
- Physical touch and feel of the product.
- Events andTrade shows.

4.REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

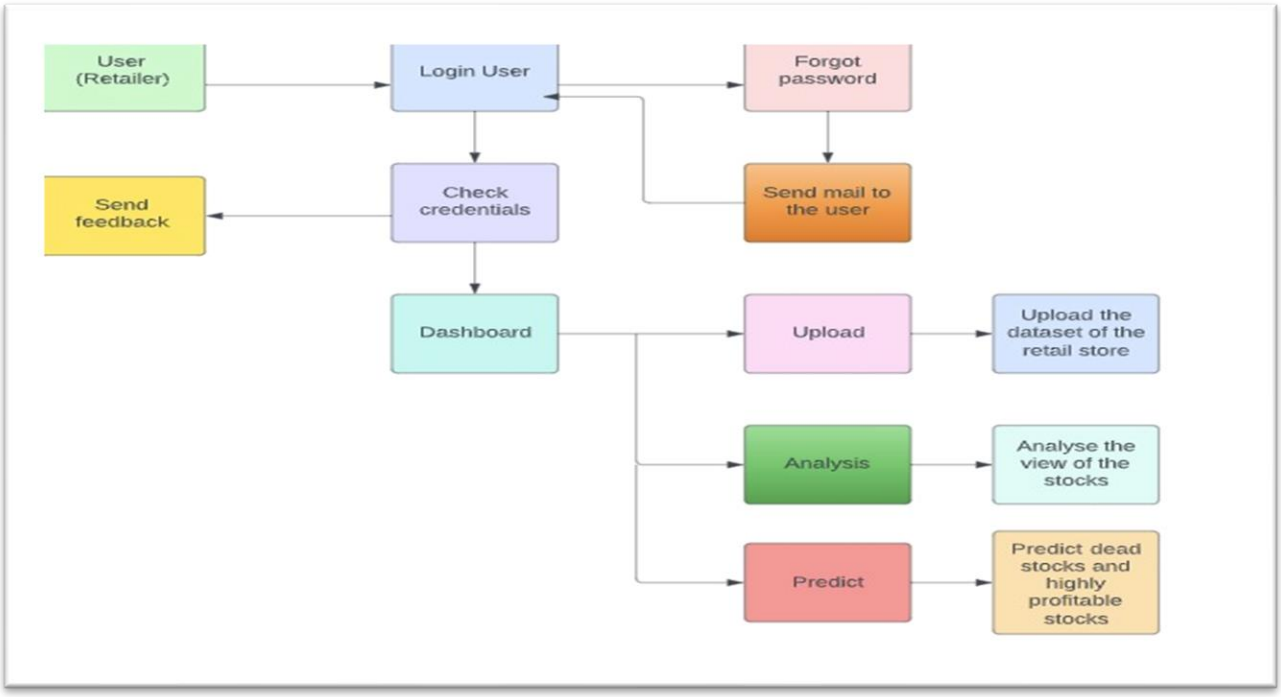
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Login	Login with username Login with password
FR-4	Profile update	Update the user credentials Update the Contact details
FR-5	Uploading Data	Collect the customer details as well as product details Upload the product details This model predicts the best sold products and also it analysis the available stocks
FR-6	Recommendation	User will request for Item Get the Item recommendations
FR-7	Ratings and Reviews	The user i.e retailer of any shop can give their ratings and view of this models

4.2 NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	They are more likely to have enough inventory to capture every possible sale while avoiding overstock and minimizing expenses. This model can be supported on both desktop and mobile browsers.
NFR-2	**Security**	This can be used only by the users who have their proper login credentials
NFR-3	**Reliability**	Avoid over or understocking Ensure accurate inventory valuation Prevent order delays Reduce dead stock
NFR-4	**Performance**	In a departmental store, the billing technique is digitalized .The database of the customer that is the name of the customer, mobile number, address and

5.PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS



5.2 SOLUTION AND TECHNICAL ARCHITECTURE

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	IBM Cognos Analytics
2.	Dashboard Logic-1	Logic for a process in the dashboard	IBM Cognos Analytics
3.	Dashboard Logic-2	Logic for a process in the dashboard	IBM Cognos Analytics
4.	Dashboard Logic-3	Logic for a process in the dashboard	IBM Cognos Analytics
5.	Database	Data Type, Configurations etc.	IBM
6.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
8.	Data Analytics & Machine Learning Model	Purpose of Machine Learning Model	Predictive Analytics Model, etc.
9.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	IBM Cognos Analytics
2.	Security Implementations	Security in IBM Cognos Analytics is optional. Typically, anonymous users have limited read-only access.	Authentication providers, Authorization, Cognos namespace, IBM Cognos Application Firewall.
3.	Scalable Architecture	You can enable or disable services run by the dispatcher on individual servers to balance the load for a given computer by request type	XML, SOAP, WSDL
4.	Availability	Web based data modelling, Interactive dashboards and enterprise reports, Data exploration and prediction	XML, SOAP, WSDL
5.	Performance	User population grow, processing requests tend to increase in number and complexity and network capacity and other aspects of infrastructure may be modified. These changes can affect IBM Cognos BI performance.	XML, SOAP, WSDL

SOLUTION 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 web application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, after completing the registration I will receive confirmation email once I have registered for the web application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the web application through LinkedIn	I can register & access the dashboard with LinkedIn Login	Low	Sprint-2
		USN-4	As a user, I can register for the web application through Google account	I can register & access the dashboard with Gmail login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password after installing the web application.	I can access the dashboard by login into the application	High	Sprint-1
	Dashboard	USN-6	As a user, I can view the charts and graphs representation of the dataset and the information shown in the dashboard.	I can analyse the stocks in my retail store.	High	Sprint-1
Customer (Web user)		USN-1	As a user, I can register for the web application entering my email, password and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, after completing the registration I will receive confirmation email once I have registered for the web application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the web application through LinkedIn	I can register & access the dashboard with LinkedIn Login	Low	Sprint-2
		USN-4	As a user, I can register for the web application through Google account	I can register & access the dashboard with Gmail login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the web application by entering email & password after installing the application.	I can access the dashboard by login into the application	High	Sprint-1

6. PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

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	10	6 Days	24 Oct 2022	29 Oct 2022	10	29 Oct 2022
Sprint-2	12	6 Days	31 Oct 2022	05 Nov 2022	12	05 Nov 2022
Sprint-3	10	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
Sprint-4	4	6 Days	14 Nov 2022	19 Nov 2022	4	19 Nov 2022

Velocity: Imagine we have a 6-day sprint duration, and the velocity of the team is 9(approx) (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

