RETAIL STORE STOCK INVENTORY ANALYTICS

NALAIYA THIRAN PROJECT BASED LEARNING

on

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

A PROJECT REPORT

TEAM ID: PNT2022TMID16489

HARIKRISHNAN A(LEAD)	111919104043
GURU A	111919104041
SANDEEP G	111919104118
SIDDHARTH S.R	111919104129

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

S. A. ENGINEERING COLLEGE
ANNA UNIVERSITY: CHENNAI 600 025

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SA Engineering College
An Autonomous Institution Affiliated to Anna University Chennai ·
Accredited by NBA, NAAC 'A' Grade & ISO 9001:2015 Certified Institution

INTERNAL MENTOR

ANITHA.M, M.E.,

Assistant Professor,

Department of Computer Science and Engineering,

S.A Engineering College

Chennai-600077

INDUSTRY MENTORS

Shivani Kapoor
Rakesh Miskin

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ABSTRACT

Inventory Management System is important to ensure quality control in businesses that handle transactions revolving around consumer goods. Without proper inventory control, a large retail store may run out of stock on an important item and it's also easy to lose its possible customer if they do not have sufficient stocks in the store.

A good Inventory Management System will alert the retailer when it is time to reorder. Inventory Management System is also an important means of automatically tracking the stocks of their product. For example, if a business orders ten pairs of socks for retail resale, but only receives nine pairs, this will be obvious upon inspecting the contents of the package, and error is not likely. On the other hand, say a wholesaler orders 100,000 pairsof socks and 10,000 are missing. Manually counting each pair of socks is likely to result in error. An automated Inventory Management System helpsto minimize the risk of error. In retail stores, an Inventory Management System also helps track theft of retail merchandise, providing valuable information about store profits and the need for theft-prevention systems.

The product quantity is updated by the store operator every time a product is bought/received. This information is then tracked by a central computer system. The Inventory Management System can serve a variety of functions in this case. It can help in identifying the overstock and understock products prior. It also provides sales insights and stock reports in the form of graphs/ charts which will be useful for easier visualization. All of this data works in tandem to provide businesses with real-time inventory tracking information. Inventory Management Systems make it simple to locate and analyze inventory information in real-time with a simple database search.

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 sidelines of industry and technology conferences, to the top of the corporateagenda. With the existing promise of delivering performance improvementsnot seen since the redesign of core processes in the 1990s, these tools are likely to 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 datasetsavailable 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 therebyensuring 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.

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

2.OBJECTIVE

By the end of this Project, you will:

Know fundamental concepts and can work on IBM Cognos Analytics. Gain a broad understanding of plotting different visualization to provide suitable solution,Able to create meaningful Visualization and Dashboard(s).

Primary objective:

1.Identifying Consumer Demands:

The first task that a retailer has to perform is to identify the consumer needs and wants. The retailer does not provide raw materials, but offers finished goods and services in a ready-to-use form that the consumers want. For this, from time-to-time, retailer gathers information about consumers' liking, disliking, tastes and preferences.

2.Management of Merchandise:

The second task that a retailer performs is the management of merchandise. The retailer performs the function of storing the merchandise and provides as and when required by the customer.

3.Convenience of timing:

The retailer creates time utility by keeping the store open and ready for sale according to consumers' convenience. The new trend in retailing to longer trade hours reflects the socio-cultural changes where over one in ten people work outside normal hours resulting in changing trading hours and panacea for small retailers against the cheaper prices of the super stores and other retail chains. By being available at a location that has easy access and convenient to shop, retailer creates place utility. Finally, when selected and bought by customers, retailers create ownership utility.

In short, retailers are not only the final link between the consumers and the manufacturers but a vital part of modern business world. In the absence of retailing, one can easily imaging how difficult and costly for a consumer to approach a manufacturer for various things every time he wants. Retailers do not sell things in small quantities but make their shopping convenient and less risky.

Retailers have floor staff to answer their queries regarding how to use effectively and safely, guide them what to buy according to individual preferences and budget and give demonstration or display products so that the consumers should have a feel of the merchandise before buying. The successful retailer focuses its activities on meeting these objectives through effective marketing.

Retail Sales Goals:

Retail Sales measures the gross receipts of a retail store by selling durable and nondurable goods. The main components of retail sales are grocery, food & clothing and shoe retailing. In India, consumer spending roughly accounts for over 60% of GDP and is therefore, a vital element in the country's economic growth. Any change in retail sales pattern is important and is seen as the timeliest indicator of wide consumption patterns. Retail sales may have short term and long term goals in nature. Short term retail sales goals are supposed to support and merge into long term goals.

3. Ideation Phase

3.1 LITERATURE SURVEY

1. Inventory management in retail industry - Application of big data analytics
   Author : Hien Vu

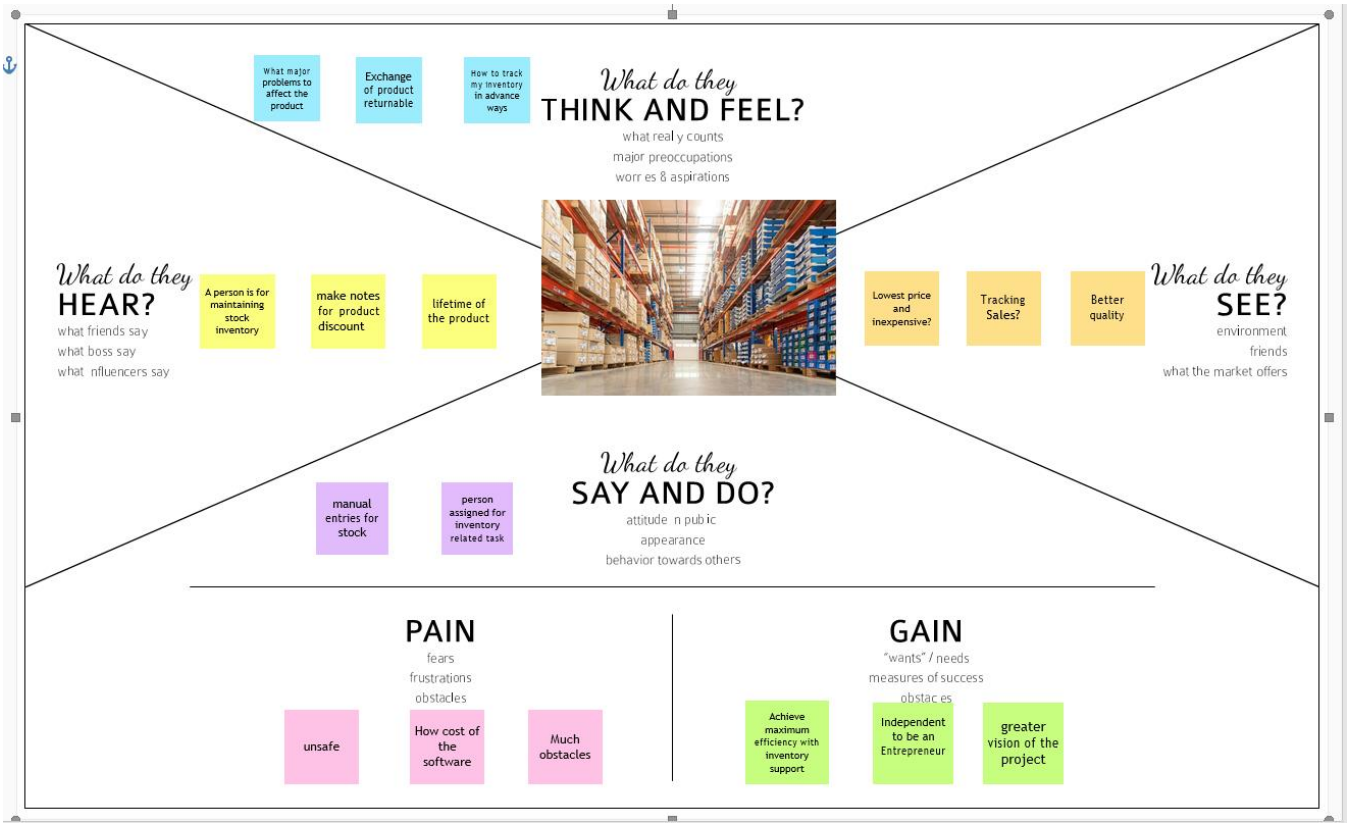
   https://www.researchgate.net/publication/329526158_Inventory_management_in_retail_indu stry_-_Application_of_big_data_analytics

   Retailers are faced with a dilemma where neither an excess of inventory on hand nor a running out of stock is negotiable as the retail sector becomes increasingly highly competitive and narrowly profitable. A thorough analysis of important inventory management strategies that have historically been employed by retailers on a large scale. The trade-off between shortage cost and overage cost is identified in the paper as the fundamental issue with inventory management. Once more, the "performance frontier" graph shows that introducing innovative is a practical way to change the efficiency curve. BDA is that innovative in this scenario. The research identifies opportunities for incorporating BDA into traditional inventory management methods and boosting the applicability and feasibility of these models in the big-data environment.

