RETAIL STORE STOCK INVENTORY ANALYTICS

PROJECT BASED LEARNING

REPORT

Submitted by

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1.INTRODUCTION

Analytics is the discovery and communication of meaningful patterns in data. As a topic, analytics has found its way from being discussed at the side lines of industry and technology conferences, to the top of the corporate agenda. With the existing promise of delivering performance improvements not seen since the redesign of core processes in the 1990s, these tools are likely change the competitive landscape in many industries in the years to come.

Big Data is all about the non-traditional ways of dealing with the modern digital data. We exist in an ocean of digital data. It includes data stored in piles of well-structured databases residing with organisations, streams of data generated from the dynamic social networks, various understandable and intangible signals generated by all kinds of digital equipment all over the place. For an organisational, Big Data can be about identifying the right datasets from large amount of data commonly defined by the three Vs - Volume, Velocity and Variety; transforming them into readily consumable models; and then extracting meaningful insights for devising business strategies. These insights can be used to improve different aspects of the business - from marketing and sales, to research and operations, and customer services.

Big Data enables clients in the retail Industry to track and better understand a variety of information from many different sources like CRM, AdWord/AdSense analytics, inventory management system, emails, transactional data, sensors data etc. Industry can identify the current trends, re-order supplies for hot-selling items, adjust the prices in real time and also manage and control product distribution across different stores to channelize their sales in more effective manner. This provides retail industry with entirely different perspectives of looking towards the datasets available at their disposal. By collating these organisational datasets with social media data streams, they can also use it for better sales predictions, designing relevant campaigns to suit their profitable customers and thereby ensuring customer satisfaction.

Retail inventory management is the process of ensuring you carry

products that shoppers want, with neither too little nor too much on hand. By managing inventory, retailers meet customer demand without running out of stock or carrying excess supply. Inventory management is vital for retailers because the practice helps them increase profits.

They are more likely to have enough inventory to capture every possible sale while avoiding overstock because too much inventory means working capital costs, operational costs, and a complex operation.

Based on the inventory management analysis we can manage how much inventory is required for selling the product based on which they can calculate the profit and losses.Our 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.

1.1 PROJECT OVERVIEW

Retail inventory management is the process of ensuring you carry merchandise that shoppers want, with neither too little nor too much on hand. 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. Retail inventory management tools and methods give retailers more information with which to run their businesses, including:

- Product locations
- Quantities of each product type
- Which stock sells well and which doesn't, by location and sales channel.
- Profit margin by style, model, product line or item
- Ideal amount of inventory to have in back stock and storage
- How many products to reorder and how often
- When to discontinue a product
- How changing seasons affect sales

1.2 PURPOSE

Inventory management is vital for retailers because the practice helps them increase profits. They are more likely to have enough inventory to capture every possible sale while avoiding overstock and minimizing expenses.

From a strategic point of view, retail inventory management increases efficiency. The practice:

- **Decreases Inventory Costs:**
  When you know how much stock you have and how much you need, you can pinpoint inventory levels more accurately, thereby reducing storage and carrying costs for excess merchandise. Other savings include shipping, logistics, depreciation and the opportunity cost that comes from not having an alternative product that might sell better.

- **Minimizes Out-of-Stocks:**
  To avoid disappointing customers and missing sales, retailers want to avoid running out of inventory. Retailers can use inventory management tools to determine how much stock is "just right" to have on hand, neither too much nor too little.

- **Improves Profit Margins:**
  With lower inventory costs and enough supply to fill every order, retailers improve profitability.

- **Prevents Spoilage and Obsolescence:**
  Inventory management helps retailers address another costly inefficiency that happens when products expire or become obsolete. This phenomenon can apply to perishables that have a limited shelf life, such as milk and meat, or a non-perishable that becomes obsolete because consumer tastes and technology change.

- **Improves Multi-Channel and Omnichannel Performance and Order Fulfillment:**
  If you are selling via physical stores, your website and third-party merchants, it can be difficult to keep correct inventory counts across all channels. Having accurate inventory data across selling channels lets you use your inventory more efficiently, ultimately getting the product to consumers faster.

- **Simplifies Processes and Facilitates Growth:**
  Strong inventory management also reduces friction in your systems as sales grow. Shipping, receiving and order fulfilment run more smoothly, and you minimize errors, customer complaints and staff stress.

- **Reduces Shrinkage:**
  Shrinkage is inventory loss due to shoplifting, product damage, vendor mistakes or fraud, employee theft and administrative errors.

- **Eases Supply Chain Management:**
  Retail inventory management helps you determine your economic order quantity (EOQ), which is the ideal order size to minimize inventory costs including holding, shortage, and ordering expenses.

- **Improves Customers Satisfaction:**
  When customers get the products they want faster with fewer mistakes or out-of-stocks, it increases customer loyalty.

- **Improves Forecasting:**

  You can use data such as historical sales results and available inventory to project future sales, growth, and capital needs. These forecasts are vital to your budgeting and guide spending for marketing, product development and staffing.

2. LITERATURE SURVEY

1.	Kujtim Hameli Istanbul university	A Literature Review of Retailing Sector and Business Retailing Types	The aim of this paper is to make an investigation of retail sector and its business type.According to the investigation retailing within the store is classified according to different characteristics, but the most important types of classification are those based on the form of the ownership, merchandise and price.Retail sector probably is the most important sector of economy because it has to do directly with consumer	https://www.researchgate.net/publication/326201790_A_Literature_Review_of_Retailing_Sector_and_Businesses_Retailing_Types

2.	ValeryLukinskiya VladislavLukinskiya BorisSokolovb	Control of inventory dynamics for products with low demand	A detailed analysis of stock forecasting methods for the low demand represents a research gap in inventory management. The existing clustering methods, that is, ABC analysis and XYZ analysis (based on coefficient of variation), do not allow identification of the consumption process dynamics and,	https://www.sciencedirect.com/science/article/aps/pii/S1367578820300158
			therefore, cannot be used for the classification and improvement of forecasting models for stock consumption. This paper surveys special cases of inventory management with low demand.	

3.	Nilesh V. Sabnis, Prashant M. Sagare2, AasimSalim Khan3, Riyaz Khan	Case Study of Inventory Management using ERP system	Inventory management systems are incredibly valuable to business owners because they allow stores to keep track of sales and purchases. Mismanaged inventory results in dissatisfied customers, slower sales, excess cash on hand, and warehouses. While speeding up the process, this inventory system reduces manual labour, human error, and manual delays	https://www.ijres.org/papers/Volume-10/Issue3/Ser6-/D10031518
4.	Marina Paolanti, Mirco Sturari, Primo Zingaretti, Emanuele Frontoni, Adriano Mancini	Retail surveying and inventory using visual and textual analysis	This paper describes a novel system for automating data collection and surveying in a retail store using mobile robots. The manpower cost for surveying and monitoring the shelves in retail stores are high, because of which these activities are not repeated frequently	https://ieeexplore.ieee.org/document/8098666/authors

2.1 EXISITING PROBLEM

The digital revolution may be upon us, but vast numbers of companies large and small still sell (and, in many cases, manufacture) physical products. These products, and the materials used to produce them, create the need for one of the most complex and challenging areas of potential

value creation and loss for any business: inventory management. Theft, fraud, human error, and other problems make preventing lost value as important as gaining it through revenue.

Fortunately, technology, paired with strategic thinking, make it easier for both small businesses and large corporations to stop the bleeding and protect their profitability and productivity while meeting the needs of their customers.

Abramovitz and Modigliani (1957)

They highlighted the relationship between capacity utilization and inventory investment. Existing stock of inventories was expected to adjust to the desired levels. Thus the variable, existing stock of inventories, was essential to be negatively related with the desired stock. The result was that there is positive relation among the ratio of inventory to sales and inventory investment. High ratio of stocks to sales in the past suggests requirement of high levels of inventories in the past and promising high investment in inventories in the current period also.

Krishnamurty and Sastry (1970)

It is the most comprehensive study on manufacturers' inventories.They used the CMI data and the consolidated balance sheet data of public limited companies published by the RBI, in order to analyse each of the major components, like the raw materials, goods-inprocess and finisHed goods, for 21 industries over the period ranging from 1946-62. The study was a time series one although there were some inter-industry cross-section analyses that were carried out in the analysis. The Accelerator represented by change in sales, bank finance and short-term interest rate was found to be an important determinant. The utilisation of productive capacity and price anticipations was also found to be relevant in the study.

2.2 REFERNECES

[1] R. Ishfaq, C. C. Defee, B. J. Gibson, y U. Raja, "Realignment of the physical distribution process in omni- channel fulfillment", International Journal of Physical Distribution & Logistics Management, vol. 46, núm. 6/7, pp. 543–561, jul. 2016, doi: 10.1108/IJPDLM-02-2015-0032

[2] J. Kembro y A. Norrman, "Exploring trends, implications and challenges for logistics information systems in omni-channels: Swedish retailers' perception", International Journal of

Retail and Distribution Management, vol. 47, núm. 4, pp. 384–411, 2019, doi: 10.1108/IJRDM-07-2017-0141.

[3] G. Hançerlioğulları, A. Şen, y E. A. Aktunç, “Demand uncertainty and inventory turnover performance: an empirical analysis of the US retail industry”, International Journal of Physical Distribution and Logistics Management, vol. 46, núm. 6–7, pp. 681–708, 2016, doi: 10.1108/IJPDLM-12-2014-0303.

[4] J. D. Sterman y G. Dogan, “‘I’m not hoarding, i’m just stocking up before the hoarders get here.’: Behavioral causes of phantom ordering in supply chains”, Journal of Operations Management, vol. 39, pp. 6–22, 2015.

[5] Y. Wang, S. W. Wallace, B. Shen, y T.-M. Choi, “Service supply chain management: A review of operational models”, European Journal of Operational Research, vol. 247, núm. 3, pp. 685–698, 2015.