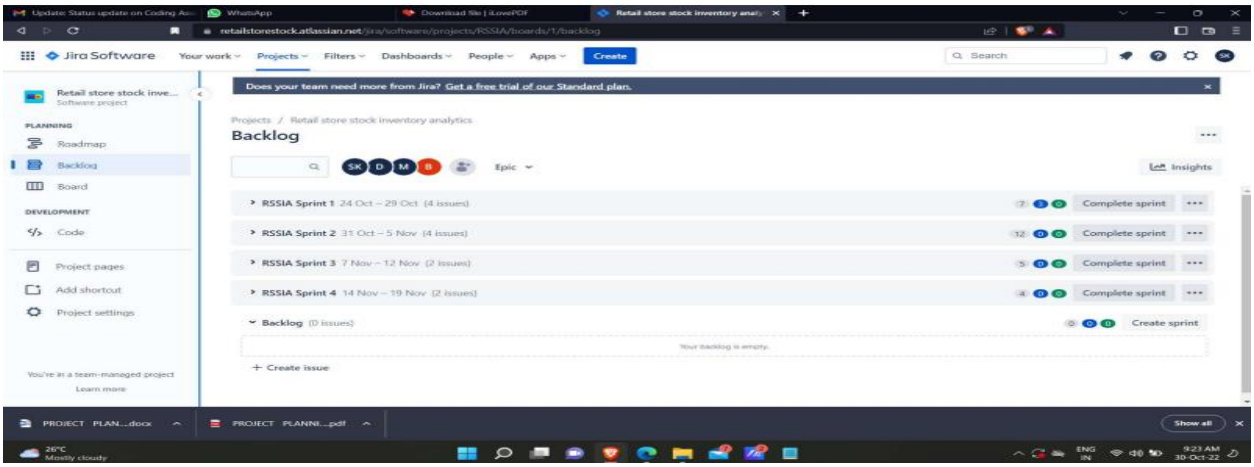
AV=Sprint duration/velocity=9/6=1.5

6.2 SPRINT DELIVERY SCHEDULE

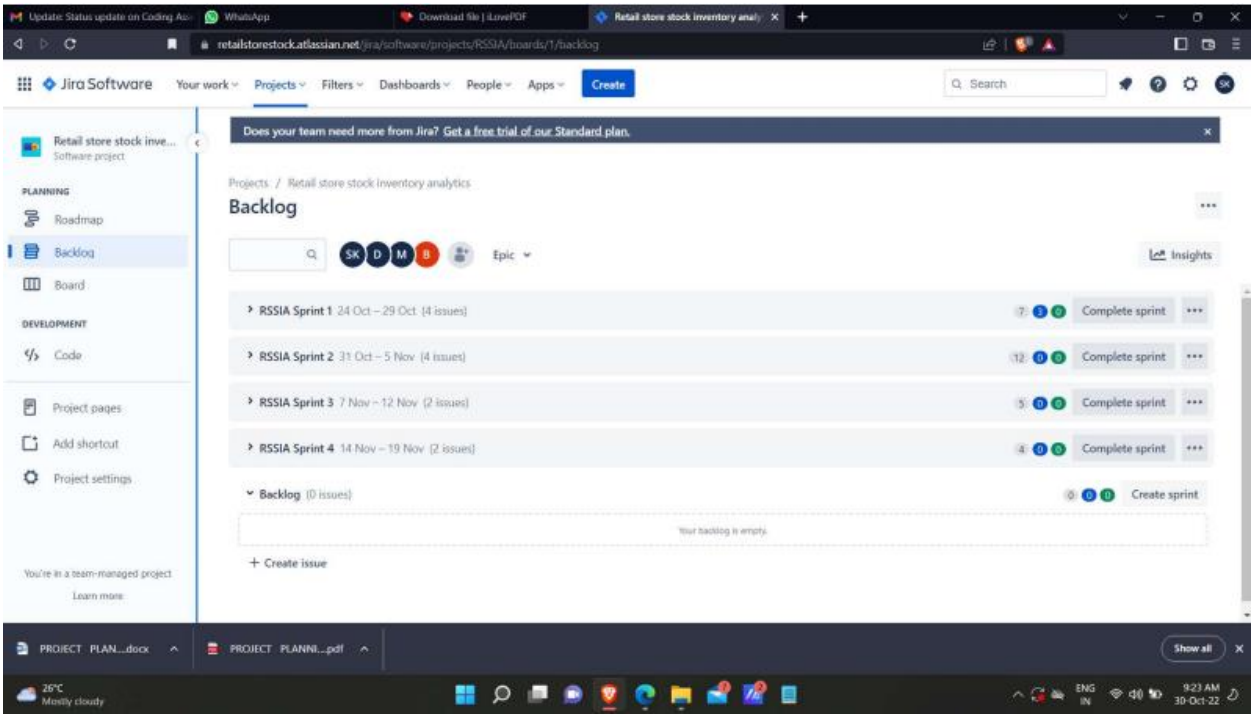
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration(Mobile user)	USN-1	As a user, I can register for the web application by entering my email, password,and confirming my password.	3	High	Team member-2
Sprint-1		USN-2	As a user, after completing the registration Iwill receive confirmation email once I have registered for the web application	2	High	Team member-3
Sprint-2		USN-3	As a user, I can register for the webapplication through LinkedIn	3	Medium	Team member-2
Sprint-2		USN-4	As a user, I can register for the webapplication through Google account	3	Medium	Team member-3
Sprint-3	Login	USN-5	As a user, I can log into the application by entering email & password	2	High	Team member-2
Sprint-4	Dashboard	USB-6	As a user, I can view the charts and graphs representation of the dataset and theinformation shown in the dashboard.	2	High	Team member-4
Sprint-1	Registration(Web user)	USB-1	As a user, I can register for the web application entering my email, password andconfirming my password.	3	Medium	Team member-1
Sprint-1		USB-2	As a user, after completing the registration Iwill receive confirmation email once I have registered for the web application	2	Medium	Team member-4
Sprint-2		USB-3	As a user, I can register for the webapplication through LinkedIn	3	High	Team member-1
Sprint-2		USB-4	As a user, I can register for the webapplication through Google account	3	Medium	Team member-4
Sprint-3	Login	USB-5	As a user, I can log into the web applicationby entering email & password after installingthe application.	3	High	Team member-3
Sprint-4	Dashboard	USB-6	As a user, I can log into the web applicationby entering email & password after installingthe application.	2	High	Team member-1