2. Inventory management for retail companies: A literature review and current trends Author : 1.Cinthya VanessaMunoz, Jorge Andres Espinoza Aguirre, RodrigoArcentales-Carrion & Mario Pena

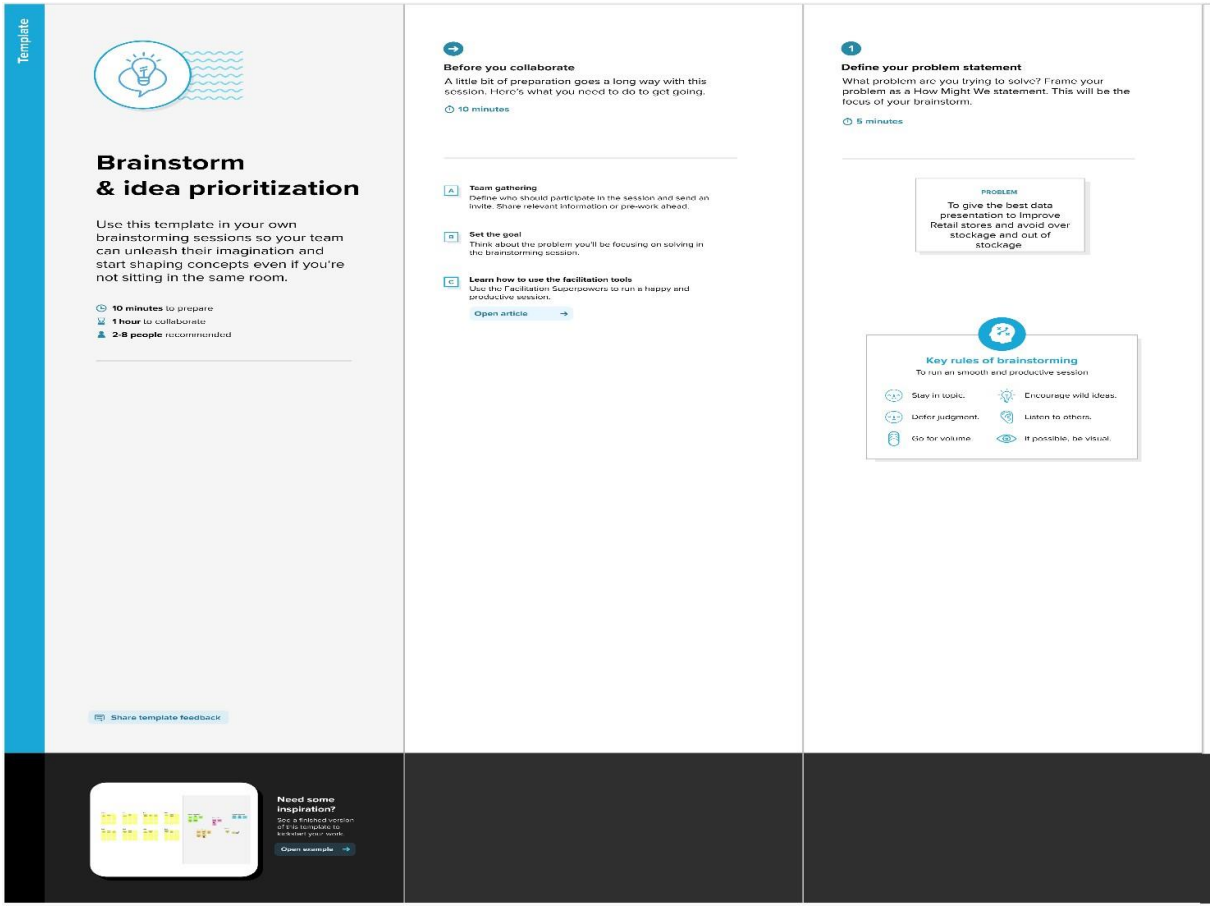
   https://www.researchgate.net/publication/352235223_Inventory_management_for_retail_co
   mpanies_A_literature_review_and_current_trends To identify the primary trends and indicators of inventory management in Small and Mediumsized Enterprises, a systematic literature study was conducted (SMEs). The five-year study period between 2015 and 2019 mainly focuses on the retail industry. The main findings of this study include the top inventory control and management models, the Key Performance Indicators (KPIs) for managing them correctly, and the advantages and difficulties of selecting or implementing an effective system.

3.2 EMPATHY MAP



3.3 IDEATION & BRAINSTORMING

Step 1:



Step 2:


2
Brainstorm
Write down any ideas that come to mind that address your problem statement.
10 minutes
TIP
Harikrishnan.A
Warehouse space insufficiency
Product Expiration
Effects Of Over stock
Unsold stocks
Loss in Business
Sandeep.G
Prevents Spoilage and Obsolescence
Improves Multi-Channel
Improves Customers Satisfaction
Importance of Inventory Management in Retail
Decreases Inventory Costs
Minimises Out-of-Stocks
Improves Profit Margins
Siddharth.S.R
Prevents over stock
Alert Demand stock
Frequent Analysis of data
Information of stocks sold
Helps to set offers on soon expired stocks
Guru.A
Price optimization
Future Performance prediction
Strategic Areas in Data Analytics for retailers
Demand prediction
Identifying Customers
3
Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.
20 minutes
TIP
Sales Data
Visualization of high sold stock and stock of demand stock
Future Performance prediction
Alert of Demand stock
Intimation of Oversstock
Price Optimization
Sales Data Report
Using Visualization to present data analysis
Performing Mathematical calculations

Step 3:


4
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
Discount Efficiency
Avoiding over stockage
Retail store data analysis
Loyalty with customer
Customer satisfactory
Forecasting Trends
Marketing
Customer Feedback
Importance
If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?
TIP
Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the H key on the keyboard.
Feasibility
Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

3.4 PROBLEM STATEMENT

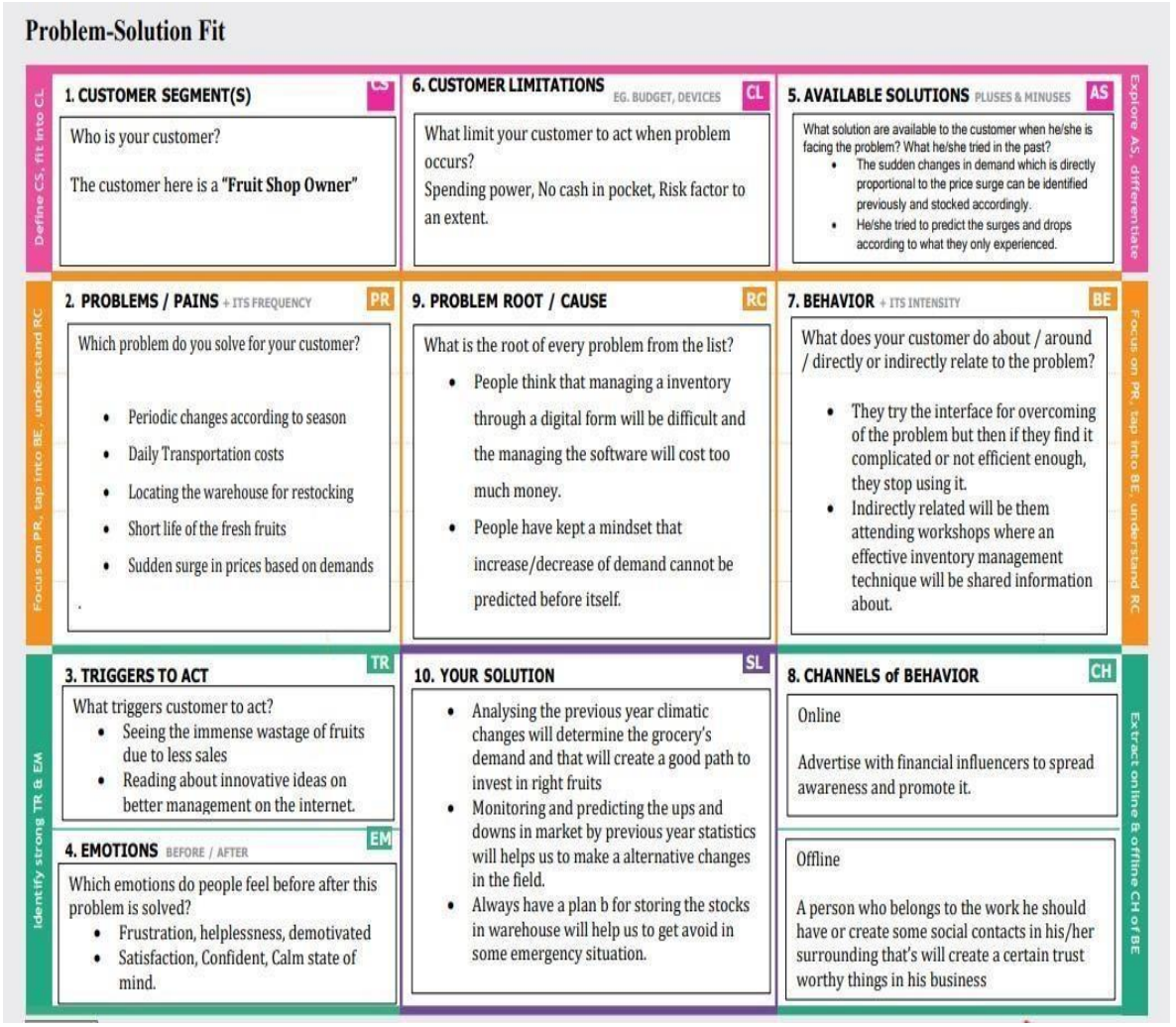
Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Harikrishnan	Buy a product at the discountsale at shop.	Makes more time and difficult to buy a product.	High crowd at the shop.	Makes satisfication fora discount sale.
PS-2	Guru	Buy a product at online.	Lack in the product quality.	Some retailer tryto cheat at customers.	Frustrated and not trustable.
PS-3	Sandeep	Sale a product as a shopkeeper.	I find difficult in gaining profit and more customers.	High economy and GST.	Frustrated
PS-4	Siddharth	Sale a product at online.	Difficult to find the location of customers.	Lack of information.	Frustrated