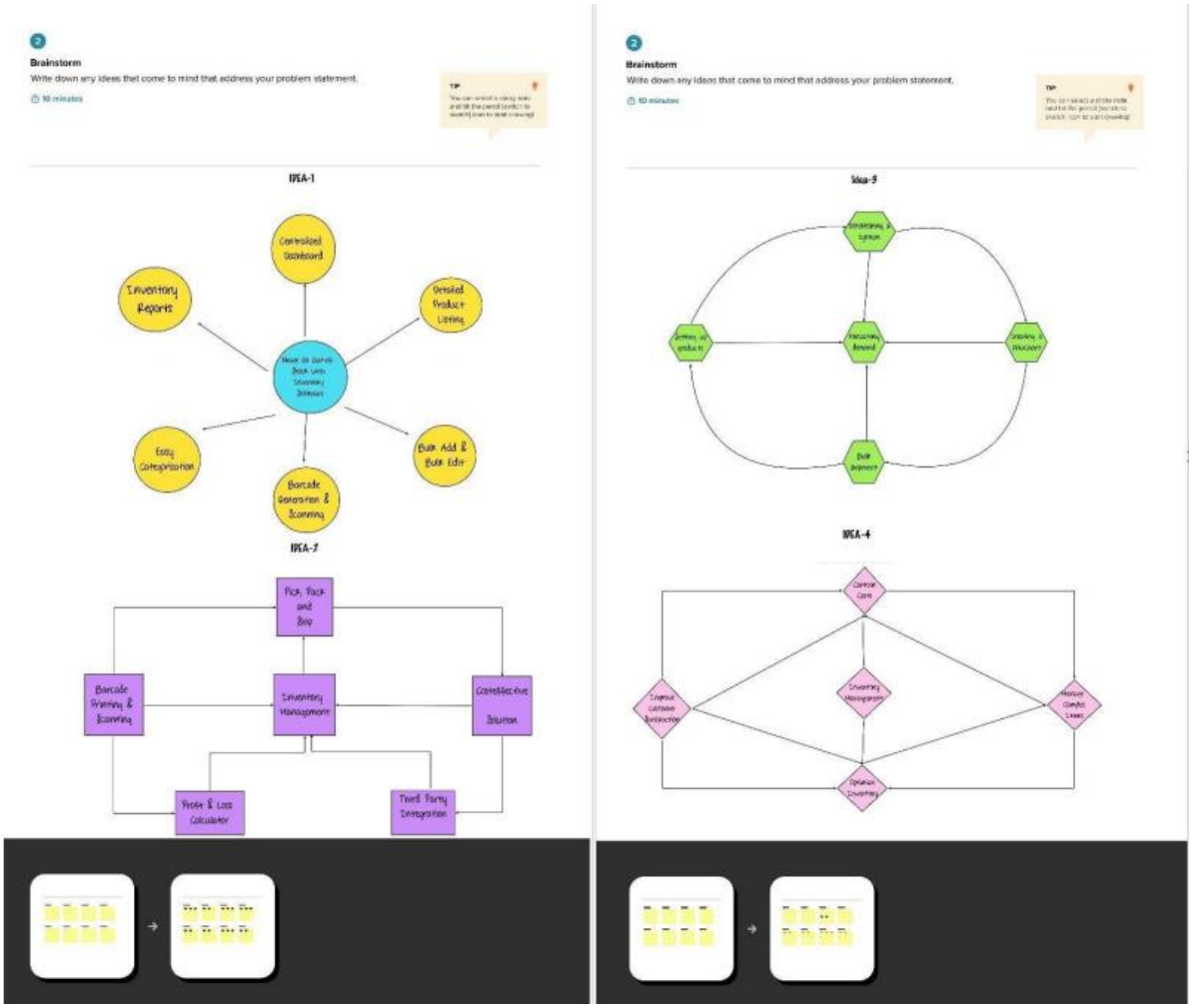
3. IDEATION AND PROPOSED SOLUTION

3.1 EMPTHY MAP CANVAS

3.2 IDEATION AND BRAINSTORMING

Step 1:

STEP : 2

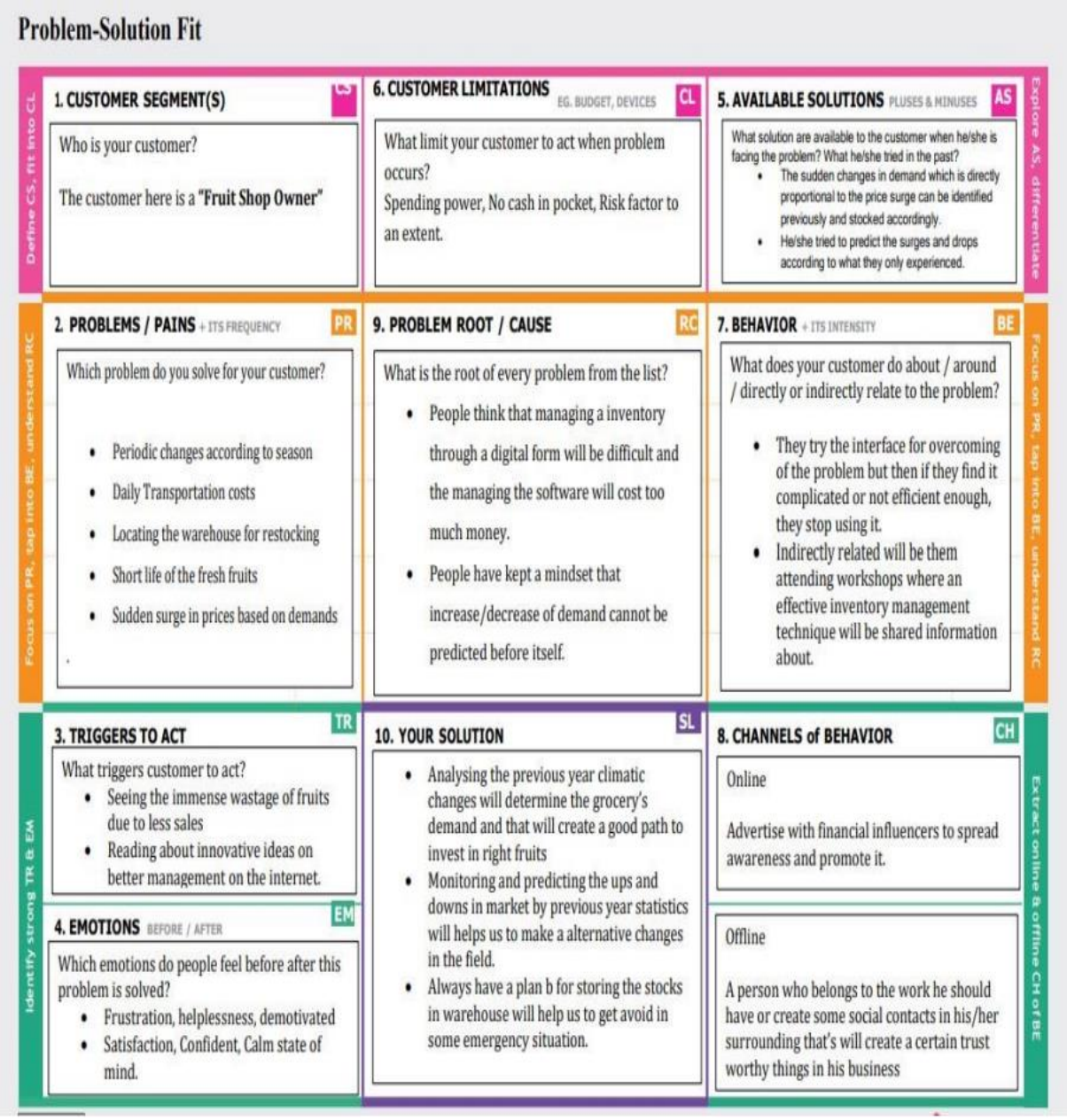


STEP 3 :

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To create a retail store stock inventory management system for retailers to meet customer demand without running out of stock or carrying excess supply.
2.	Idea / Solution description	Retail store stock inventory analytics is implemented to analyse the historical sales data of a retailer. By deeply understanding the dataset, identifying pattern, relationships and connection using python libraries like pandas and using IBM Cognos analytics to build visualizations of stock inventory and to create meaningful dashboards. The final dynamic dashboard helps retailers by providing detailed product listing, easy categorization, inventory reports satisfying customer needs and meet variation in product demand.
3.	Novelty / Uniqueness	This solution involves analysing the sales ratio and determining the stock availability. It indicates the retailer of out-of-stock commodities and also determine the popular products among customers. Also, it involves usage of IBM Cognos analytics tool for visualisation rather than using python libraries like matplotlib.
4.	Social Impact / Customer Satisfaction	Customers will get more varieties, high availability of the products.
5.	Business Model (Revenue Model)	1. Improve the decision-making process oriented at reducing costs and increasing revenues. 2. Retailers are able to understand the deepest customer needs and adjust their offering to meet shoppers' demands.
6.	Scalability of the Solution	This solution is applicable for small retail stores as well as large departmental stores. It can also analyse wide range of datasets and different types of visualisations can be done.

3.4 PROBLEM SOLUTION FIT



4 REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	**User Registration**	Registration through Form Registration through Linked IN Registration through Website Registration through G-mail
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

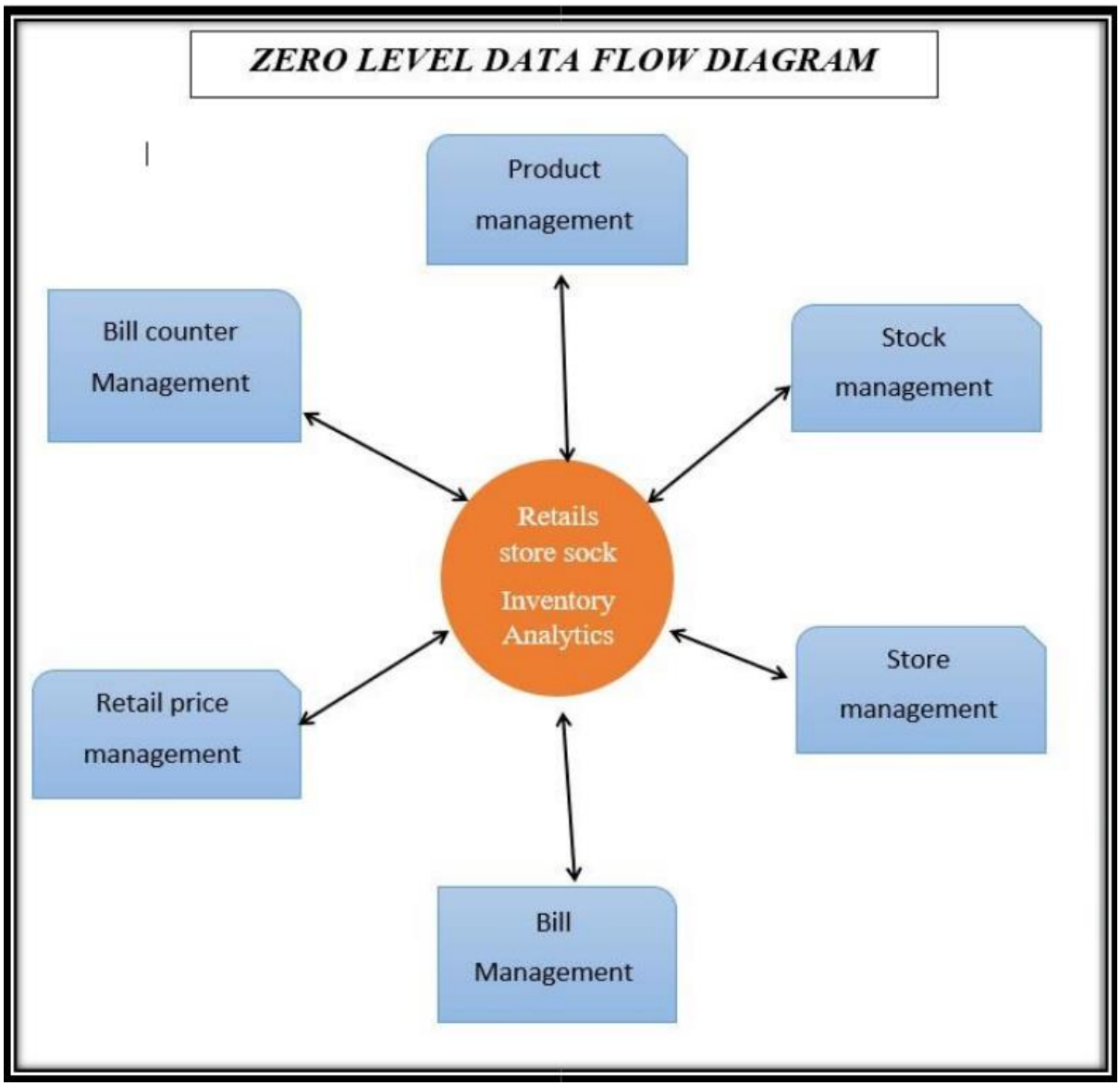
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	They are more likely to have enough inventory to capture every possible sale while avoiding overstockand minimizing expenses. This model can be supported on both desktop and mobile browsers.
NFR-2	**Security**	This can be used only by the users who have their proper login credentials
NFR-3	**Reliability**	Avoid over or under stocking 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 the purchase details of the customer are included inthe dataset. From this, the model can predict the dead stocks and highly profitable stocks. The accuracy of this model will be ensured by checking multiple times.
NFR-5	**Availability**	This model is suitable for all kind of retail stores. It can give retailers real-time visibility into stock levels,avoid stock outs, keep inventory carrying costs low and help meet customer expectations
NFR-6	**Scalability**	More number of users can be accessed at the same time without any issues. The feedback of the users will be taken and be proceeded further up to the satisfaction of the user.