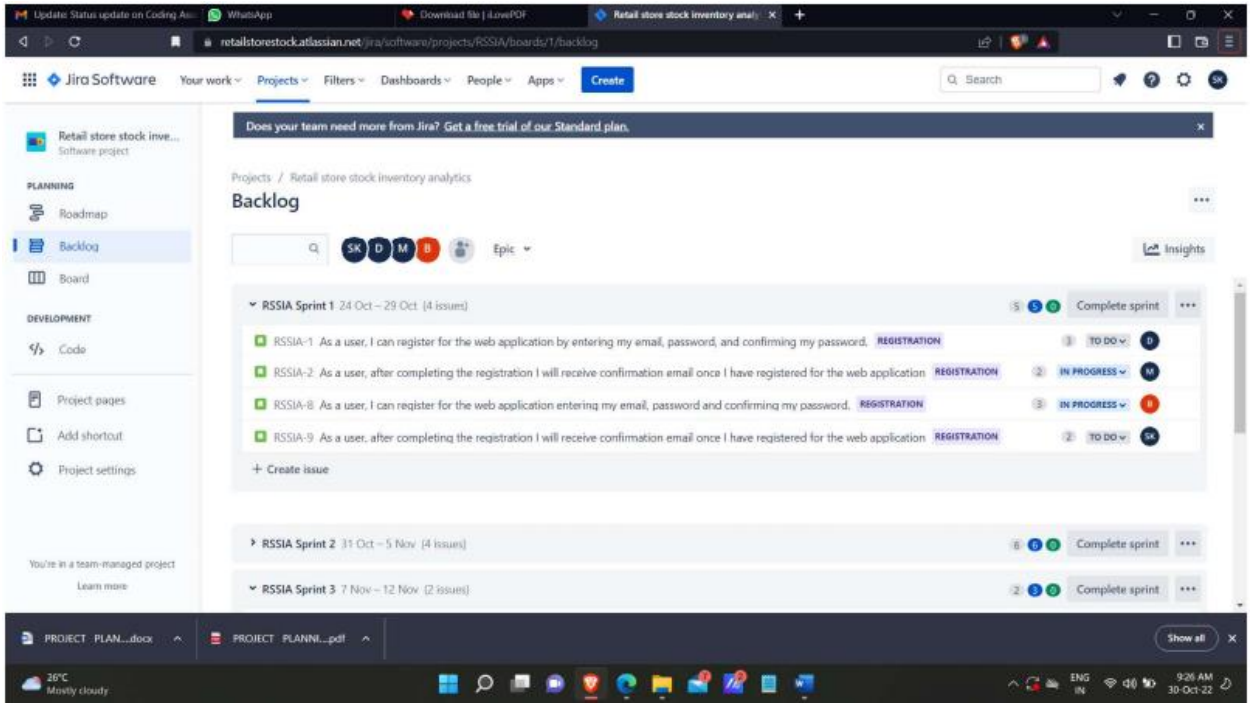
6.3 REPORTS FROM JIRA

1.Image showing the Backlogs create in the JIRA Software(RSSIASpring1, RSSIA Spring2, RSSIA Spring3, RSSIA Spring4)