4.Project Design Phase-1

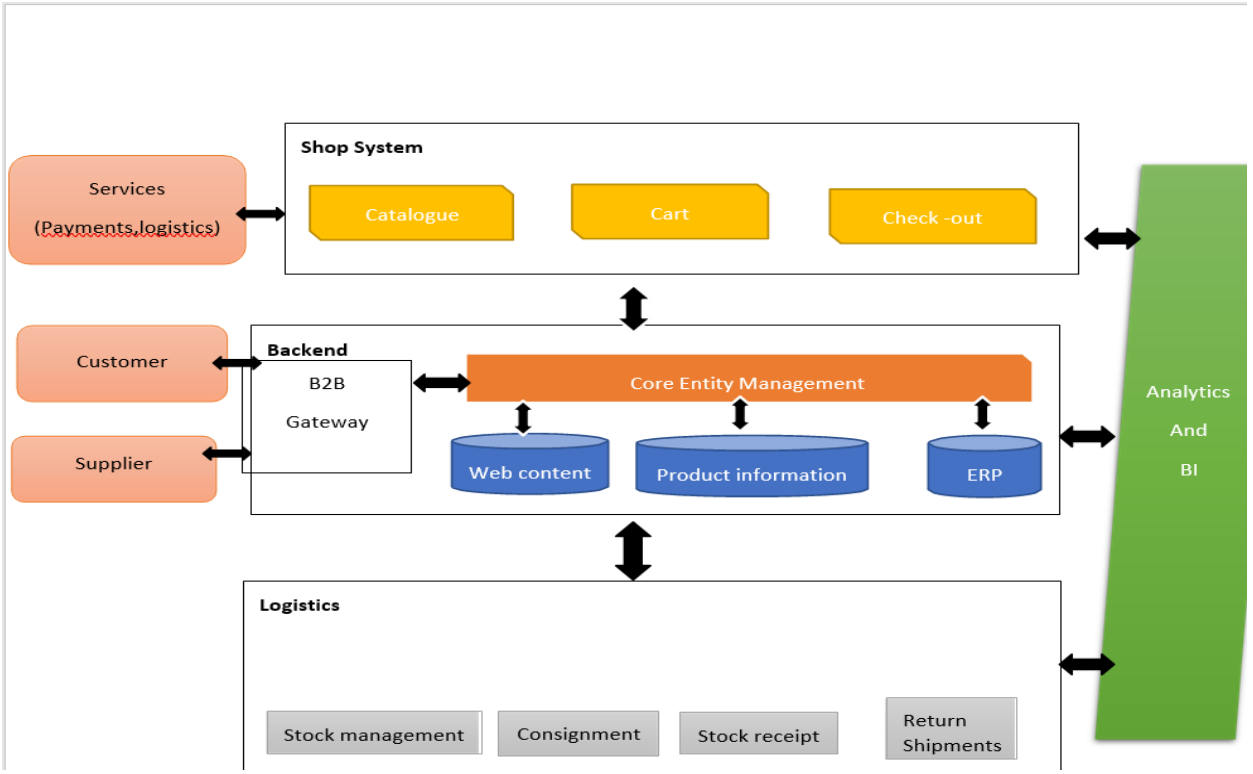
4.1 PROPOSED SOLUTION

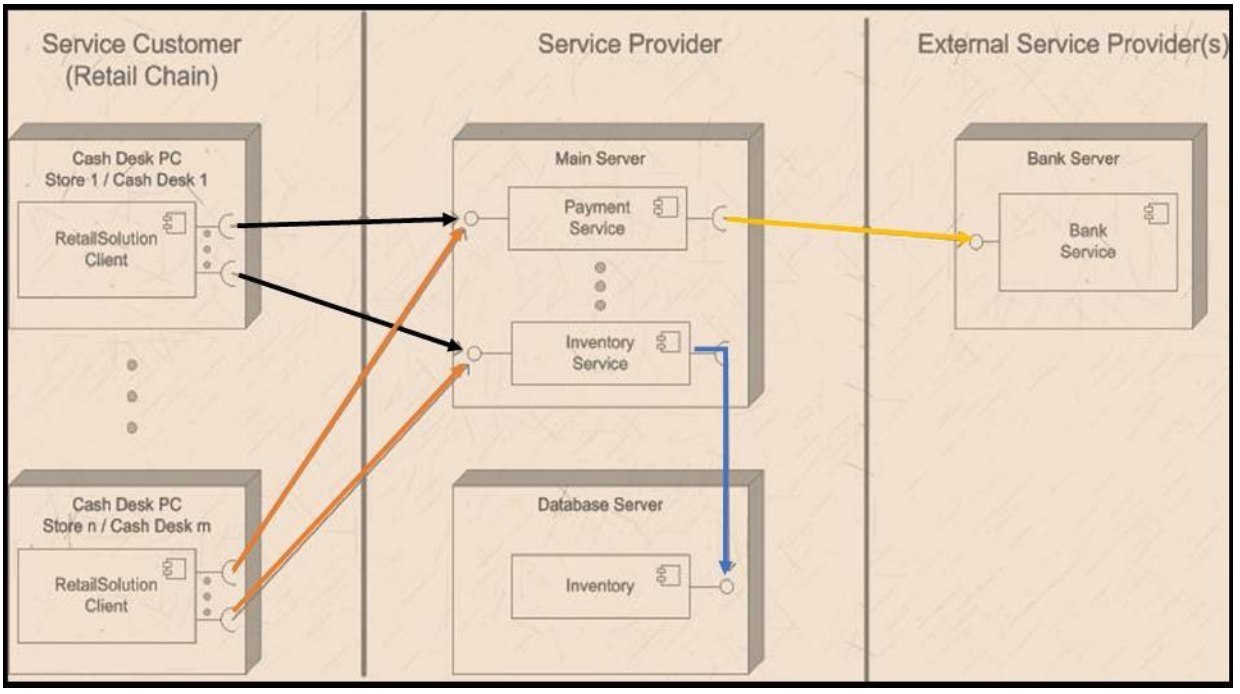
S.No.	Parameter	Description
1.	Problem Statement (Problem to besolved)	To create a retail store stock inventory management system for retailers to meet customer demand without running out of stock or carrying excess supply.
2.	Idea / Solution description	Retail store stock inventory analytics is implemented to analyse the historical sales data of a retailer. By deeply understanding thedataset, 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 detailedproduct 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 storesas well as large departmental stores. It can alsoanalyse wide range of datasets and different types of visualisations can be done.