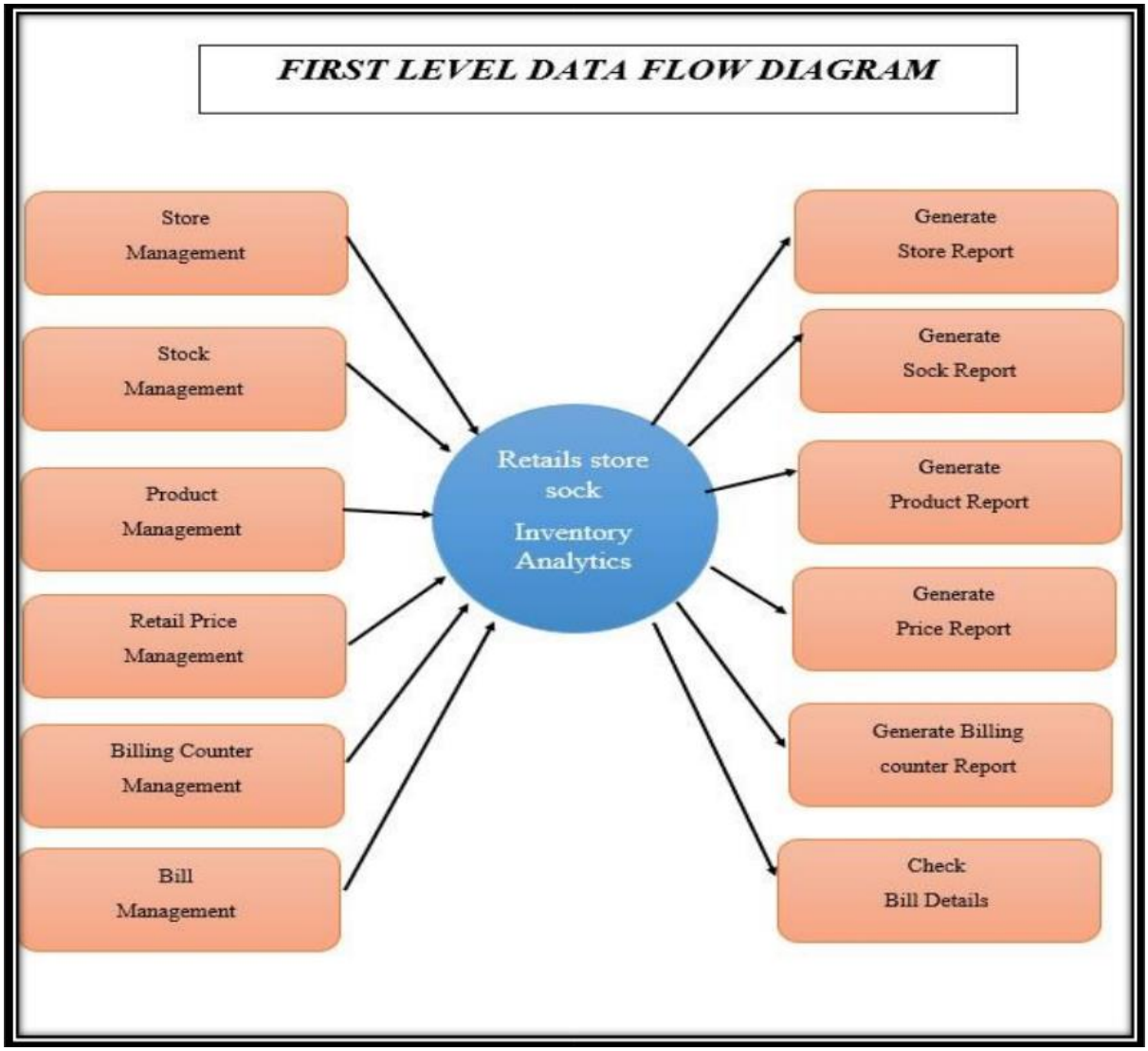
5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

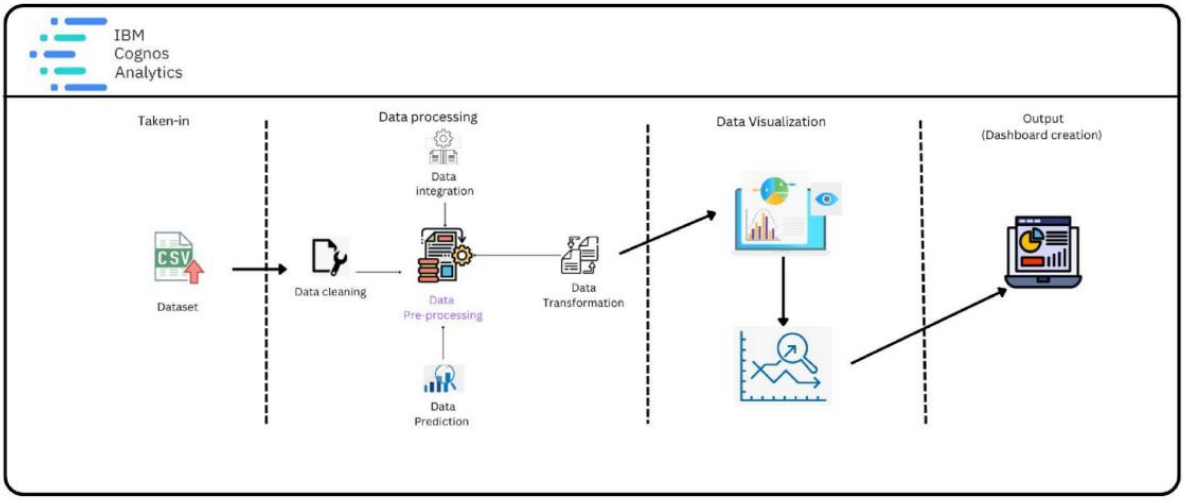
Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.





5.2 SOLUTION AND 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, 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 application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail	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

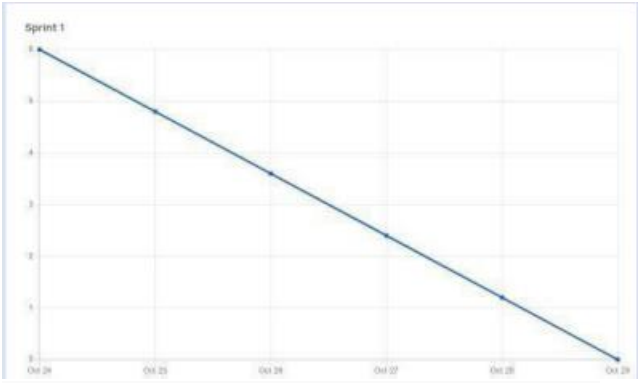
6. PROJECT PLANNING AND SCHEDULING

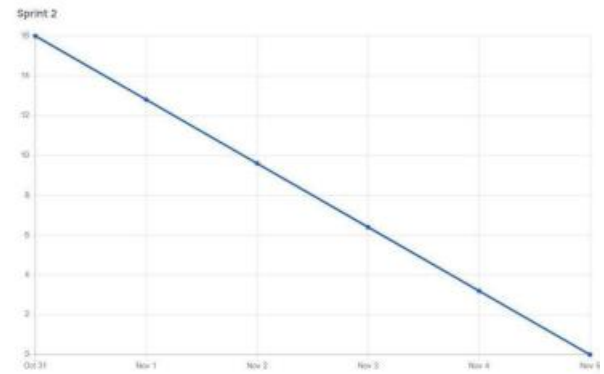
6.1 SPRINT PLANNING AND ESTIMATION

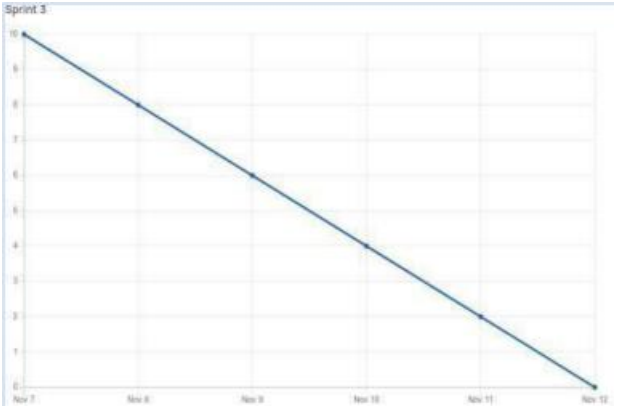
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	10	High
Sprint-1	Data uploading	USN-2	As a user, I will be uploading my data in to the Cognos analytics	10	High