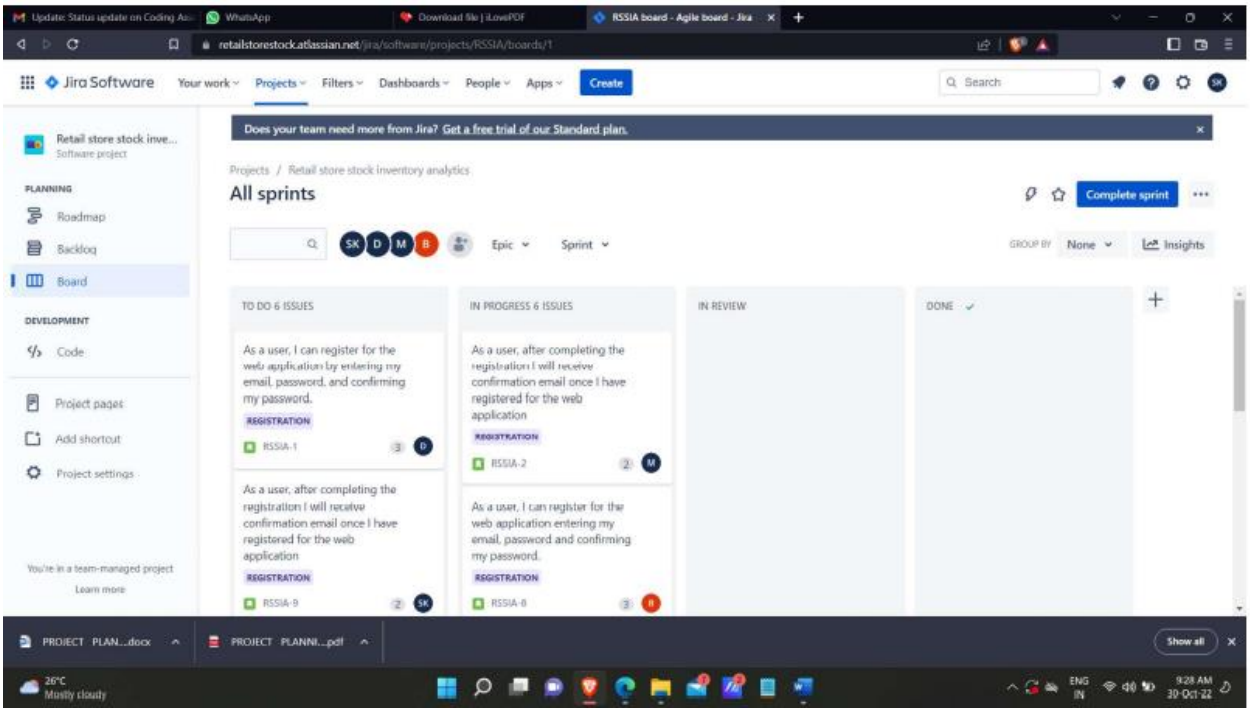


2.Image showing the User Stories in the respective sprints

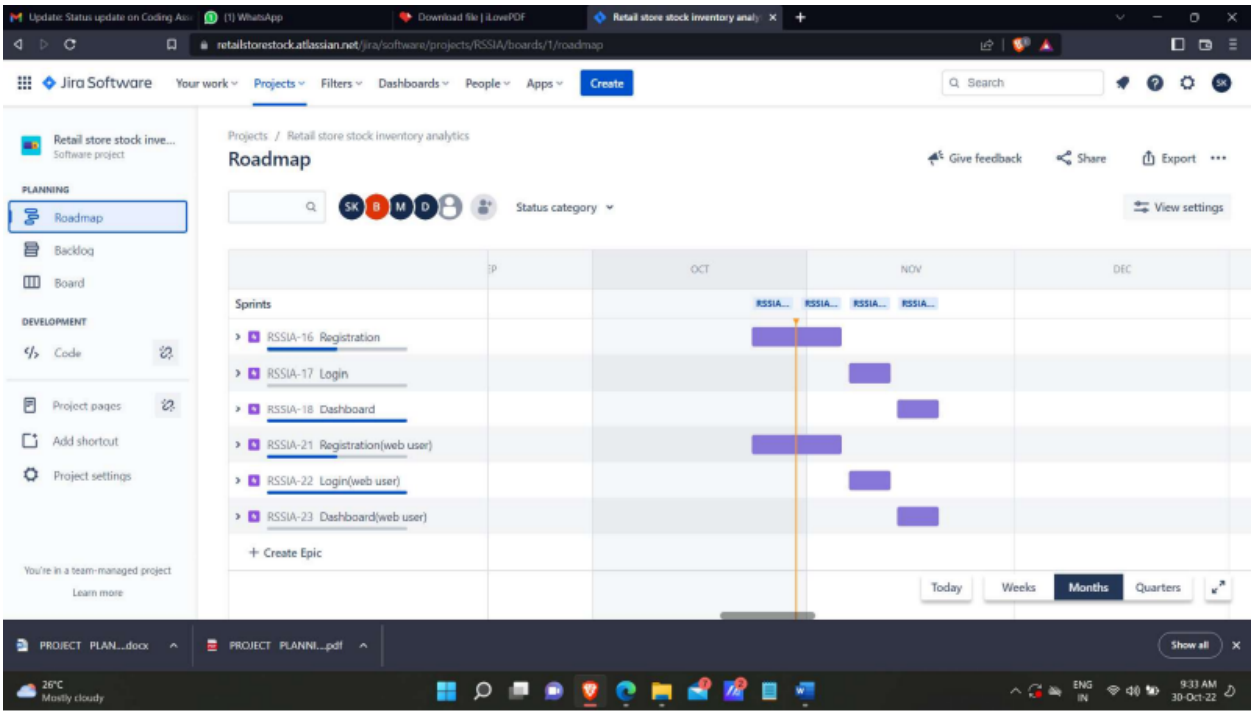




3.Image showing the workspace progress of the sprint.



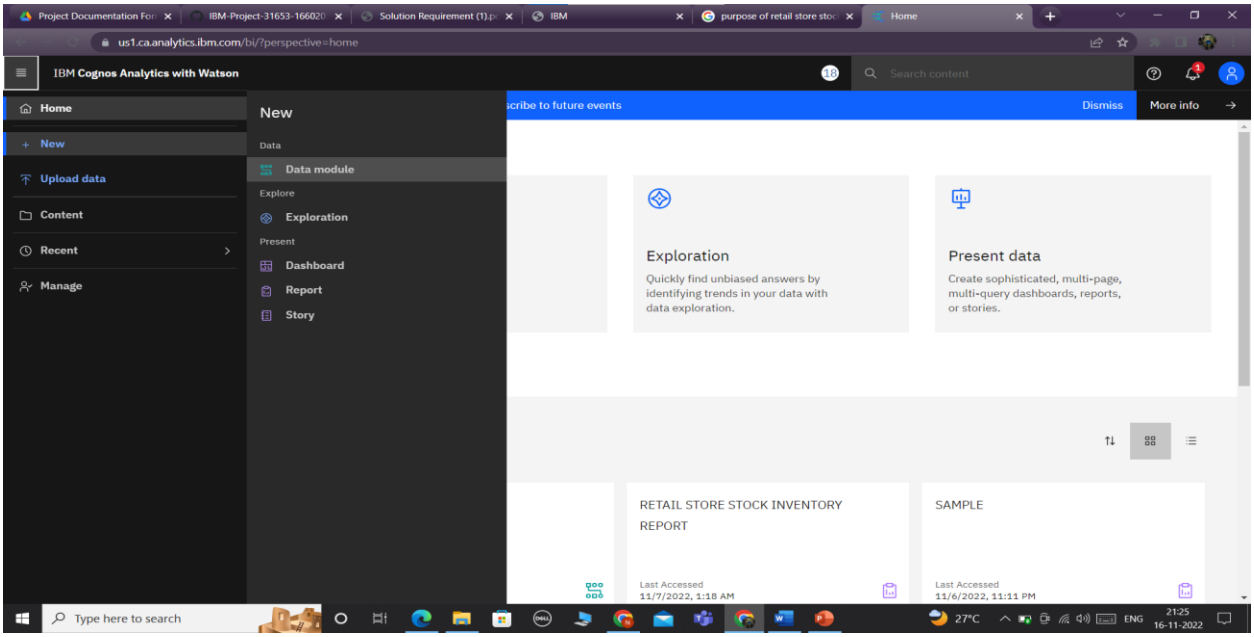
4.Image showing the Roadmap of Sprints



7. SOLUTIONING

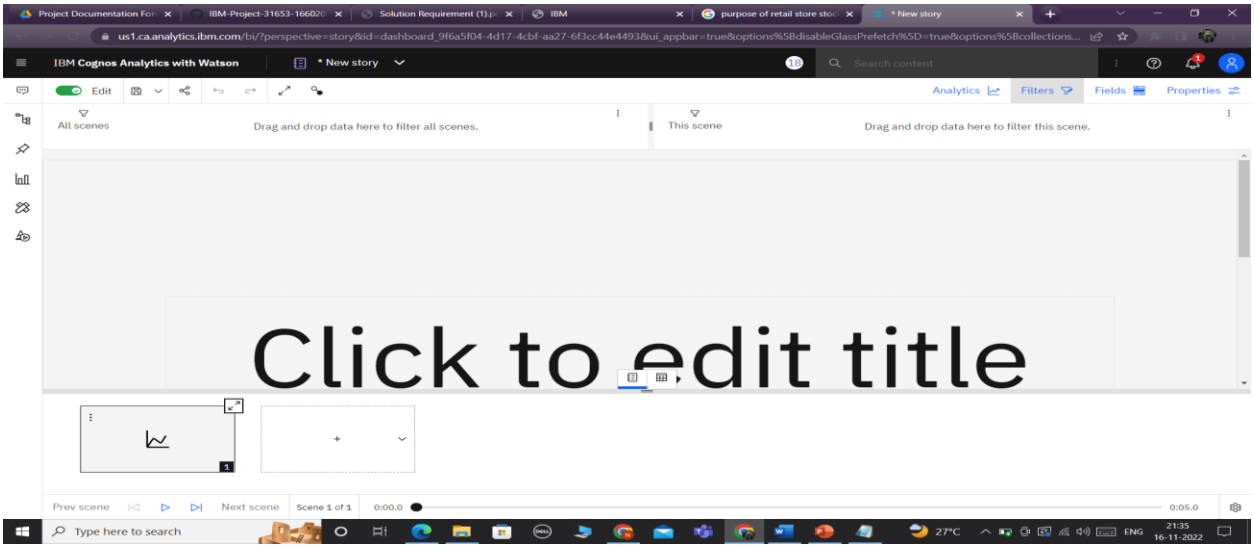
7.1 FEATURE 1

DASHBOARD AND REPORT:



7.2 FEATURE 2

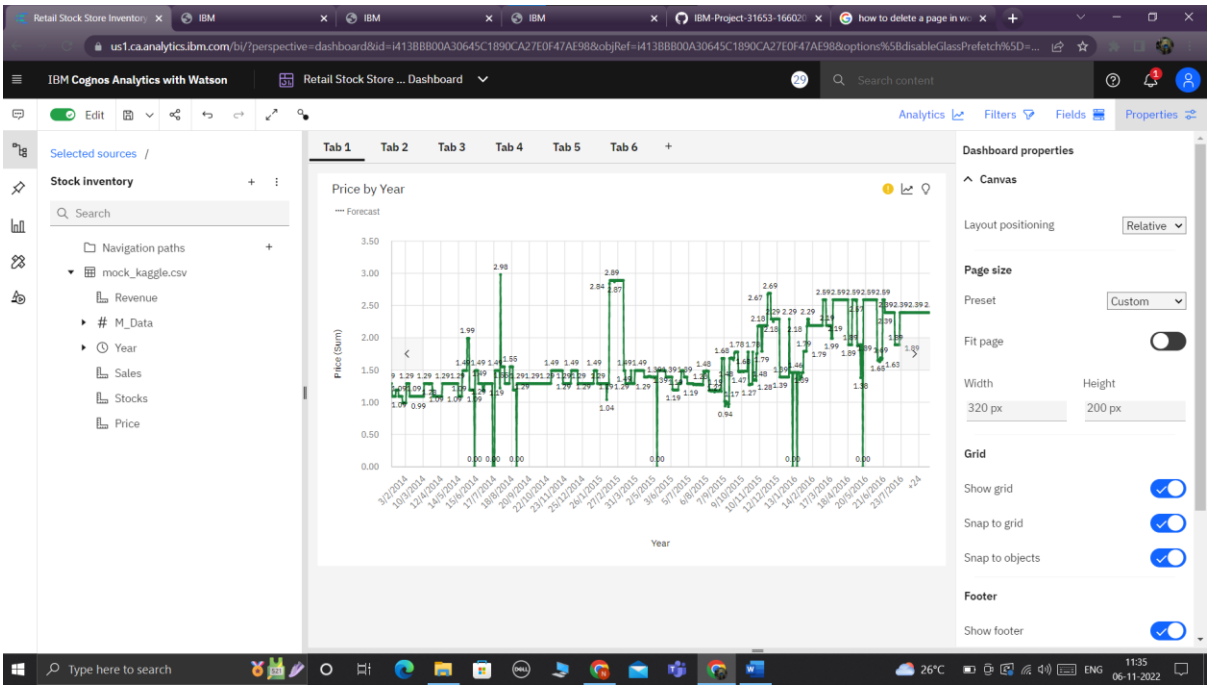
STORY OF THE DATASET:



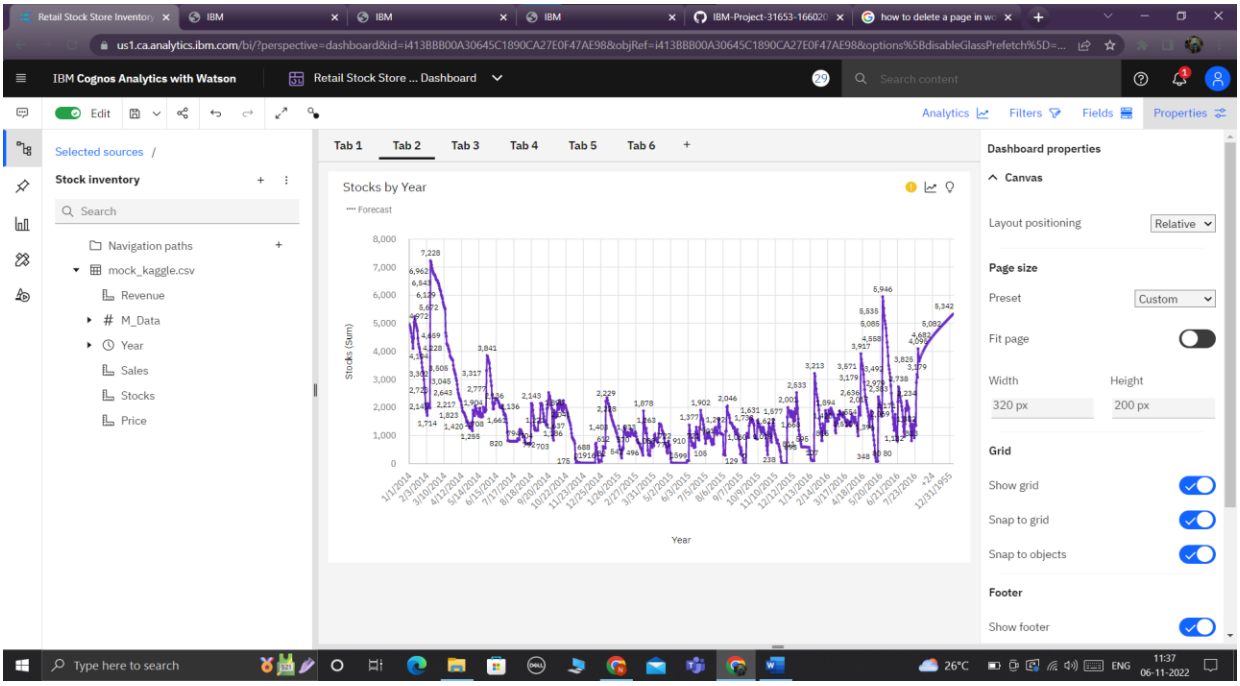
8.TESTING

8.1 TEST CASES

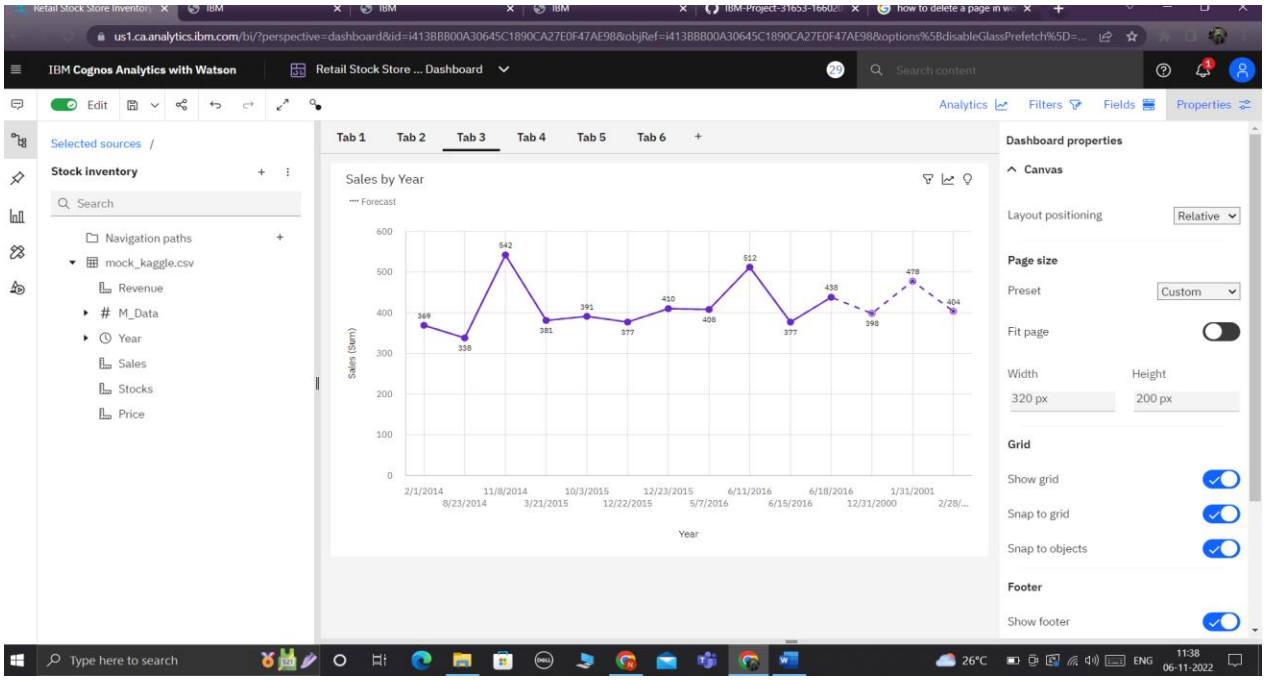
1.Year Wise Price Using Line Graph



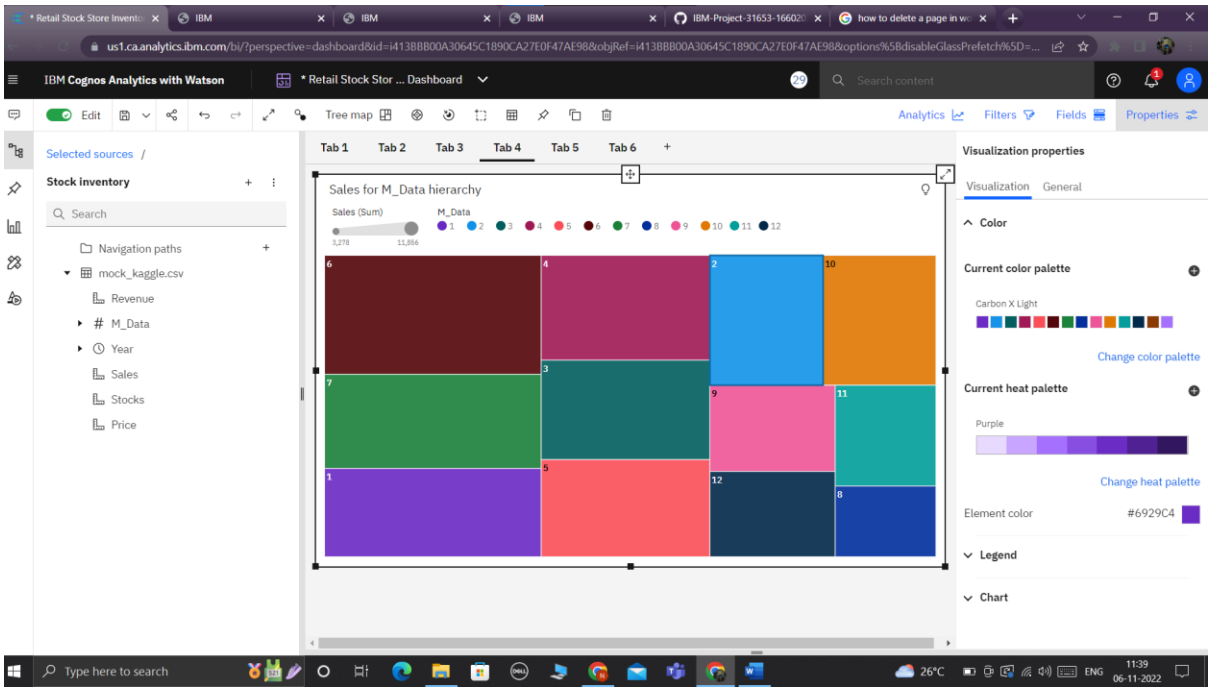
2.Year Wise Stock Using Line Graph



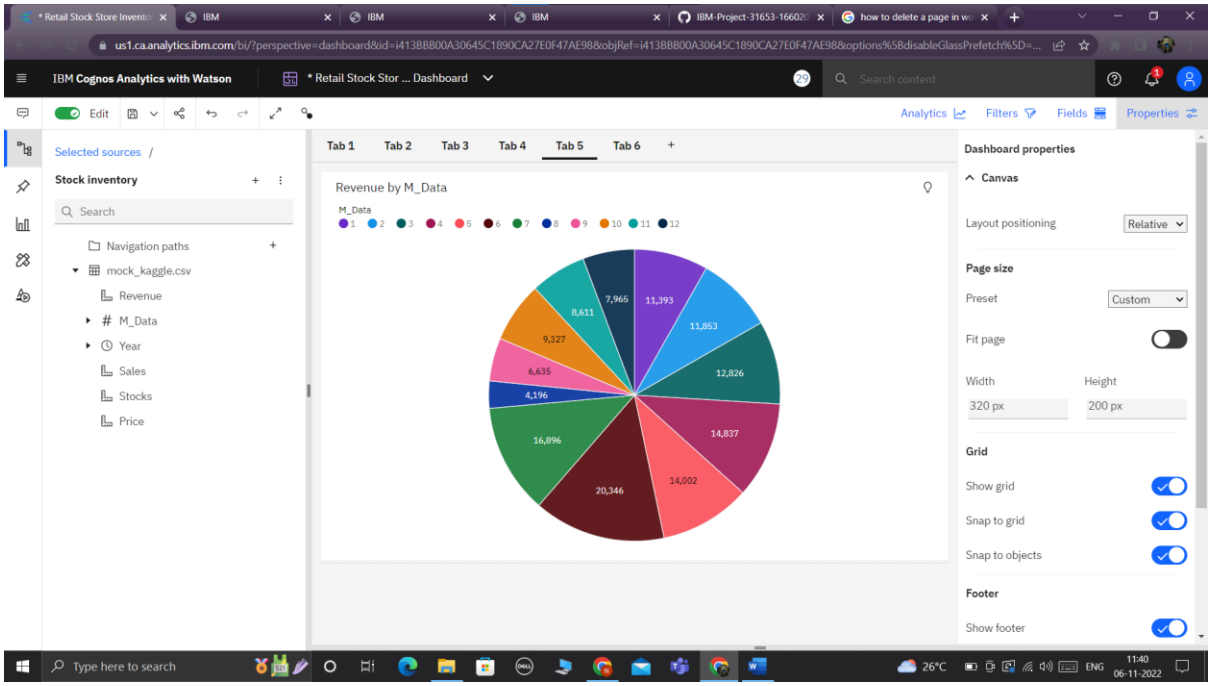