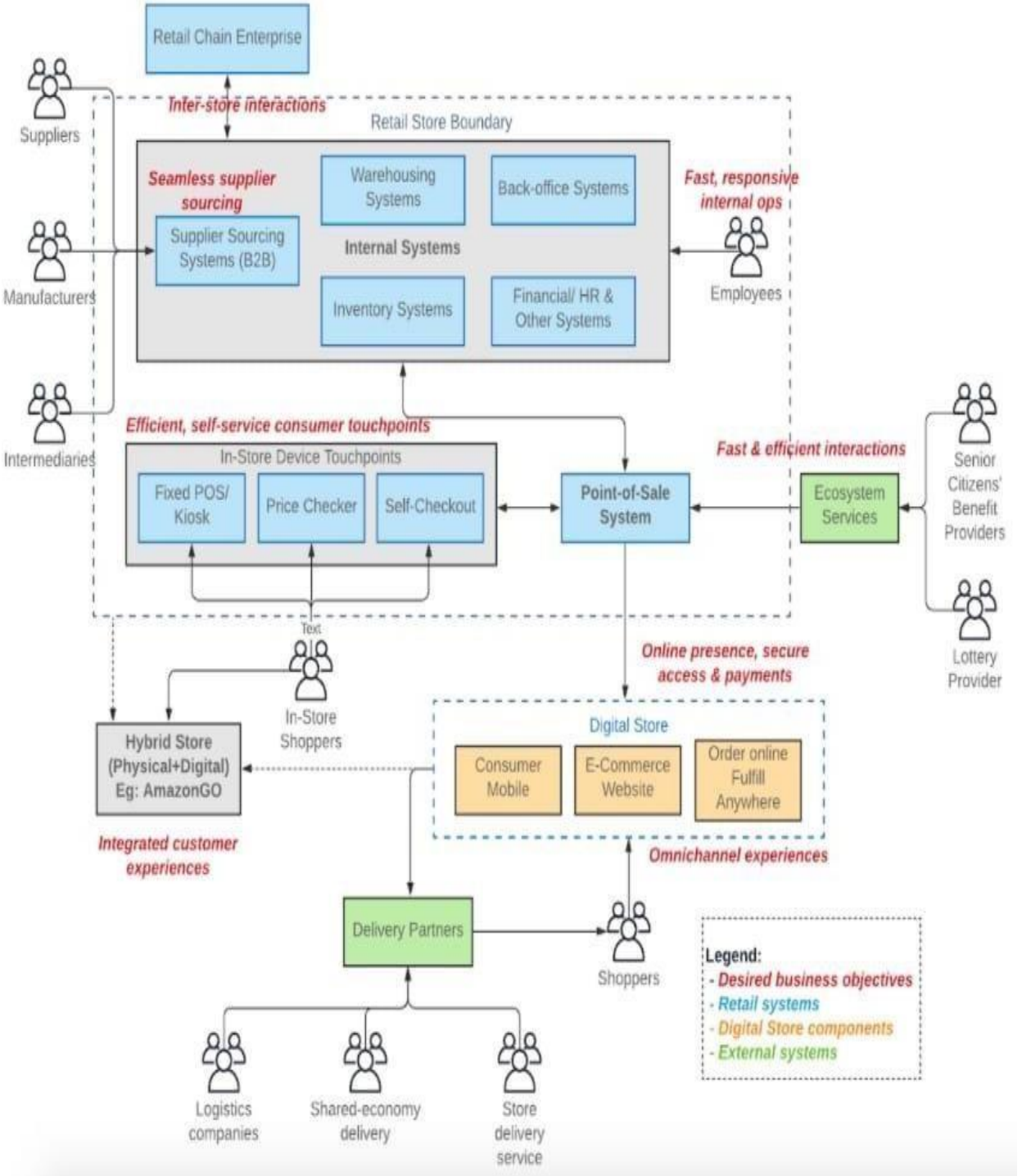
4.2 PROBLEM SOLUTION FIT



4.3 SOLUTION ARCHITECTURE

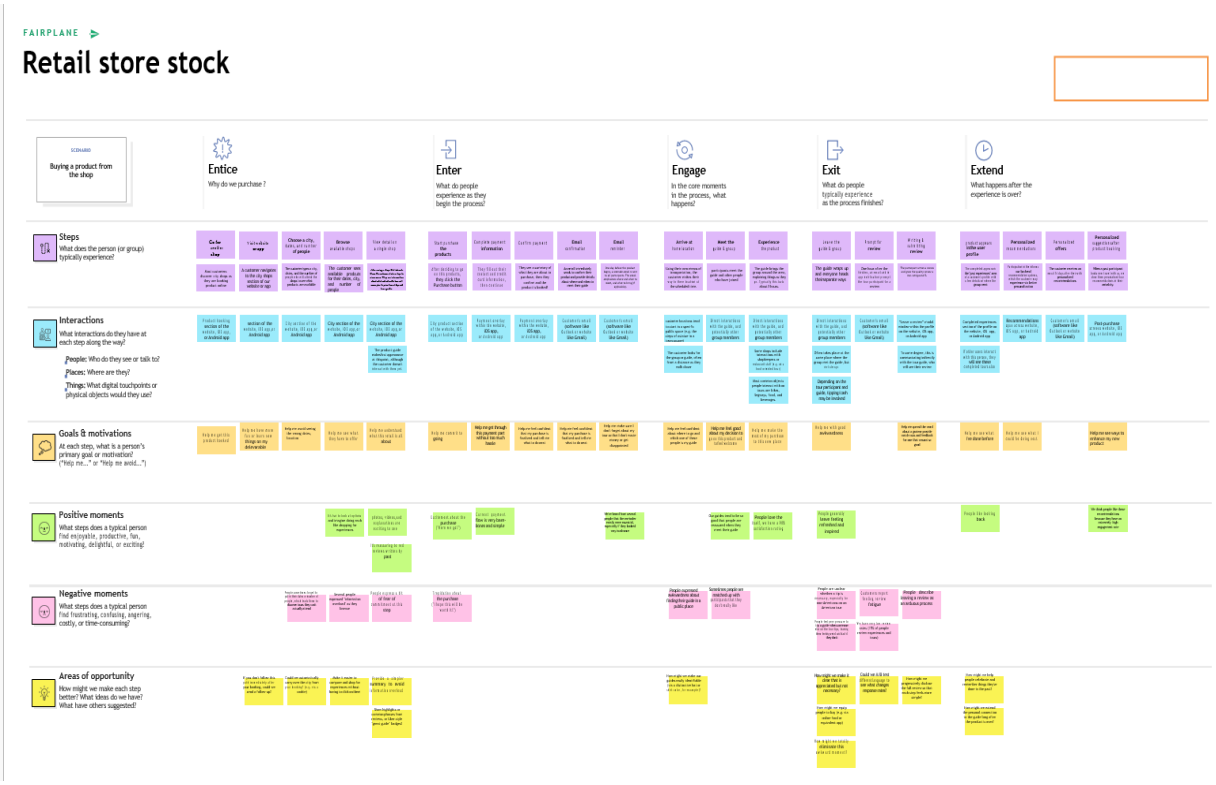





Retail Chain Enterprise
Inter-store interactions
Retail Store Boundary
Suppliers
Seamless supplier sourcing
Warehousing Systems
Back-office Systems
Fast, responsive internal ops
Supplier Sourcing Systems (B2B)
Internal Systems
Manufacturers
Employees
Inventory Systems
Financial/ HR & Other Systems
Intermediaries
Efficient, self-service consumer touchpoints
In-Store Device Touchpoints
Fast & efficient interactions
Senior Citizens' Benefit Providers
Fixed POS/ Kiosk
Price Checker
Self-Checkout
Point-of-Sale System
Ecosystem Services
Lottery Provider
Text
Online presence, secure access & payments
In-Store Shoppers
Digital Store
Hybrid Store (Physical+Digital) Eg: AmazonGO
Consumer Mobile
E-Commerce Website
Order online Fulfill Anywhere
Integrated customer experiences
Omnichannel experiences
Delivery Partners
Shoppers
Legend:
- Desired business objectives
- Retail systems
- Digital Store components
- External systems
Logistics companies
Shared-economy delivery
Store delivery service

5. Project Design Phase-2

5.1 CUSTOMER JOURNEY MAP



5.2 SOLUTION REQUIREMENT

Functional Requirements:

Following are the functional requirements of the proposed solution:

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

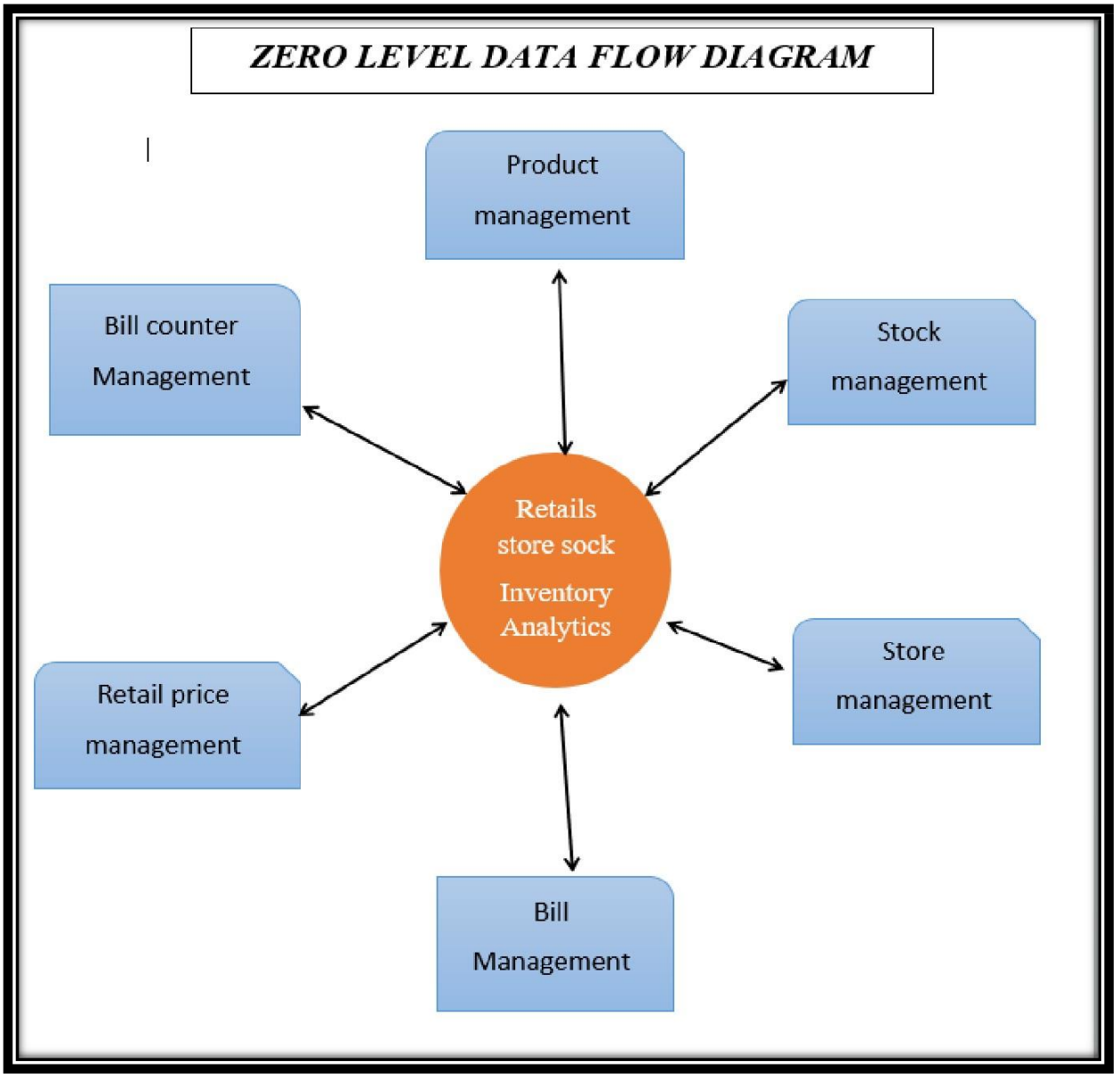
Non-functional Requirements:

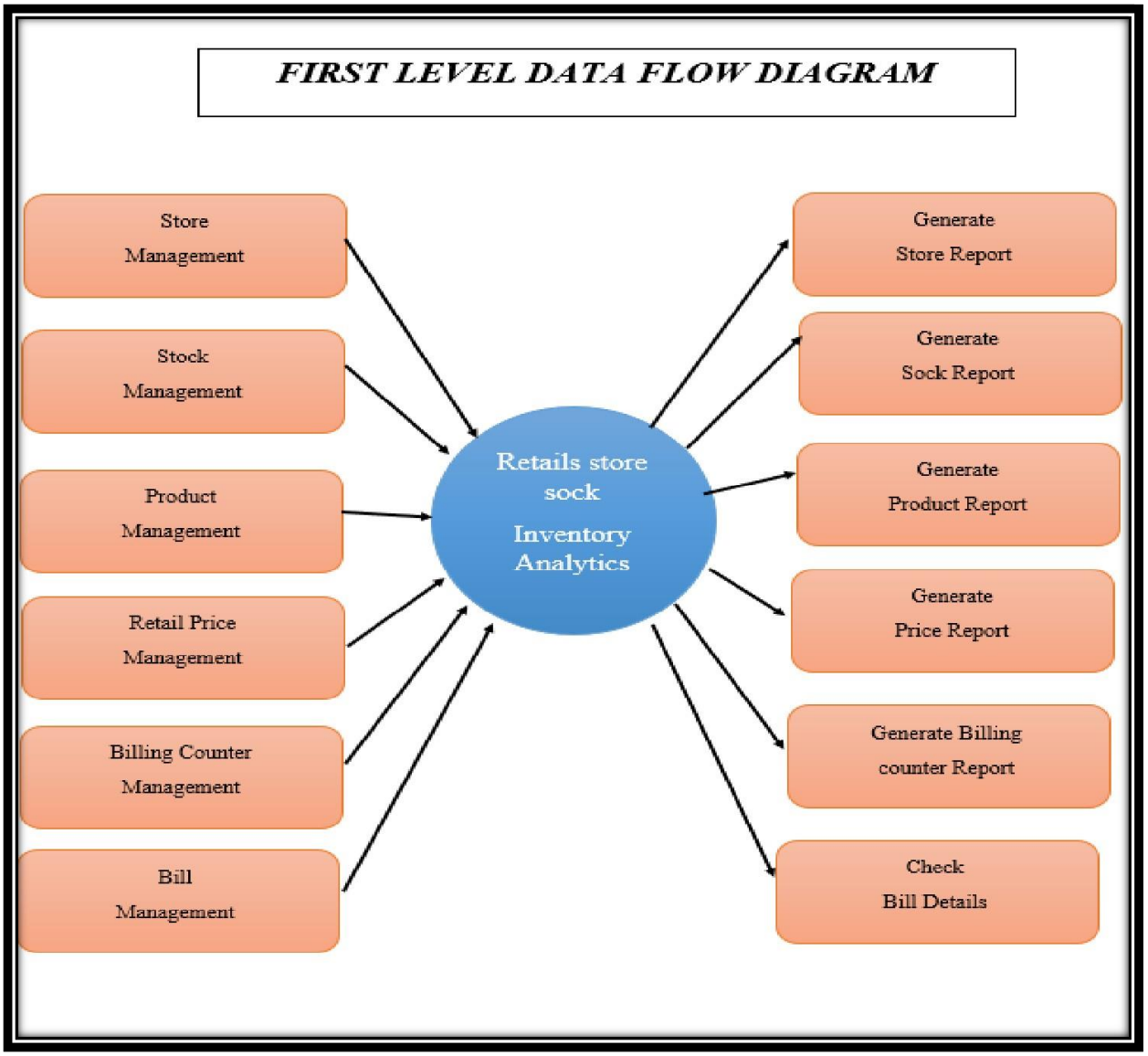
Following are the non-functional requirements of the proposed solution:

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	They are more likely to have enough inventory to capture every possible sale while avoiding overstockandminimizing 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 theirproper 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 willbe taken and be proceeded further up to the satisfaction of the user.