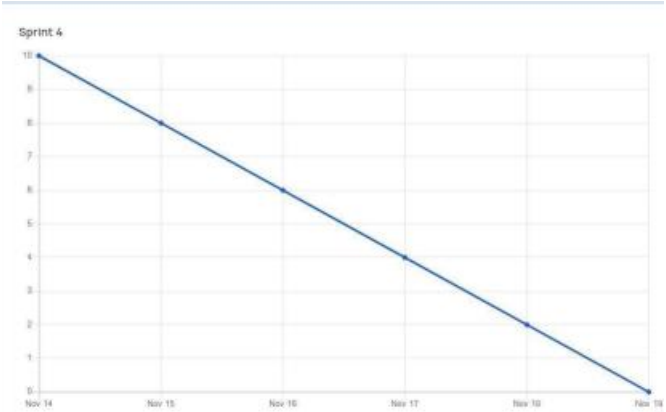
6.2 SPRINT DELIVERY SCHEDULE

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

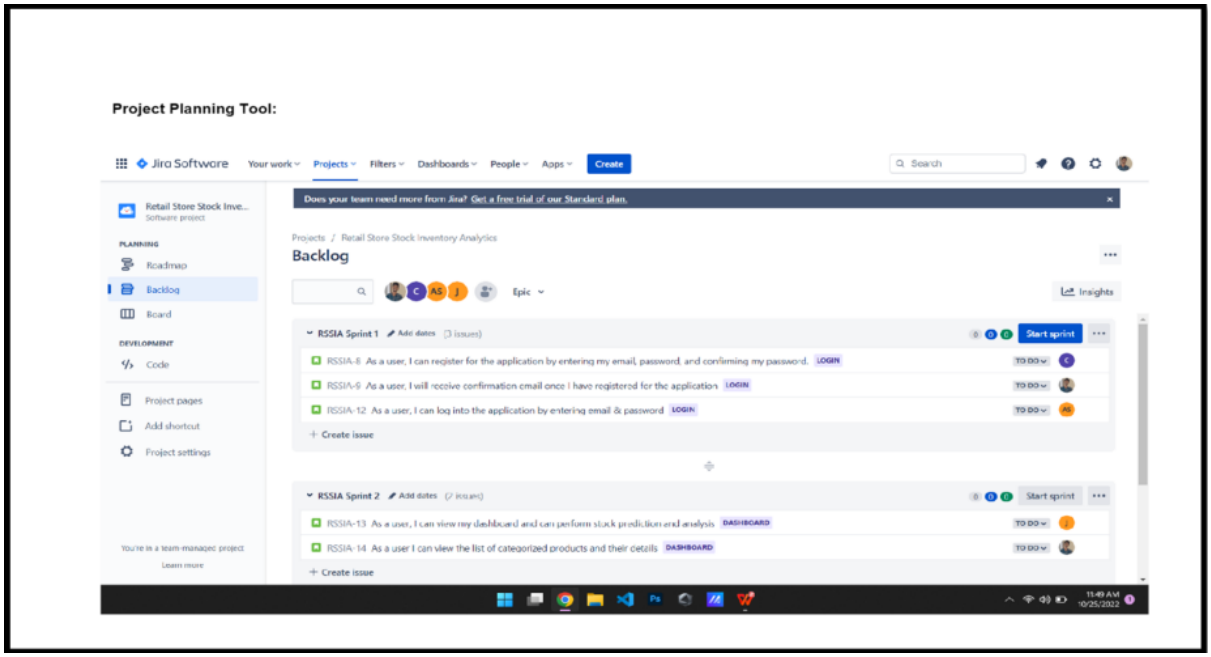


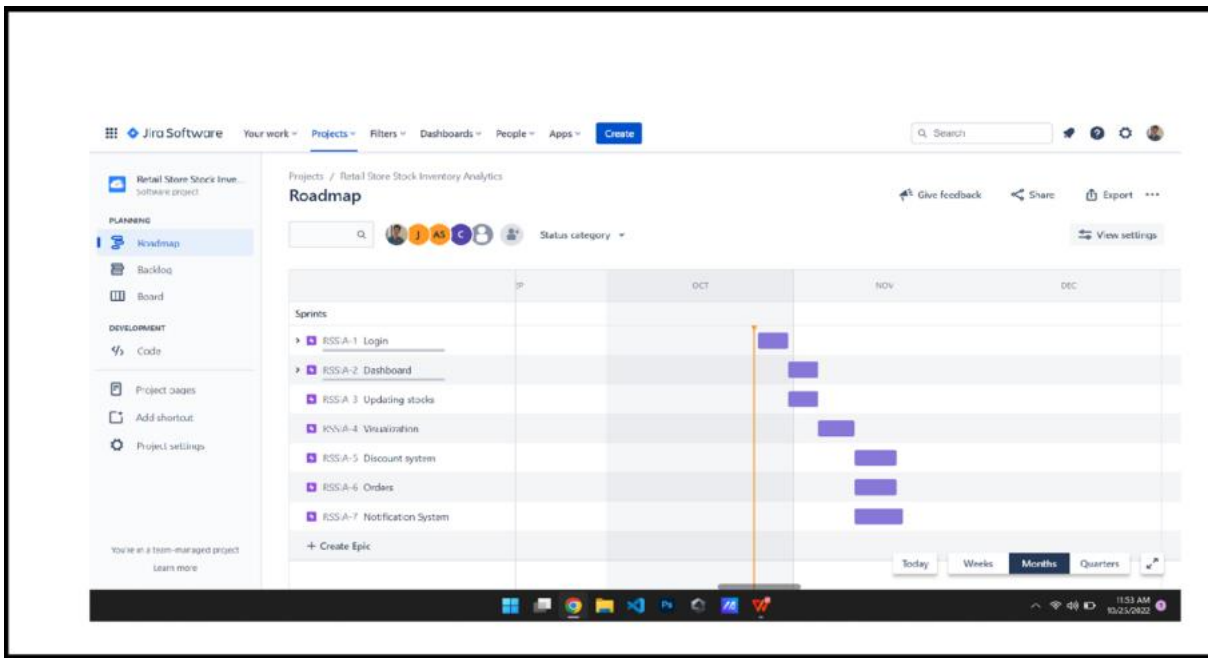






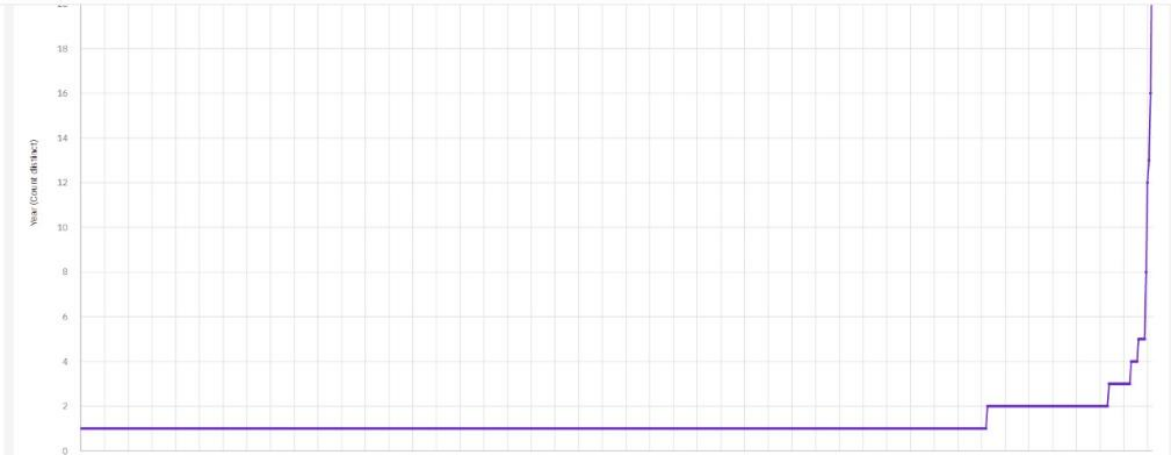
6.3 REPORTS FROM JIRA

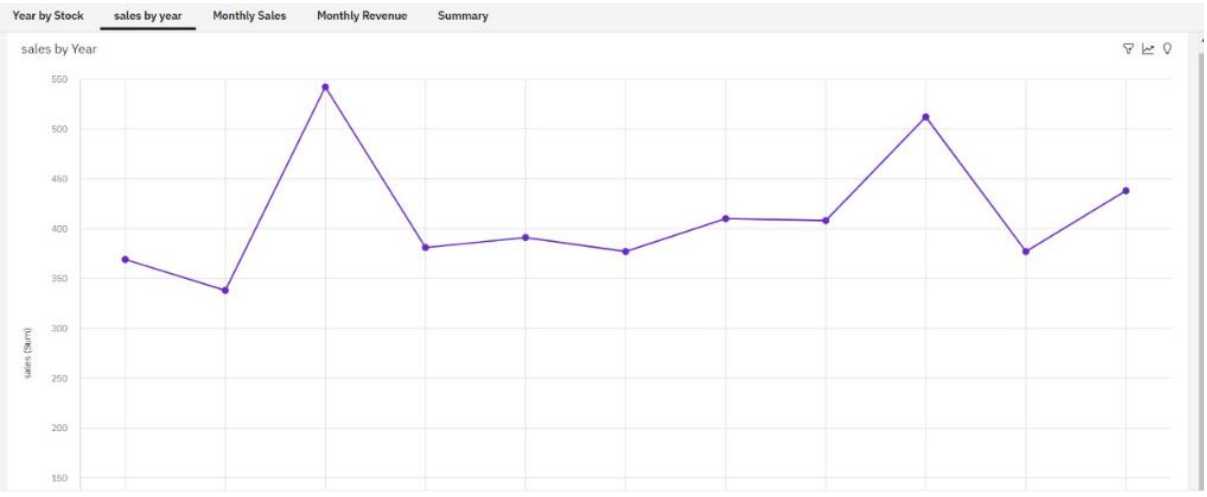


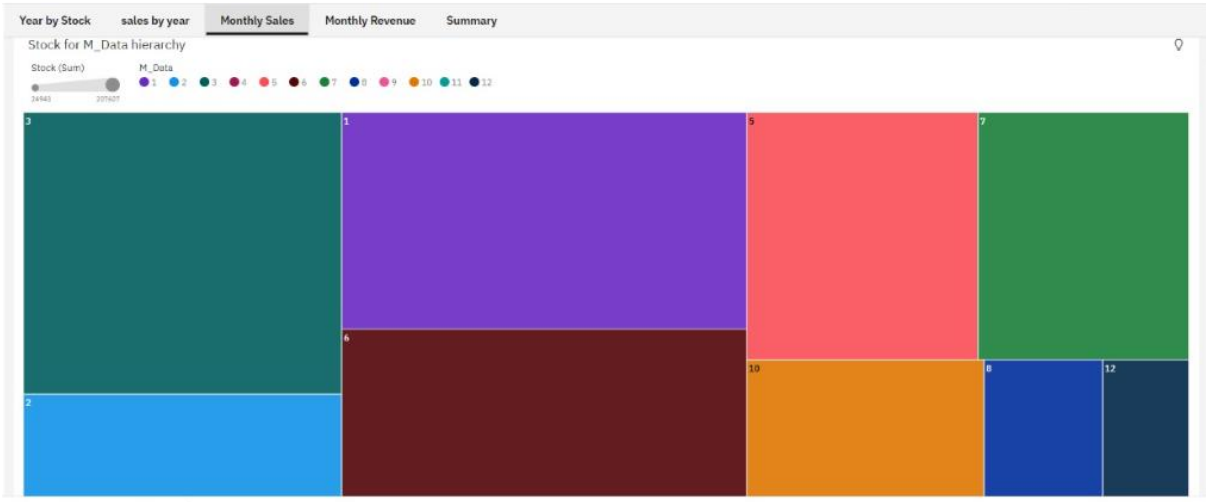


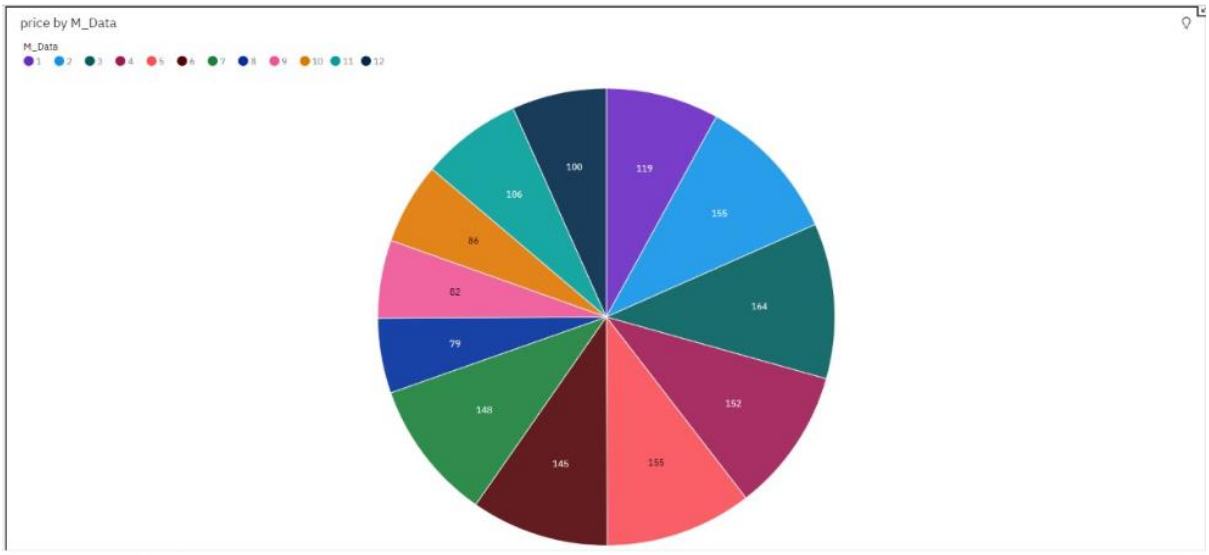
7.CODING AND SOLUTION

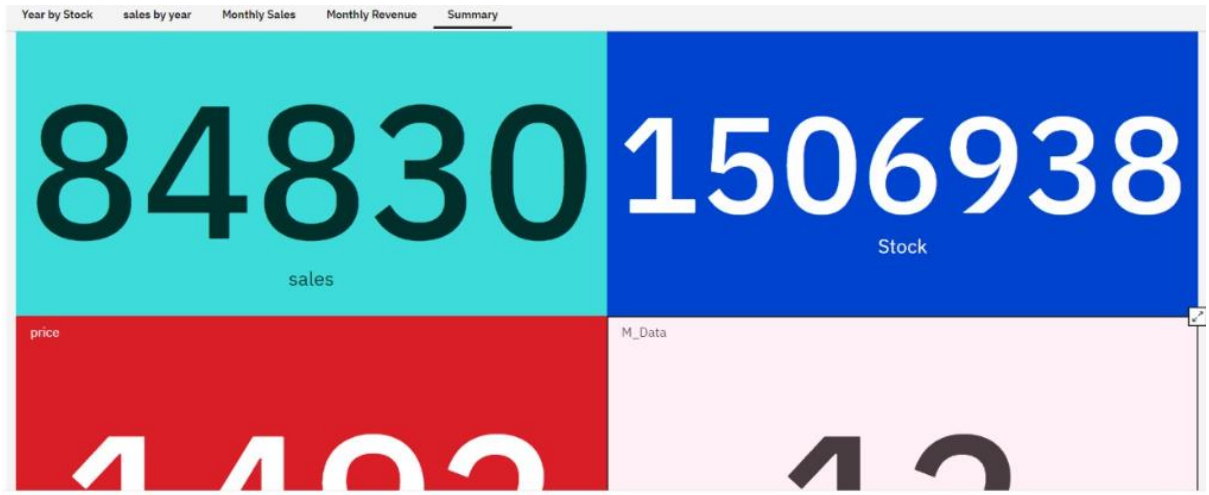
7.1 FEATURE 1- DASHBOARD






Year by Stock
sales by year
Monthly Sales
Monthly Revenue
Summary
Stock for M_Data hierarchy
Stock (Sum)
M_Data
3
1
5
7
6
10
8
12
2


price by M_Data
M_Data
100
119
106
155
86
164
82
79
152
148
145
155


Year by Stock
sales by year
Monthly Sales
Monthly Revenue
Summary
84830
sales
1506938
Stock
price
M_Data

7.2. FEATURE 2-STORIES

Stories can help you inform and engage your audience. You can use stories in IBM Cognos Analytics to create scenes that visualize your data and to tell a narrative.

What is a story?

A story is a type of view. A story is composed of a set of scenes that are displayed in sequence over time. Stories can be used to provide your data with a visual narrative.

What is a scene?

A scene can be considered as a container for a sequence of objects, such as widgets, data, or animations. The objects in a scene are also placed into a timeline, which dictates when the objects appear in the scene.

How is a story different from a dashboard?

Stories are similar to dashboards because they also use visualizations to share your insights. Stories differ from dashboards because they provide an over-time narrative and can convey a conclusion or recommendation. For example, each scene can contain an analysis, insight, or piece of information that is revealed as the viewer plays the scenes in the story. The scenes build upon each other until the final scene, which provides a conclusion or summary.

What can I use to assemble a story?

You can add the following to your scenes when creating a story:

- Text, media, web pages, images, and shapes What are animations? Animations are one of the properties that a widget can have. By using animations, you can have define how widgets enter and exit your scenes.