3.Top10 Sales By Year Using Line Graph



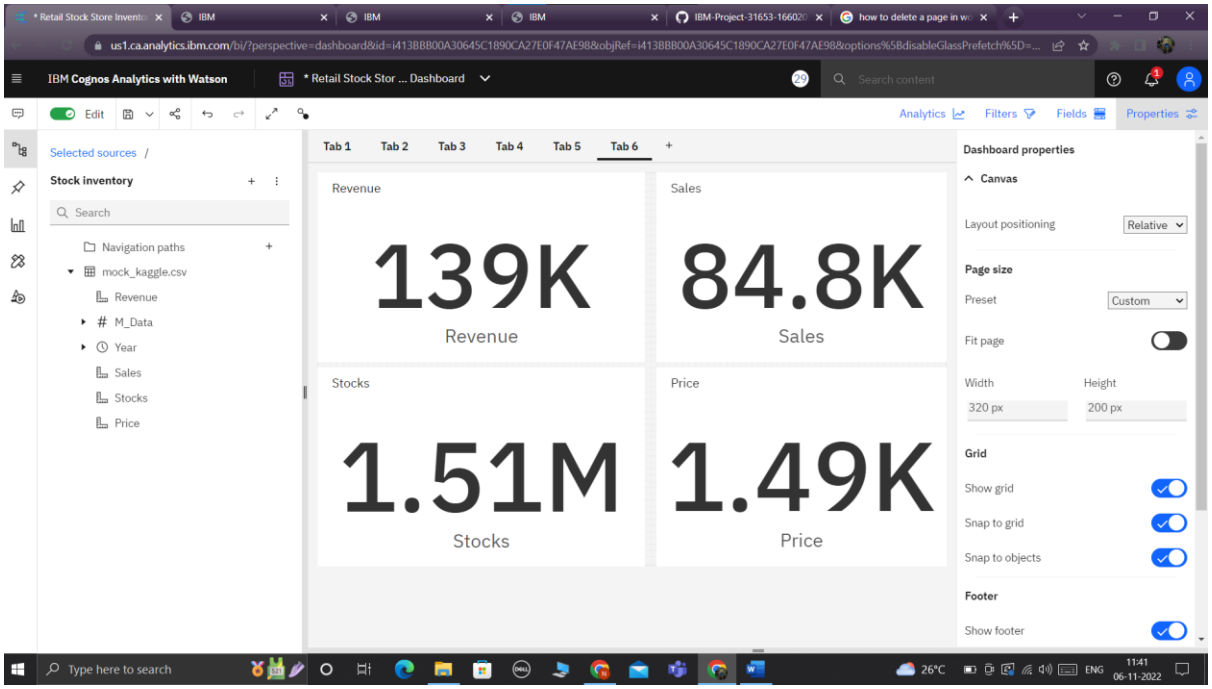
4.Monthly Sales Using Tree Map



5.Monthly Revenue By Pie Chart



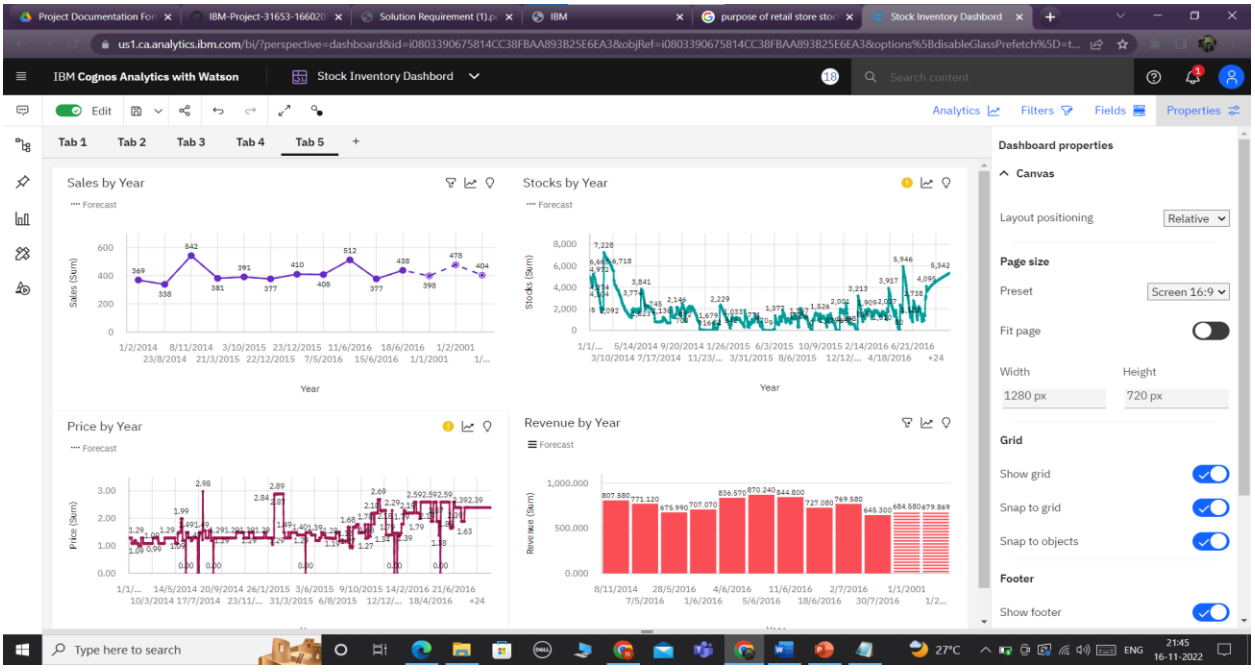
6.Summary Cards Of Total Revenue,Sales,Stock,Price