5.3 DATAFLOW 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 thesystem requirement graphically.It shows how data enters and leaves the system, what changes the information, and where data is stored.





USER STORIES

Use the below template to list all the user stories for the product.

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 mypassword.	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 registeredfor 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 throughGmail	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 enteringemail & 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 (Webuser)		USN-1	As a user, I can register for the web application entering my email, password and confirming mypassword.	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 registeredfor the web application	I can receive confirmation email & click confirm	High	Sprint-1
Administrator		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 throughGmail	I can register & access the dashboard with Gmail login	Medium	Sprint-1

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
	Login	USN-5	As a user, I can log into the application by enteringemail & password after installing the web application.	I can access the dashboard bylogin 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 inmy retail store	High	Sprint-1
Customer Care Executive		CCE-1	As a customer care executive, I will always be available for the interaction with the customer toclarify the queries.	An executive will analyse thecustomer complaints and rectify their problems.	High	Sprint-2
Administrator		ADMIN-1	As an administrator, I will manage backup and recovery, data modelling and design, distributed computing, database system, and a data security	Administrator can evaluate, design, review and implementing a data and theyare also responsible for updating and maintaining thedata	HIgh	Sprint-2

5.4 TECHNOLOGY STACK

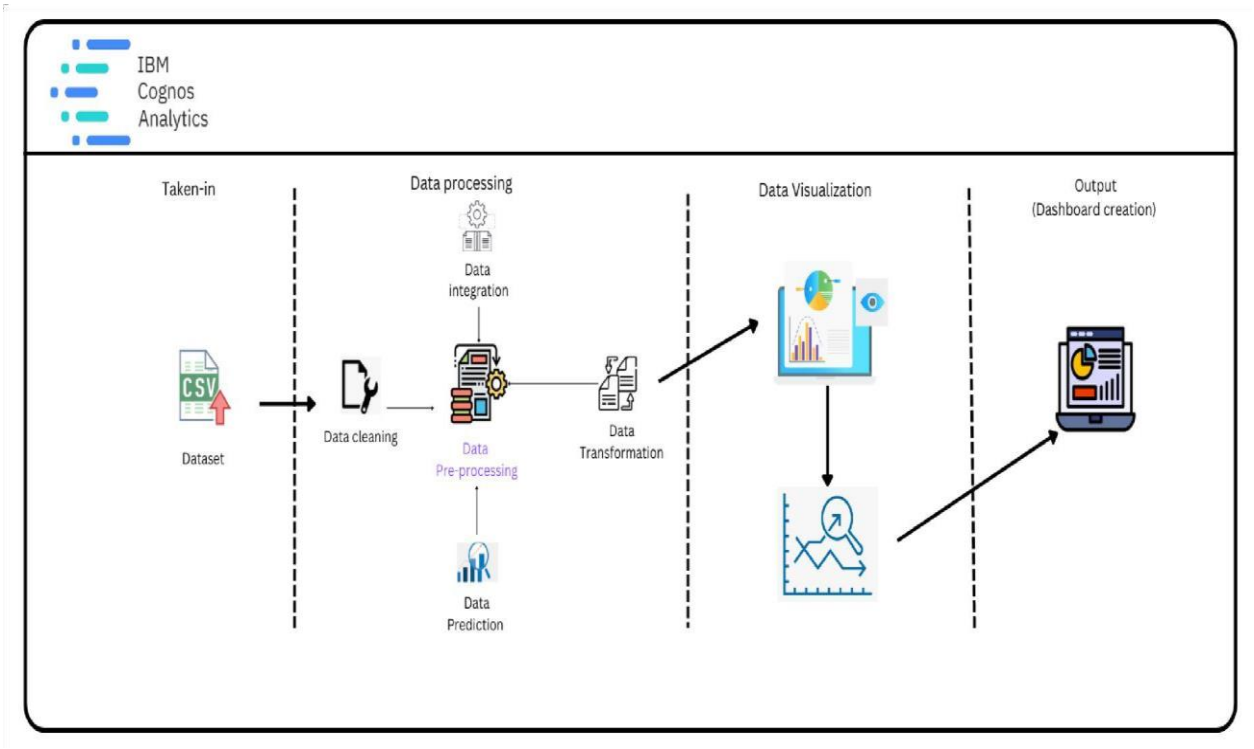


Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The user interacts with application using Web UI	HTML, CSS, JavaScript
2.	Data Processing	The data from the dataset is pre-processed	IBM Cognos Analytics
3.	Cloud Database	The clean dataset is stored on IBM Cloud	IBM Cloud
4.	Data visualization	The data is visualized into different forms	IBM Cognos Analytics, Python
5.	Prediction	These Algorithm techniques are used to predictthe proper way to make the stock in store.	ML algorithms –Logistic Regression,Linear Regression, Random Forest,ABC Techniques.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Open-source frameworks used	IBM Cognos Analytics, Python
2.	Security Implementations	Request authentication using Encryptions	Encryptions
3.	Scalable Architecture	Scalability consists of 3-tiers	Web Server – HTML, CSS, JavascriptApplication Server – Python Database Server – IBM Cloud
4.	Availability	The application is available for cloud users	IBM Cloud Hosting
5.	Performance	The user can know how to maintain the inventoryto increase profits.	ML algorithms

6.PROJECT PLANNING PHASE

6.1 MILESTONE AND ACTIVITY LIST

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on selected project and gathering information by referring the project's related technical papers, research publications, etc.	**19 SEPTEMBER 2022**
Prepare Empathy Map	Prepare empathy map canvas to capture the user's pains & gains and prepare the list of problem statements.	**19 SEPTEMBER 2022**
Ideation	To list by the organizing brainstorm sessions and prioritize the top three ideas based on the feasibility and importance.	**19 SEPTEMBER 2022**
Proposed Solution	To prepare the proposed solution documents, which includes the novelty, feasibility of ideas, business model, social impact, scalability of the solution, etc.	**19 SEPTEMBER 2022**
Problem Solution Fit	Includes customer segments and customer constraints, the problem root cause and jobs to be done.	**19 SEPTEMBER 2022**

Solution Architecture	From data collection to digit recognition by the web application are represented in architectural diagrams	**19 SEPTEMBER 2022**

Customer Journey	Prepare the customers journey map help the customers understand the user interaction and experiences with the application from the beginning tothe end.	**03 OCTOBER 2022**
Functional Requirement	Prepare the functional requirementdocument.	**03 OCTOBER 2022**
Data Flow Diagrams	Data flow diagrams and user stories are prepared and four sprint phases aredescribed. .	**03 OCTOBER 2022**
Technology Architecture	Technical flow graphs are created and the functions of technical stacks are defined.	**03 OCTOBER 2022**
Prepare Milestone & Activity List	Prepare the milestones and activity of the project.	**03 OCTOBER 2022**
Sprint Delivery Plan	To develop a template for sprint planning.	**05 OCTOBER 2022**
Project Development – Delivery of Sprint-1, 2, 3 & 4	Develop and submit the developed code by testing it and having no errors.	**10 OCTOBER 2022 - 19 NOVEMBER 2022**

6.2 SPRINT DELIVERY PLAN

Product Backlog, Sprint Schedule, and Estimation

Sprint	Functional Requirement (Epic)	User Story Numb er	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirmingmy password.	2	High	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint-1	Login	USN-2	As a user, I need valid credentials to log in tomy application.	1	High	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint-1	Data Collection	USN-3	As a user, I need to gather the data in the formof CSV/XLS and clean the data	2	High	Harikrishnan.A Sandeep.G Siddharth S.R
Sprint-2	Upload dataset	USN-4	As a user, I can view the data of the products	1	Low	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint-2	Data Preparation	USN-5	As a user, I need to filter it for Data visualizatio n.	3	High	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint-2	Data visualization	USN-6	As a user, I can easily visualize the data in the form of charts.	4	Medium	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint-3	Dashboard	USN-7	As a user, I can view the summary of theproduct sales by the help dashboard.	2	Medium	Harikrishnan.A Guru.A Sandeep.G
						M
Sprint-3	Dashboard	USN-8	As a user, I must plan visualizations in a way that I'm able to gain insights regarding the sales based upon the category of sales and the respective region.	4	High	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**	**Story Points**	**Priority**	**Team Members**

Sprint-3	Dashboard	USN-9	As a user, I must be able to gain insights from the charts/graphs through a variety of relationships established in the dashboard.	4	Medium	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint- 4	Prediction	USN-10	As a user, I see the prediction of the specific product's future sales expectation.	4	Medium	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint- 4	Report	USN-11	As a user, I can view the list of categorized products and their details as a report.	5	High	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R
Sprint-4	Story	USN-12	As a user, I can view the product and customer description and more additional information as a story.	5	High	Harikrishnan.A Guru.A Sandeep.G Siddharth S.R

Project Tracker, Velocity & Burndown Chart:

Sprints	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	5	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	8	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	14	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).

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

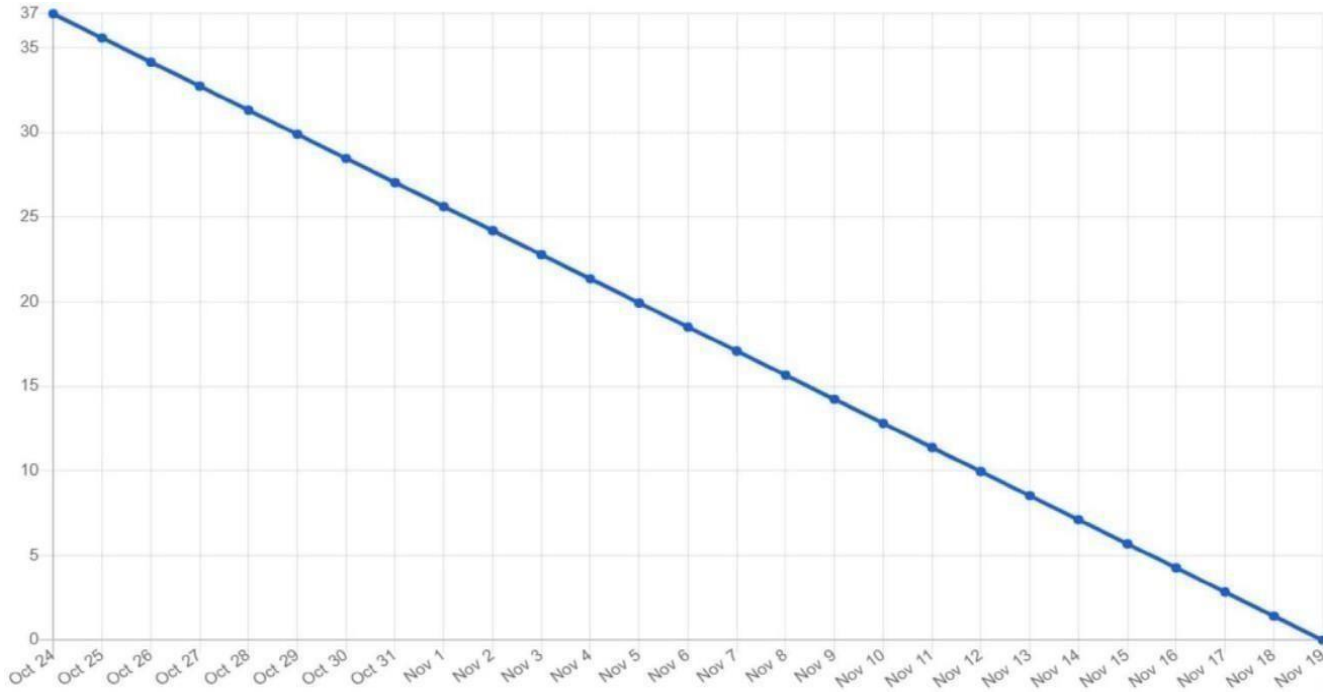
iteration unit (story points per day)