- Getting started with your first story Stories are an effective way to present and share your data. In this tutorial, you will learn how to create a story, an outline, and how to animate a scene.

- Creating a story Stories are effective ways to share a narrative. They can be as simple or as complex as you need them to be. You can create a story from scratch or from an existing dashboard.

- Transition styles Transition styles allow for seamless scene transitions and they help to highlight the progression from one scene to another.

- Animation types There are different types of animations for widgets and animation types for specific data widgets. Use animations to define how your widgets enter or exit a scene Adding animations You can apply animations to your widgets to make your story more dynamic and memorable.

- Using the timeline You can use the timeline to define when a widget enters or exits a scene, and to test a scene.

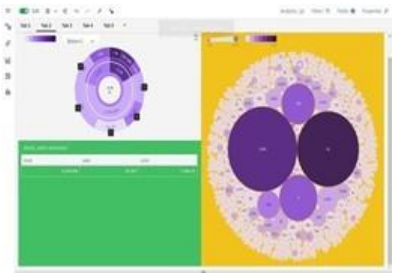
- Working with scenes A scene is used to divide your story into separate messages or points. You can populate your scenes with text, data, and widgets.

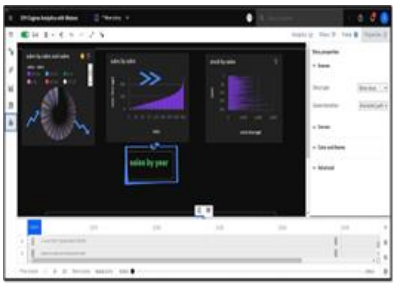
- Playback options Use playback options to tailor the playback experience to your needs.

- Testing a story or a scene After your story or a scene within a story is assembled, you can test it to see how it will look to someone who is viewing it. You also want to ensure that the visualizations appear and disappear at the correct time during the scene.

8.TESTING

8.1 TEST CASES

S.No.	Parameter	Screenshot / Values
1	Dashboard design	The dashboard is eated with three category i.e. Overview, Sales, Price. 
2	Data Responsiveness	The data is downloaded from an external API and uploaded in the IBM Cognos analytics with Watson and a data module is created.

3	Amount Data to Rendered (DB2 Metrics)	The dataset which is downloaded from the external API and uploaded is rendered from the DB2.
4	Utilization of DataFilters	The data filters are used for pre-processing the data i.e. cleaning of data , removing the null value. The unwanted columns are removed from the data-set and the additional data which are required are added to the data-set.
5	Effective User Story	The story is created with two scenes i.e. Introduction, sales by
		year & stock. 