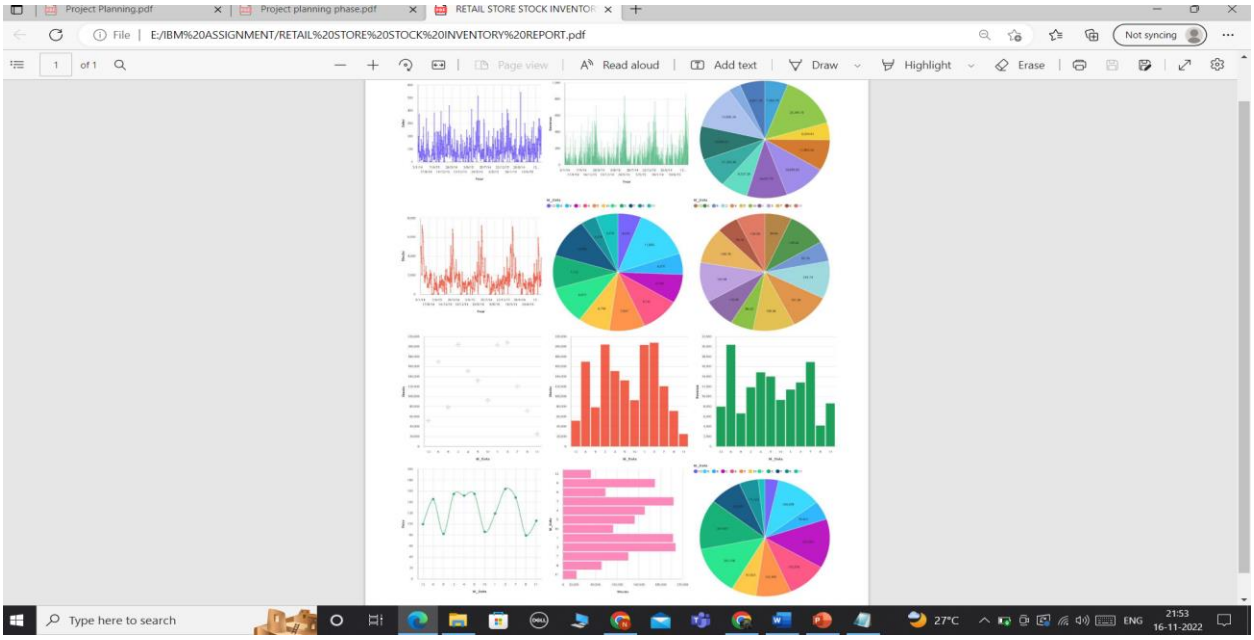
9.RESULTS

9.1 PERFORMANCE METRICS

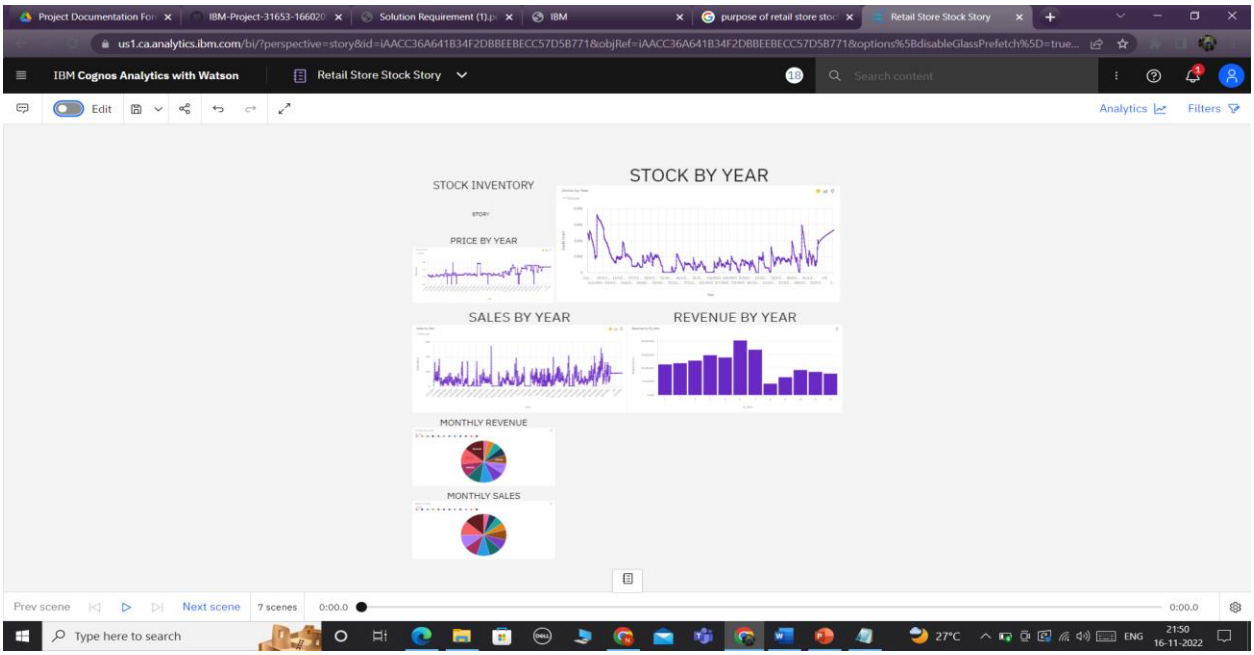
DASHBOARD:



REPORT:



STORY:



10. ADVANTAGES:

By managing inventory, retailers meet customer demand without running out of stock or carrying excess supply. In practice, effective retail inventory management results in lower costs and a better understanding of sales patterns.

DISADVANTAGES:

- Loss of items.
- Scanning errors.
- Improper inventory tracking.
- Hacking.
- Theft.

11.CONCLUSION

This retail store stock inventory analytics dashboard shows the particular testcases for the retail store from which we can identify the stocks and also retailer can analyze the items using this dashboard.

12.FUTURE SCOPE

This dashboard does not include any prediction model. It can be built by using machine learning techniques. So that, the retailer can predict the items which will be sold more in future. By knowing that stock, retailer can gain more profit.

13.APPENDIX

Github project link - https://github.com/IBM-EPBL/IBM-Project-31653-1660203973