6	Descriptive Reports	The report is created with two visualisations i.e. Result, sales greater than 350.

8.2 USER ACCEPTANCE TESTING

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N)	BUG ID
LoginPage_TC_001	Functional	Home Page	Verify user is able to navigate to the homepage	IBM COGONOS WITH WATSON and IBM cloud	Navigate to Data analytics page and view the Homepage	https://us1.ca.analytics.ibm.com/bi/?perspective=ca-modeler&pathRef=.my_folder%2Fproject%2Bdevelopment%2Bphase%2FSprint-3%2FRetail%2Binventory%2BManagement	The interactive Homepage	Working as expected	Pass	NIL	Y	NIL
LoginPage_TC_002	Functional	Dashboard	Verify that users are able to view the responsive Data analytics dashboard and view the data about the current scenario	IBM COGONOS WITH WATSON and IBM cloud	1. Enter the Analytics Home page 2. click the dashboard option 3. View the embedded dashboard data in html page or click the ibm cognos link to directly view the dashboard in ibm cognos watson 4.if you want ML code ,click the google colab link to view the ML code for dashboard. 5. after click the back	https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2Fproject%2Bdevelopment%2Bphase%2FSprint-3%2FRetail%2Binventory%2BManagement%2FDashboard&action=view&mode=dashboard&subView=model000001	Displaying the responsive Dashboard.A dashboard helps you to monitor events or activites at a glance by providing key insight and analysis about your data on one or more page or screens	Working as expected	Pass	NIL	Y	NIL
LoginPage_TC_003	Functional	Story	Verify whether the story is functioned on the analytics dashboard	IBM COGONOS WITH WATSON and IBM cloud	1. Enter the Analytics Home page 2. click the story option 3. View the ibm embedded story about the Hospital data in html page and after click the back to top button, go to the top of the main page.	https://us1.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2Fproject%2Bdevelopment%2Bphase%2Fsprint-4%2FRetail%2Binventory%2BManagement%2FStory&act	A story is a type of view that contains a set of scenes that are displayed in sequence over time.	Working as expected	Pass	NIL	Y	
LoginPage_TC_004	Functional	exploration	Verify user is able to view the exploration,hidden relationship and identity patterns that turn your data into insights.	IBM COGONOS WITH WATSON and IBM cloud	1. Enter the Analytics Home page 2. click the exploration option 3. View the embedded exploration data in html page or click the ibm cognos link to directly view the exploration in ibm cognos watson 4.if you want ML code ,click the google colab link to view the ML code for exploartion. 5. after click the back to top button, go to the top of the main	https://us1.ca.analytics.ibm.com/bi/?perspective=explore&pathRef=.my_folders%2Fproject%2Bdevelopment%2Bphase%2Fsprint-2%2FRetail%2Binventory%2BManagement%2FExploration&subView=model000001844f1e025e_00000004	Exploration is a flexible workspace where you can discover and analyze data.	Working as expected	Pass	NIL	Y	NIL
LoginPage_TC_004	Functional	Report	Verify user is able to view and run the reports	IBM COGONOS WITH WATSON and IBM cloud	1. Enter the Analytics Home page 2. click the report option 3. View the ibm embedded report about the Hospital data in html page and after click the back to top button, go to the top of the main page.	https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2Fproject%2Bdevelopment%2Bphase%2Fsprint-4%2FRetail%2Binventory%2BManagement%2FReport&actionrun&formatHTML&xpt=false	explore data and create and developerpurse to build sophisticated,multiple-page,multiple-query report against multiple database.	Working as expected	Pass	NIL	Y	NIL

9.RESULTS

9.1 PERFORMANCE METRICES

1. Sales per employee

For brick-and-mortar stores, this is an essential metric when planning employee schedules. It enables you to put together your budget for payroll and have a good idea of how many people you can have on the floor at once. You can take this a step further with a proper and track sales per individual employee, pinpointing your top performers.

2.Conversion rate

Conversion rate is a metric every business needs to keep track of. Your conversion rate helps you identify how many sales you made out of how many store or website visitors you've had. A good retail conversion rate to aim for is between 20-40%. (Multiplying by 100 in your formula puts your answer in a percentage format.) This is an easy metric to track for ecommerce stores with access to website analytics, but it can be more challenging when you try to track foot traffic. Consider using traffic counting systems at the door to gauge the number of people coming in each day.

3.Gross profit

Your gross profit is the total amount of profit you've made, minus the cost it took to buy or create the product(s). This shows the overall profit you're bringing in before expenses. It can tell you if your expenses are too high (we'll talk more about that in the next point) or if you have some wiggle room for investing in other strategies.

4.Net profit

Your net profit is the total profit you've made, minus all of your expenses. Essentially, this is how much money goes into your pocket at the end of the day. Expenses are administrative costs, operating charges, taxes, salaries, etc. Your net profit should be high enough that you're able to make a comfortable living at the end of the day. If you're spending all revenues on expenses or you're in the red, it might be time to increase prices.

5.Average order value

Average order value or average transaction value determines how much customers typically spend in your store. A higher average order value means your customers are gravitating toward high-value items or ordering larger quantities of products. Lower average order value may mean you need to increase prices or provide incentives for ordering more. For example, you might offer free shipping for orders over $50 or $100 to try to increase this metric.

6.Basket size

Basket size tells you the typical number of items sold per transaction. Knowing how many items the average customer is buying at a time tells you a number of things: First, you'll be able to see if an increase in revenue is due to your customers purchasing more items at once, or if they're starting to purchase more expensive products. It can also define which employees are performing better, i.e., guiding customers to increase their basket size. This metric can also help you decide if your products mesh well together. Are customers increasing their basket size because they're buying a number of products that complement each other? If not, you may want to consider what product offerings you could add to your collection.

7.Inventory turnover

Inventory turnover, or stock turn, defines how many times you've needed to replace your inventory over a certain period of time. This is an important metric because it can tell you if you're ordering too much or too little inventory. A low stock turn could leave you with dead stock, while a high stock turn might mean you're not ordering enough, and that customers frequently encounter an "Out of Stock" sign. This can obviously have a negative impact on your customer satisfaction.

8. Sell-through rate

Your sell-through rate indicates which specific products are over performing or underperforming, enabling you to adjust how much of that product you keep in stock. Knowing this metric for each of your products lets you decide if you need to run a promotion or marketing campaign to help sell underperforming products. It can also tell you if any of your products are more popular than you expected, and whether you need to order more

10. ADVANTAGES AND DISADVANTAGES

10.1. ADVANTAGES

• An advantage of the retail inventory method is that it does not require a physical inventory

• The retail inventory method only requires an organization to record the retail prices of inventory items.

• If an organization has multiple locations in different cities and states, performing a physical inventory can become a costly and time-consuming undertaking.

• By using retail inventory, an organization can prepare an inventory for a centralized location.

• The retail inventory method also allows the organization to create an inventory value report for budgeting or the preparation of financial statements.

10.2. DISADVANTAGES

• On the other hand, the retail inventory method is only accurate if all pricing across the board is the same and all pricing changes occur at the same rate.

• In most cases, this is not realistic in retail because of the many variations that exist in merchandise pricing.

• For example, depreciation, markdowns, product damage and theft can affect the price of the retail inventory.

• For this reason, any calculations made using the retail inventory method should serve only as an estimate.

11.CONCLUSION

• Inventory management in retail is easy when done right. Considering the negligible cost endured for the near-essential pack of benefits and features it's really hard to argue against the use of software.

• Unlike many others, Multiorders provides 24/7 customer support as standard. This gives you the chance to clear up any questions you might have.

• For the success of the program, the managers of the retail stores must formulate a modern way of managing the inventory by instituting electronic systems to take care of the resources of the company.

• This ensures that they can be accounted for and there are proper records available all the time for reference to be made when the need arises.

• Besides, the retail management system is necessary for ensuring that there is accountability in the way the company handles its stock. It helps in saving time.

12.FUTURE SCOPE

Stores doing omnichannel retailing are at the top of their game; they attract the 90% of customer who switch between at least three applications per day to complete specific tasks.

And that’s minus consumers who shop physically.

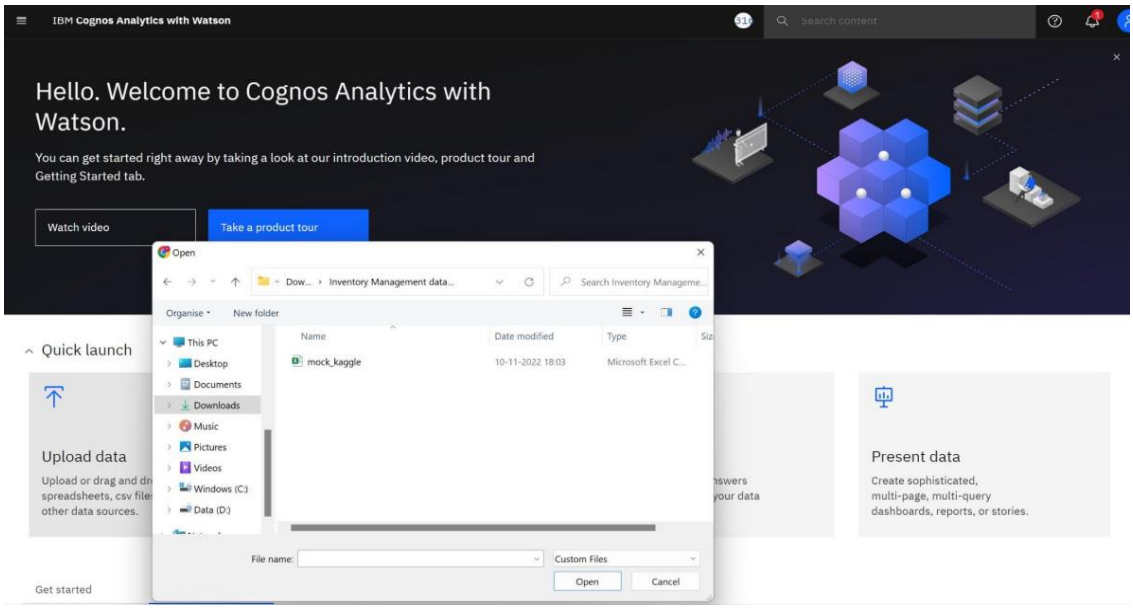
Imagine profits gushing in from several online channels and from your physical store too. But that profit advantage comes with a serious inventory control responsibility — omnichannel inventory management.

13.APPENDIX

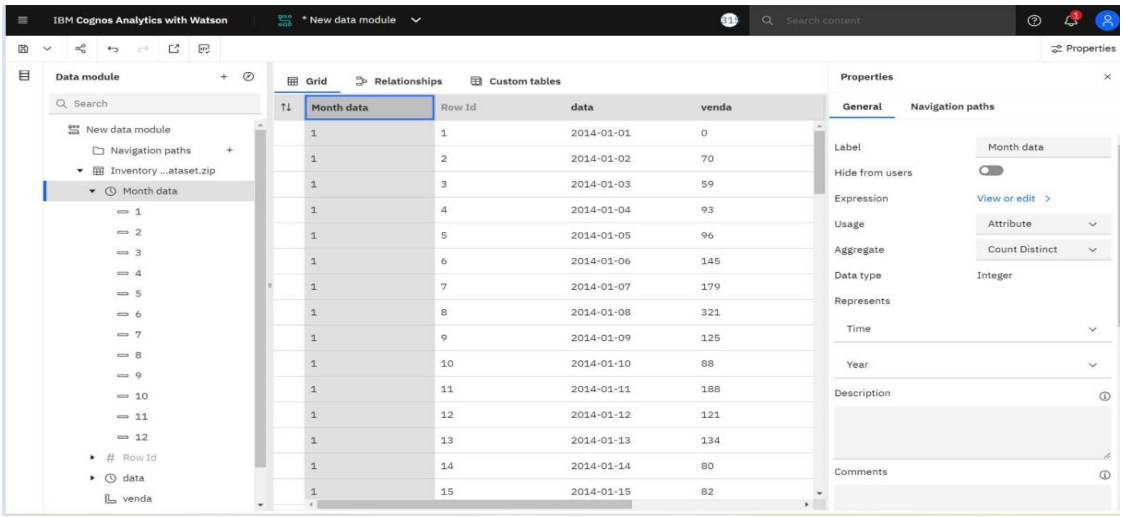
SOURCE CODE

SPRINT 1

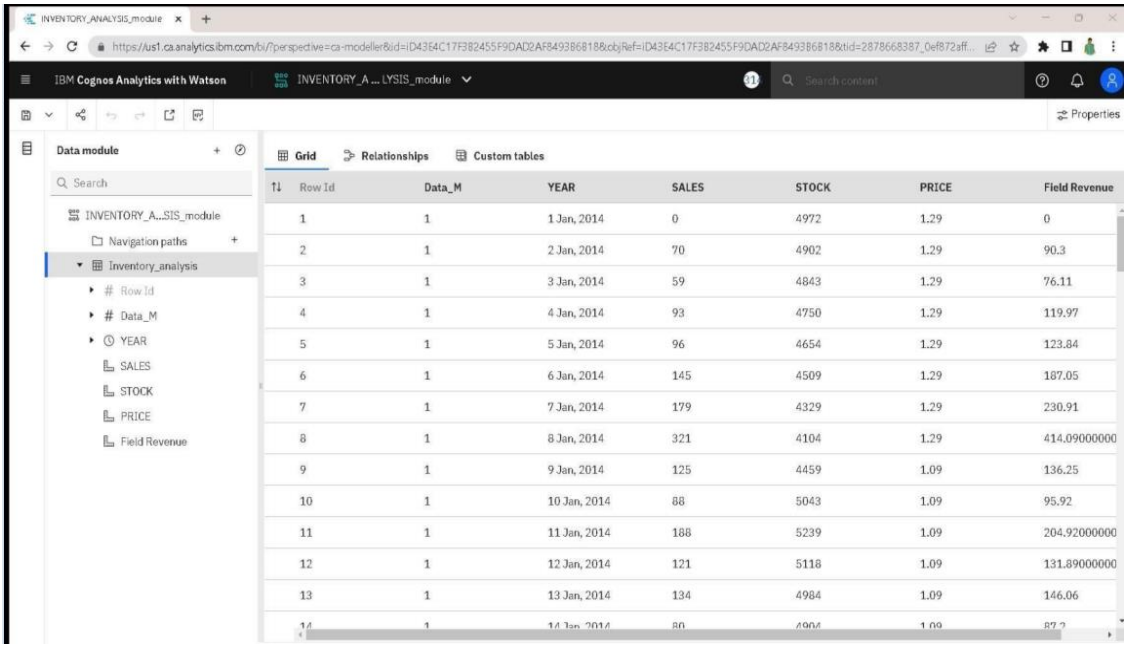
DATA COLLECTION



PREPARING DATASET



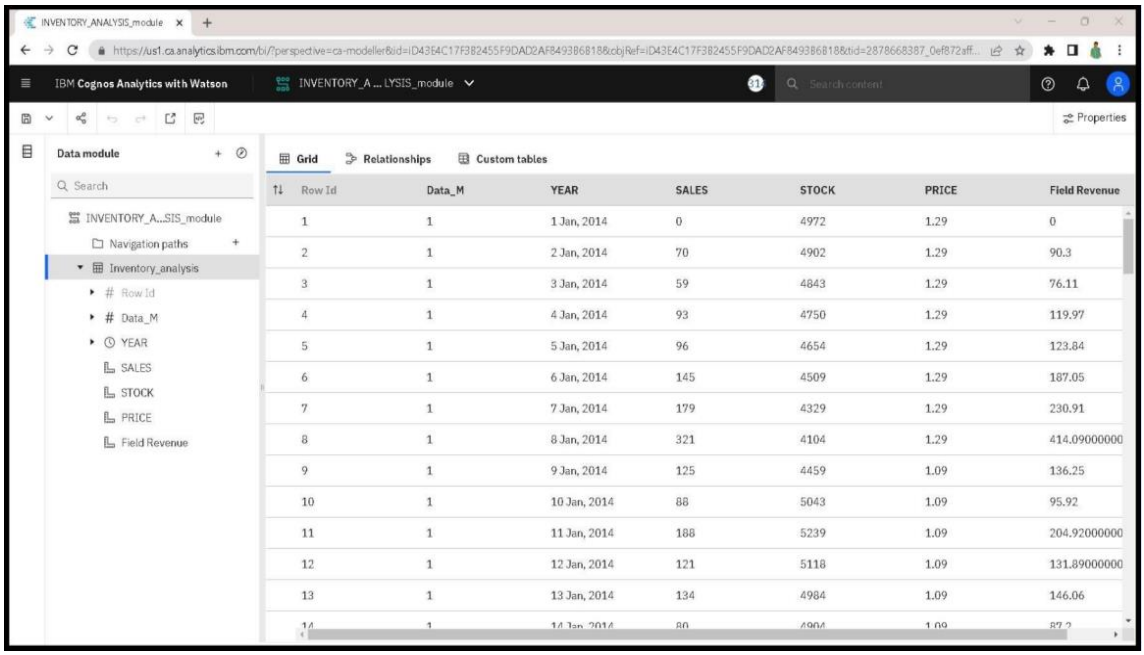
DATASET:



Row Id	Data_M	YEAR	SALES	STOCK	PRICE	Field Revenue
1	1	1 Jan, 2014	0	4972	1.29	0
2	1	2 Jan, 2014	70	4902	1.29	90.3
3	1	3 Jan, 2014	59	4843	1.29	76.11
4	1	4 Jan, 2014	93	4750	1.29	119.97
5	1	5 Jan, 2014	96	4654	1.29	123.84
6	1	6 Jan, 2014	145	4509	1.29	187.05
7	1	7 Jan, 2014	179	4329	1.29	230.91
8	1	8 Jan, 2014	321	4104	1.29	414.09000000
9	1	9 Jan, 2014	125	4459	1.09	136.25
10	1	10 Jan, 2014	88	5043	1.09	95.92
11	1	11 Jan, 2014	188	5239	1.09	204.92000000
12	1	12 Jan, 2014	121	5118	1.09	131.89000000
13	1	13 Jan, 2014	134	4984	1.09	146.06
14	1	14 Jan, 2014	80	4904	1.09	87.2

SPRINT 2

DATA EXPLORATION



Row Id	Data_M	YEAR	SALES	STOCK	PRICE	Field Revenue
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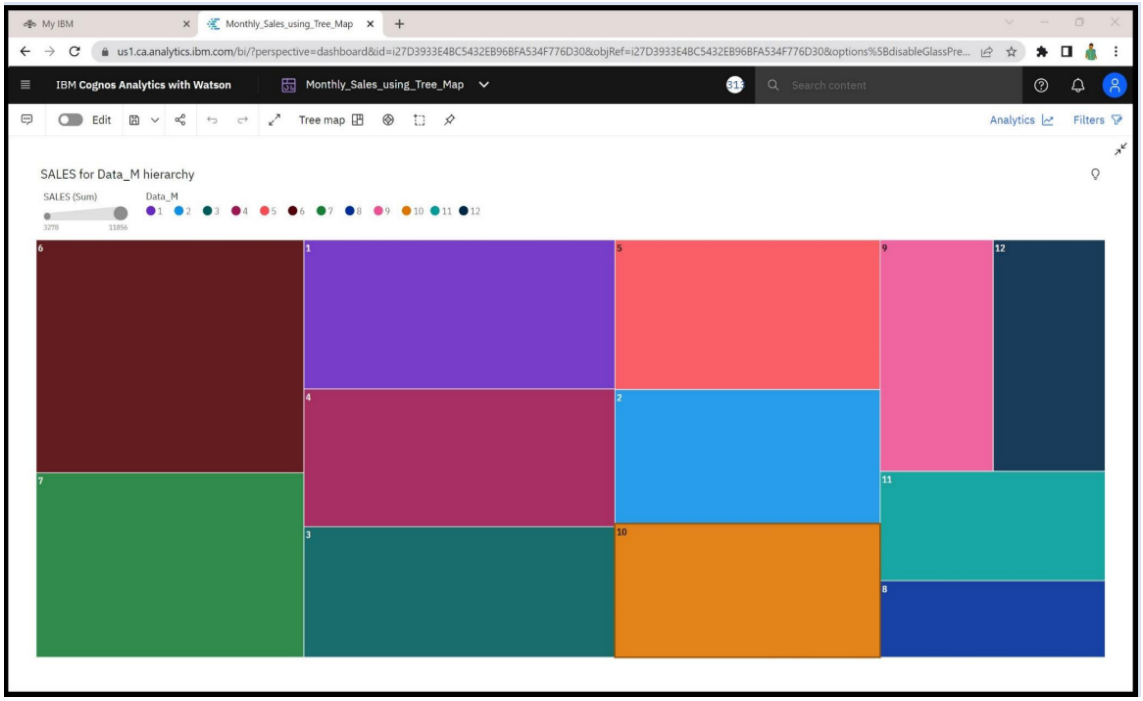
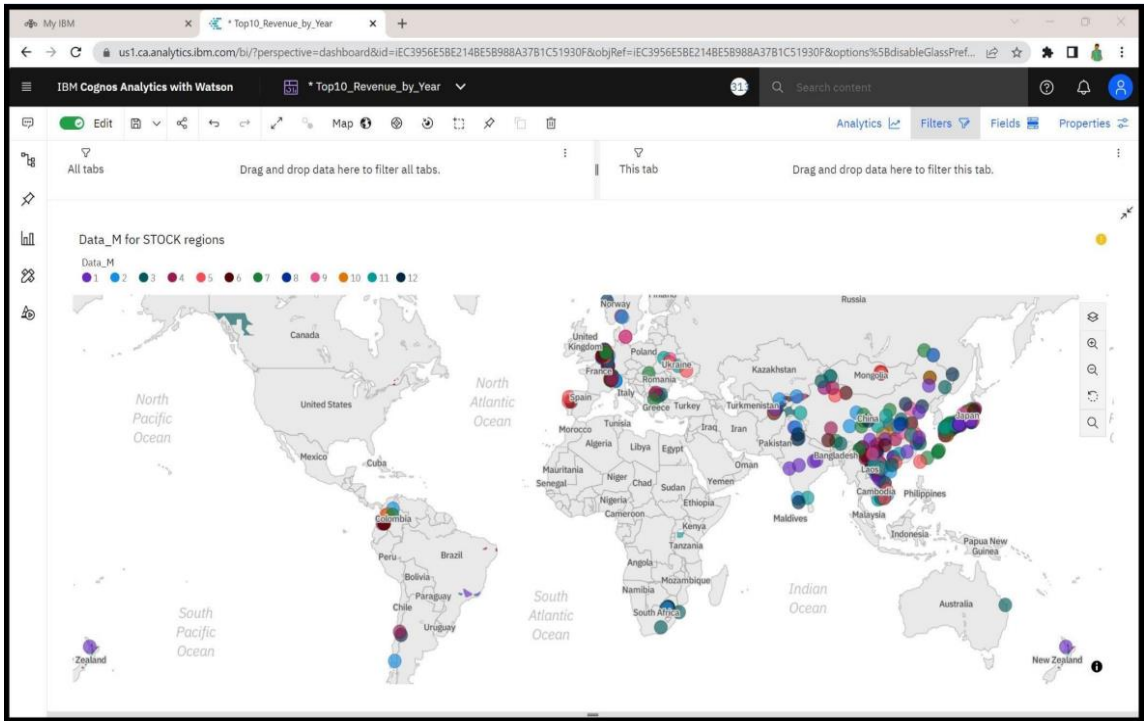
13	1	13 Jan, 2014	134	4984	1.09	146.06
14	1	14 Jan, 2014	80	4904	1.09	87.2

SALES FOR EACH MONTH:

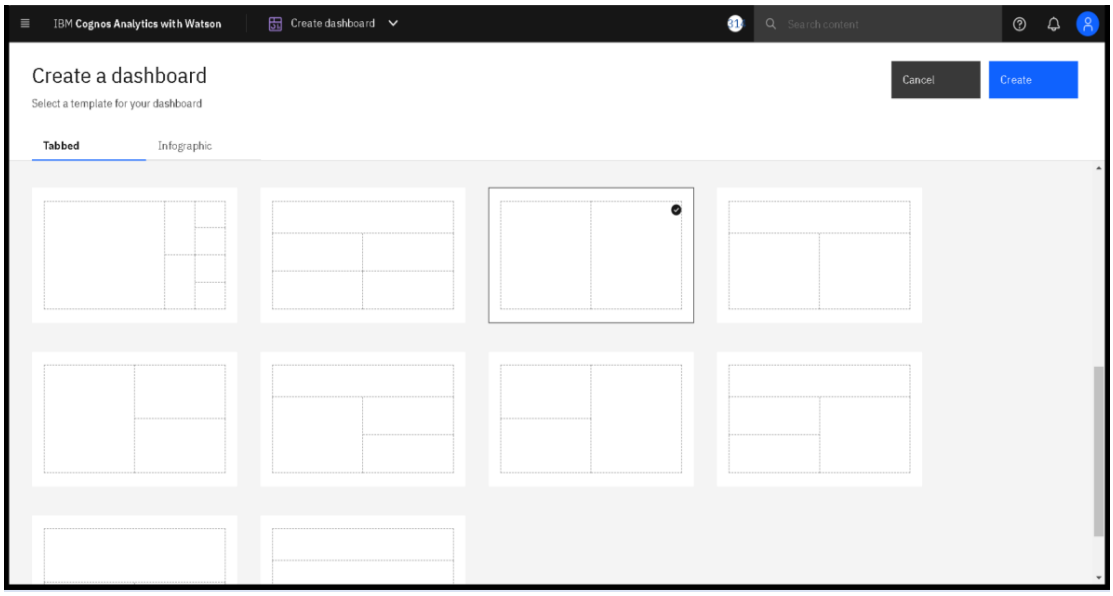


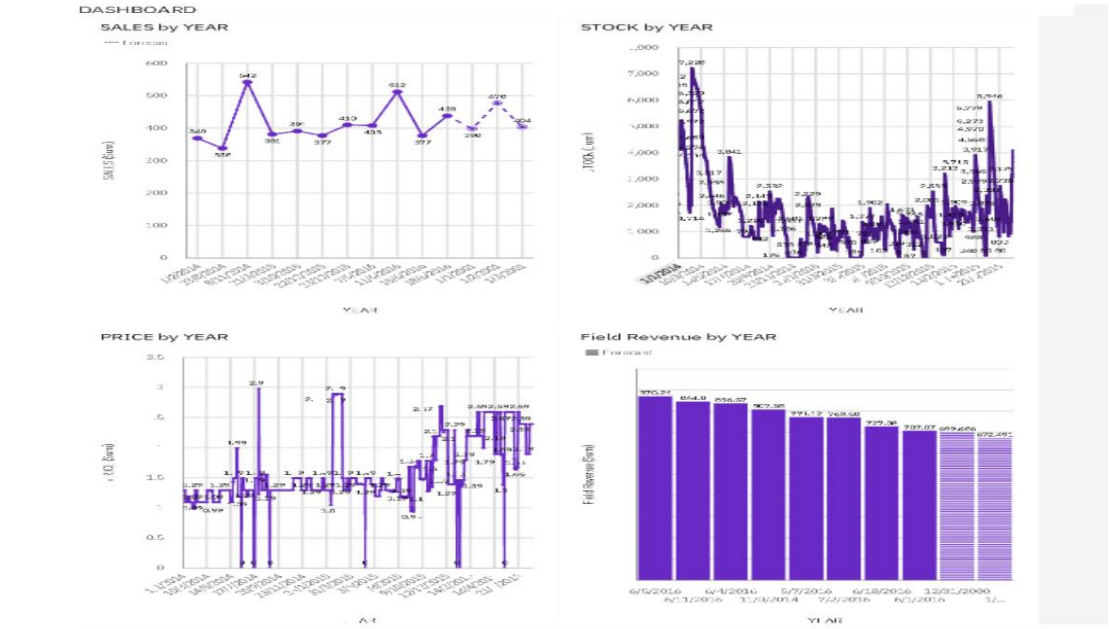
STOCK REGION:



SPRINT 3

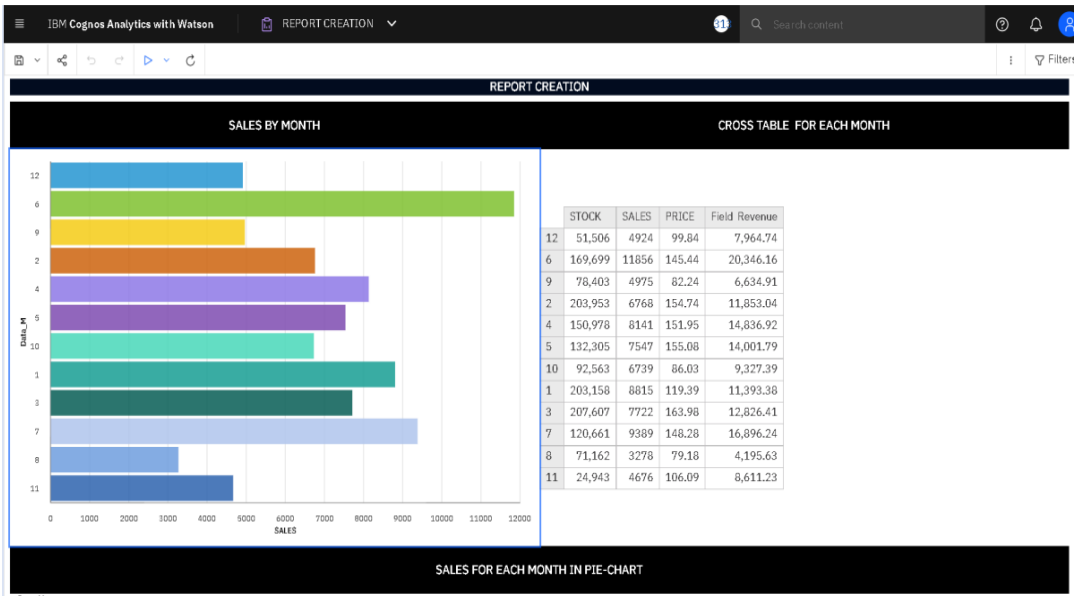
DASHBOARD CREATION



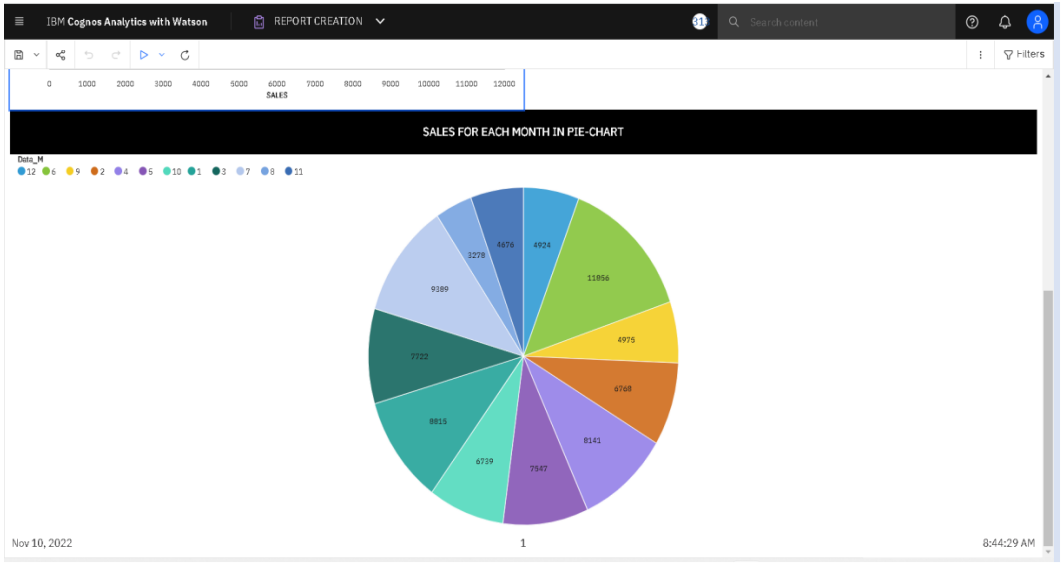


SPRINT 4

REPORT GENERATION



	STOCK	SALES	PRICE	Field Revenue
12	51,506	4924	99.84	7,964.74
6	169,699	11856	145.44	20,346.16
9	78,403	4975	82.24	6,634.91
2	203,953	6768	154.74	11,853.04
4	150,978	8141	151.95	14,836.92
5	132,305	7547	155.08	14,001.79
10	92,563	6739	86.03	9,327.39
1	203,158	8815	119.39	11,393.38
3	207,607	7722	163.98	12,826.41
7	120,661	9389	148.28	16,896.24
8	71,162	3278	79.18	4,195.63
11	24,943	4676	106.09	8,611.23



GITHUB LINK

https://github.com/IBM-EPBL/IBM-Project-39657-1660483600

DEMO LINK

https://drive.google.com/file/d/1NrnyDHiE5Ybln1OH6PHELfA4YRWuqfUH/view?usp=drivesdk