SPRINT	TOTAL STORY POINTS	DURATION	AVERAGE VELOCITY
SPRINT-1	5	6 Days	5/6 = 0.833
SPRINT-2	8	6 Days	8/6 = 1.33
SPRINT-3	10	6 Days	10/6 = 1.66
SPRINT-4	14	6 Days	14/6 = 2.33

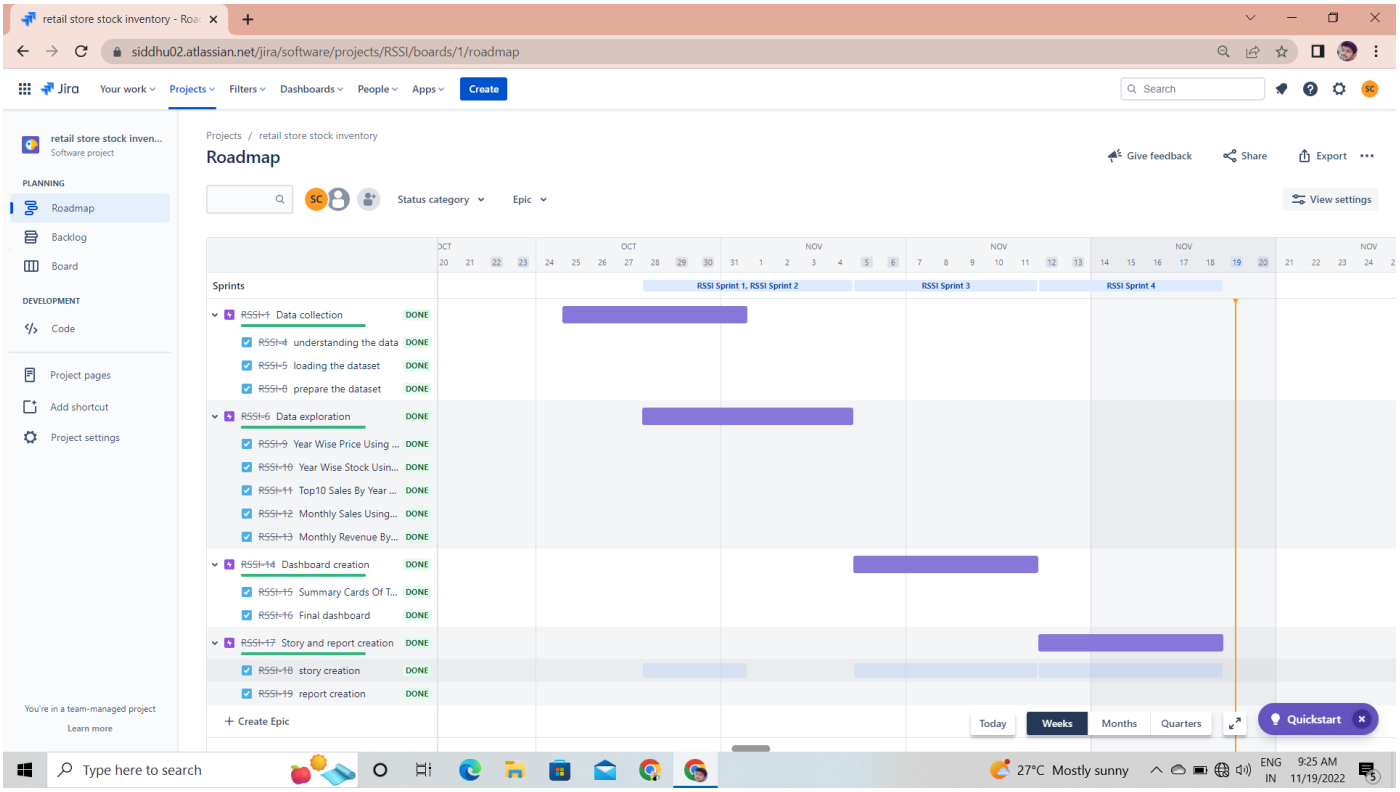
Burndown Chart:

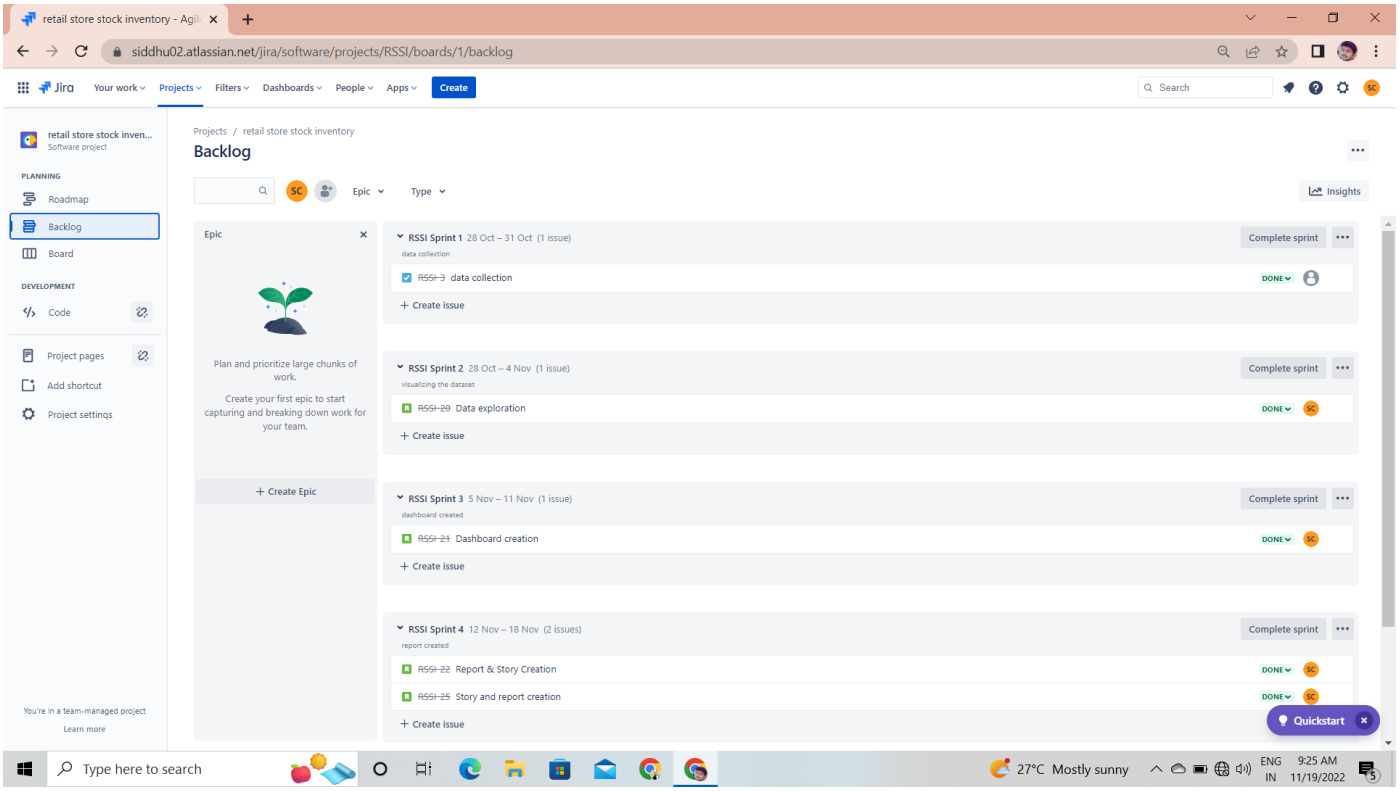
A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies suchas Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

Overall Burndown Chart:



JIRA SOFTWARE:





7.PROJECT DEVELOPMENT PHASE

SPRINT-1:

- Data Collection
- Data Preparation

SPRINT-2:

- Data Exploration

SPRINT-3:

- Dashboard Creation

SPRINT-4:

- Report Creation
- Story Creation

7.1 DELIVERY OF SPRINT-1

Data Collection:

Download the Dataset

Dataset link - https://drive.google.com/drive/folders/1kiL-5CHJmQvbk9VyFsuUs-myAupBZGNy

Data Preparation:

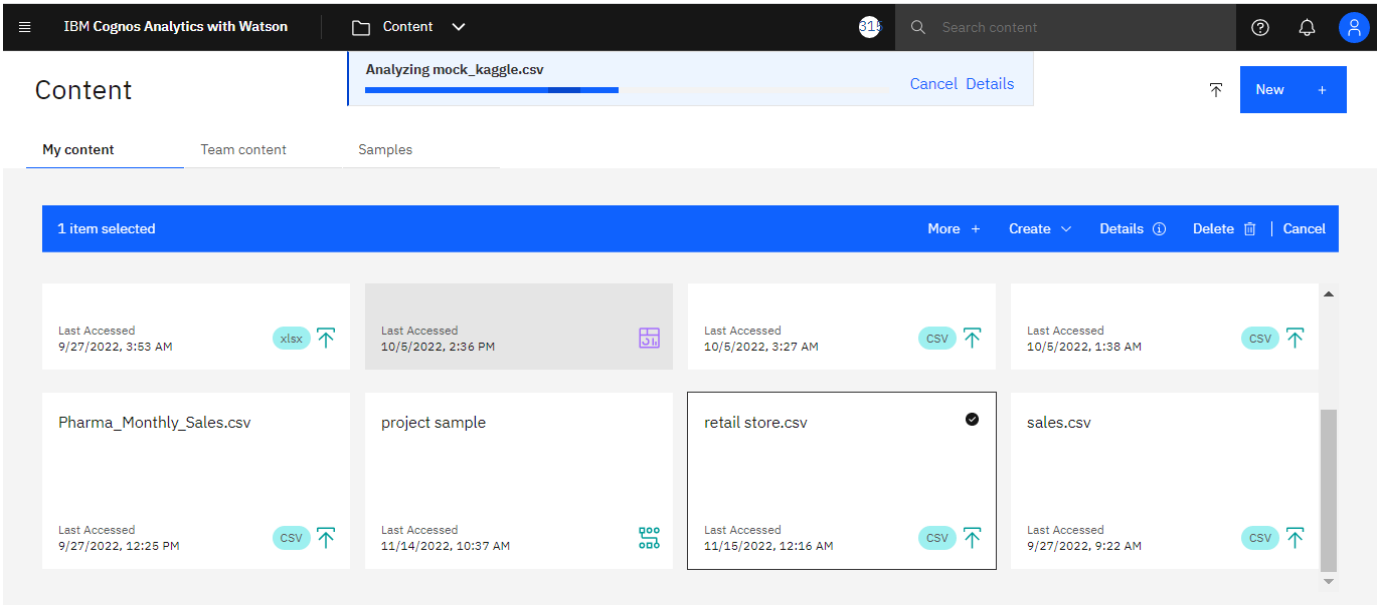
Understanding the dataset:

By using the Microsoft Excel platform

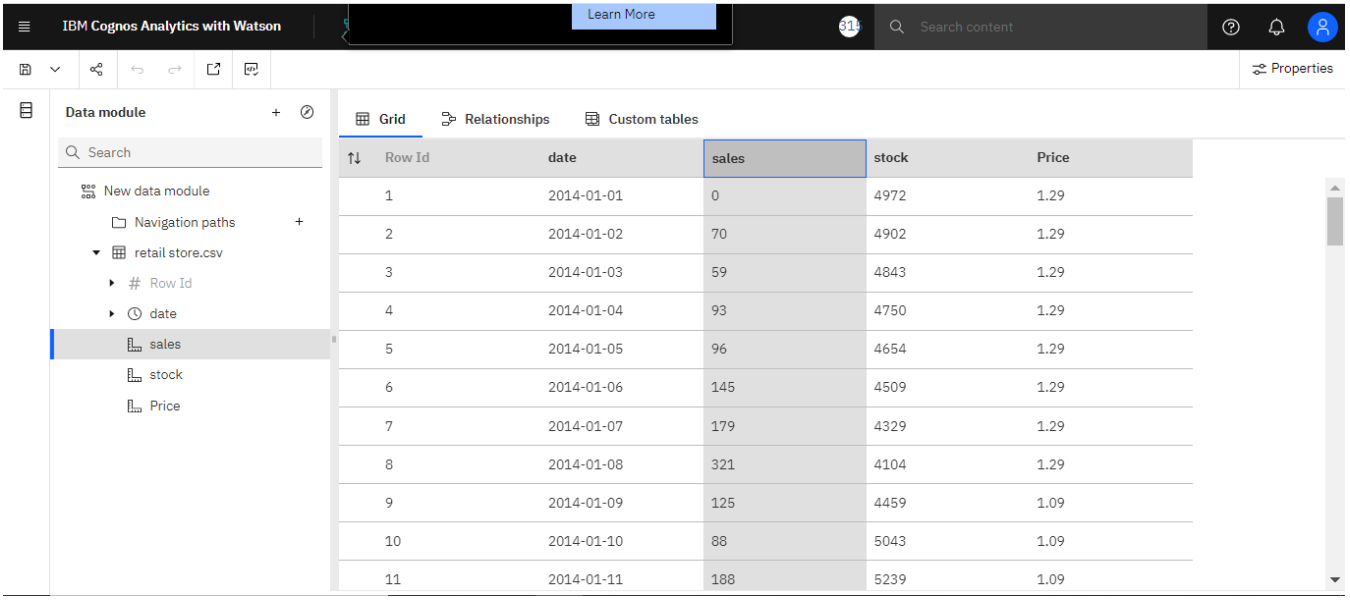
	A	B	C	D
1	date	sales	stock	Price
2	01-01-2014	0	4972	1.29
3	02-01-2014	70	4902	1.29
4	03-01-2014	59	4843	1.29
5	04-01-2014	93	4750	1.29
6	05-01-2014	96	4654	1.29
7	06-01-2014	145	4509	1.29
8	07-01-2014	179	4329	1.29
9	08-01-2014	321	4104	1.29
10	09-01-2014	125	4459	1.09
11	10-01-2014	88	5043	1.09
12	11-01-2014	188	5239	1.09
13	12-01-2014	121	5118	1.09
14	13-01-2014	134	4984	1.09

Loading the Dataset:

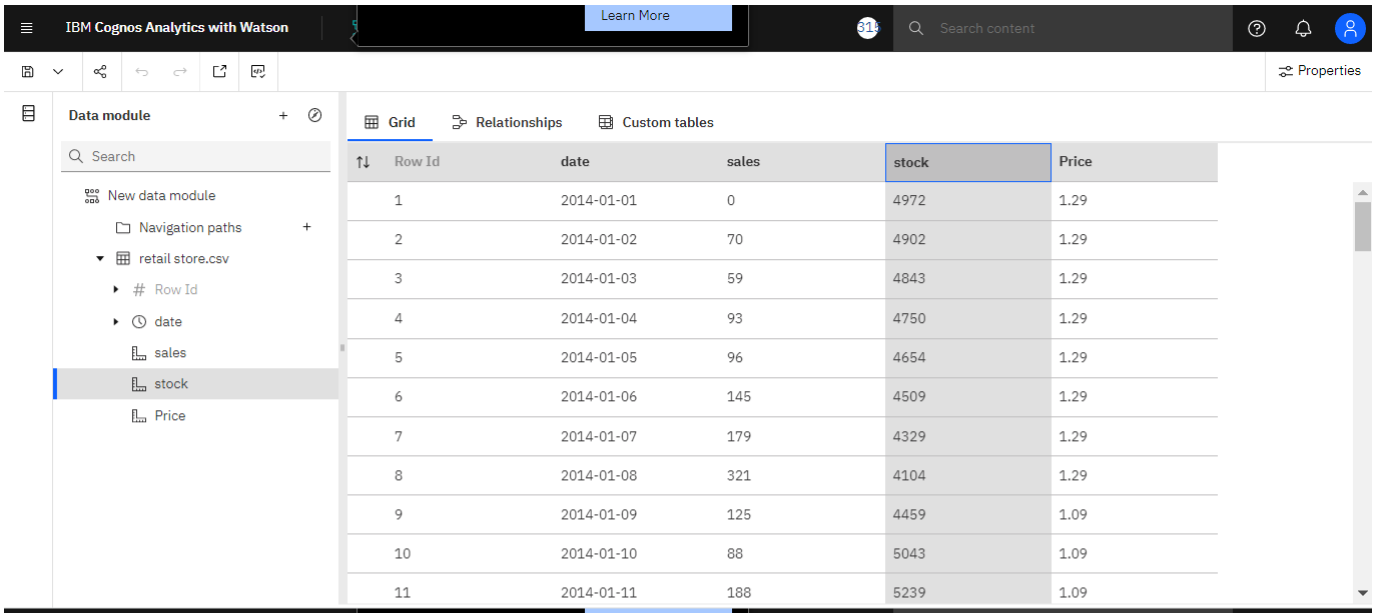
Tool used – IBM Cognos analytics

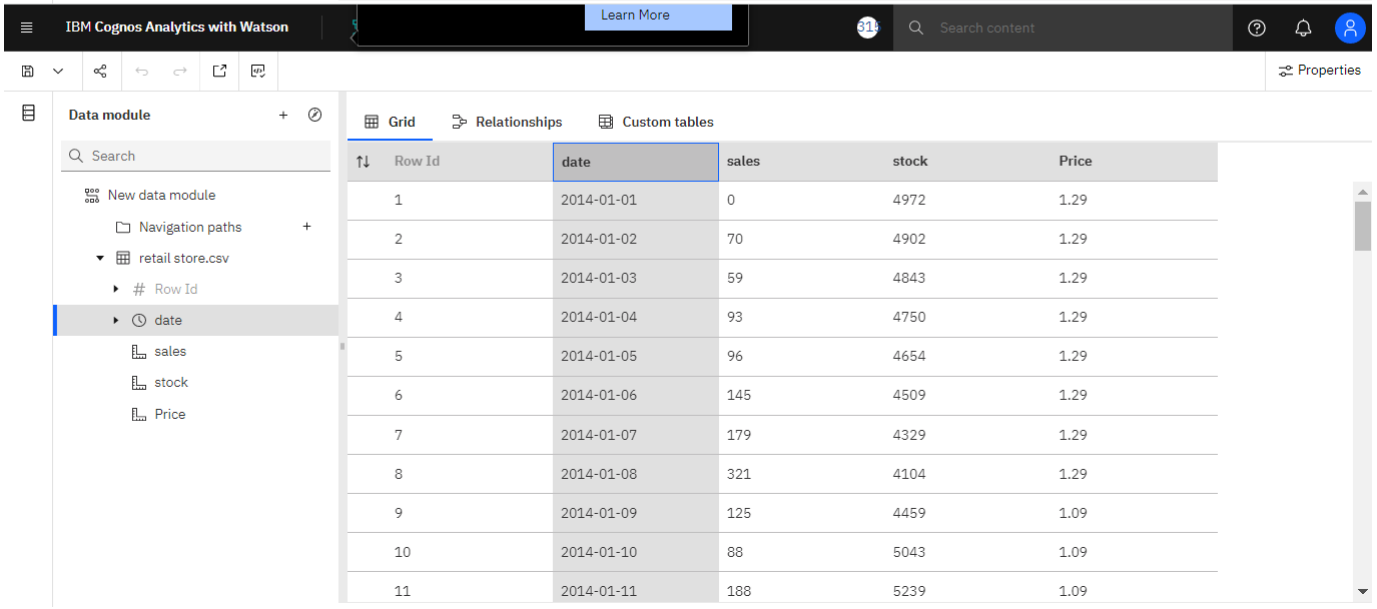


Prepare the dataset:



Row Id	date	sales	stock	Price
1	2014-01-01	0	4972	1.29
2	2014-01-02	70	4902	1.29
3	2014-01-03	59	4843	1.29
4	2014-01-04	93	4750	1.29
5	2014-01-05	96	4654	1.29
6	2014-01-06	145	4509	1.29
7	2014-01-07	179	4329	1.29
8	2014-01-08	321	4104	1.29
9	2014-01-09	125	4459	1.09
10	2014-01-10	88	5043	1.09
11	2014-01-11	188	5239	1.09


IBM Cognos Analytics with Watson
Learn More
Search content
Properties
Data module
Search
New data module
Navigation paths
retail store.csv
Row Id
date
sales
stock
Price
Grid
Relationships
Custom tables
Row Id
date
sales
stock
Price
1 2014-01-01 0 4972 1.29
2 2014-01-02 70 4902 1.29
3 2014-01-03 59 4843 1.29
4 2014-01-04 93 4750 1.29
5 2014-01-05 96 4654 1.29
6 2014-01-06 145 4509 1.29
7 2014-01-07 179 4329 1.29
8 2014-01-08 321 4104 1.29
9 2014-01-09 125 4459 1.09
10 2014-01-10 88 5043 1.09
11 2014-01-11 188 5239 1.09

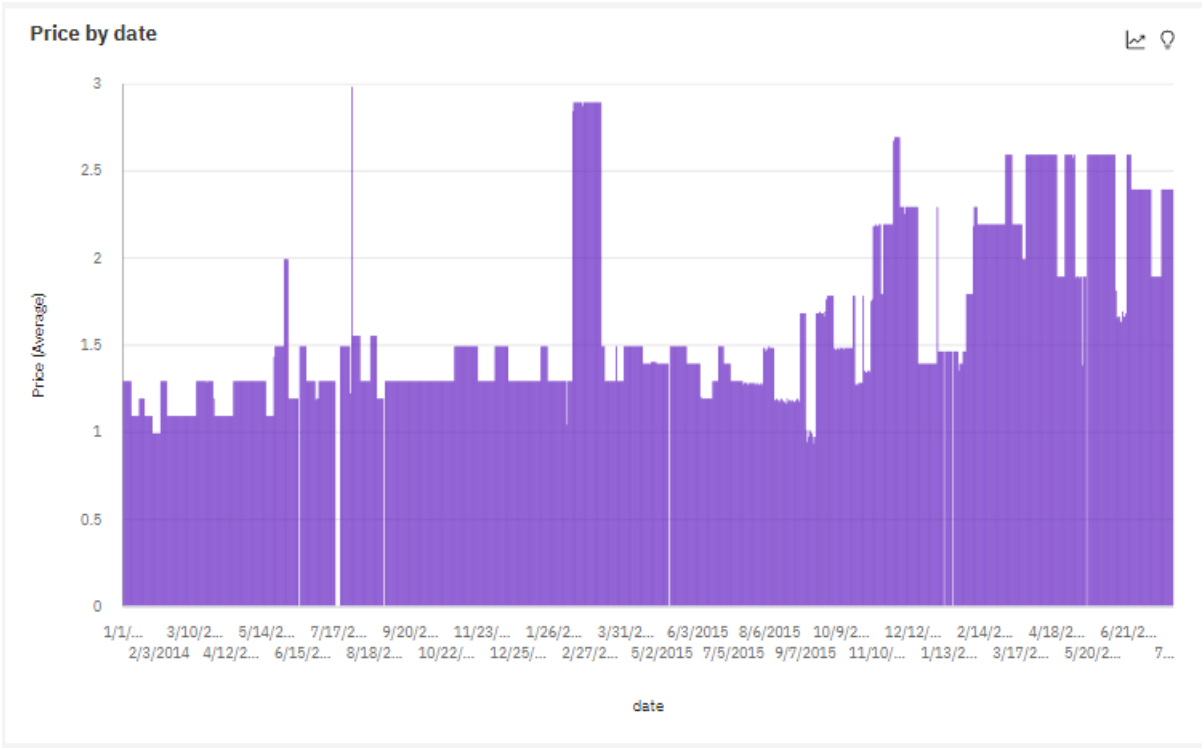

IBM Cognos Analytics with Watson
Learn More
Search content
Properties
Data module
Search
New data module
Navigation paths
retail store.csv
Row Id
date
sales
stock
Price
Grid
Relationships
Custom tables
Row Id
date
sales
stock
Price
1 2014-01-01 0 4972 1.29
2 2014-01-02 70 4902 1.29
3 2014-01-03 59 4843 1.29
4 2014-01-04 93 4750 1.29
5 2014-01-05 96 4654 1.29
6 2014-01-06 145 4509 1.29
7 2014-01-07 179 4329 1.29
8 2014-01-08 321 4104 1.29
9 2014-01-09 125 4459 1.09
10 2014-01-10 88 5043 1.09
11 2014-01-11 188 5239 1.09

7.2 DELIVERY OF SPRINT-2

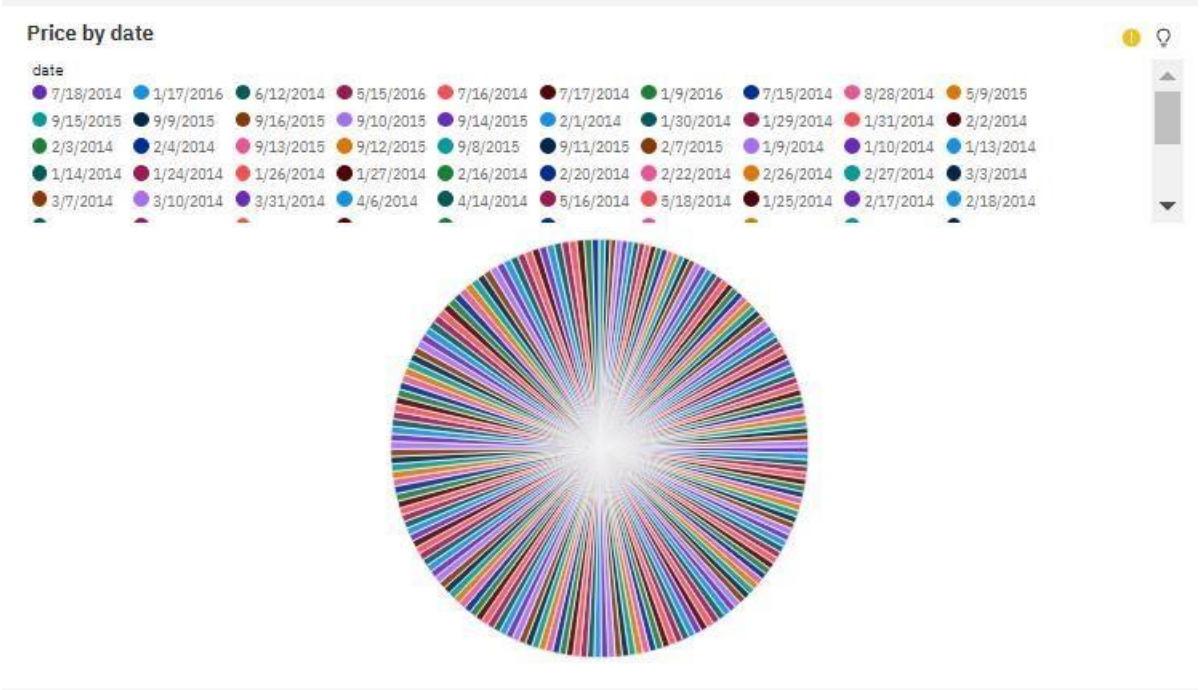
Data Exploration:

1. Monthly sales using tree map

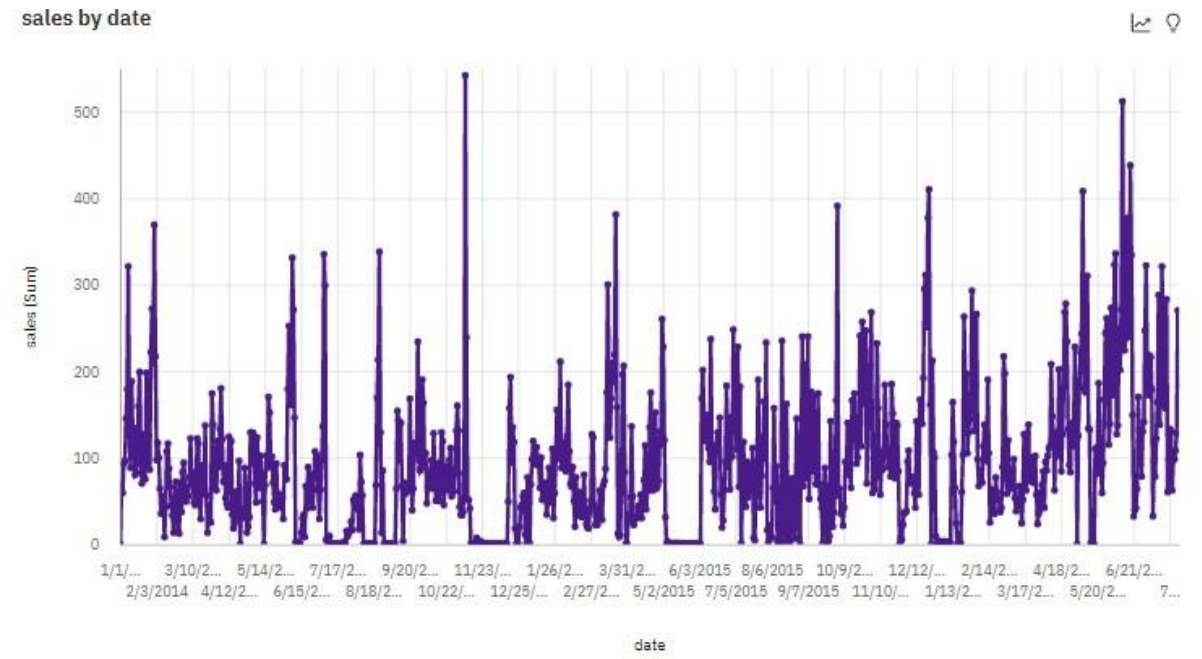
2. Year wise price using line graph



3. Monthly revenue by piechart

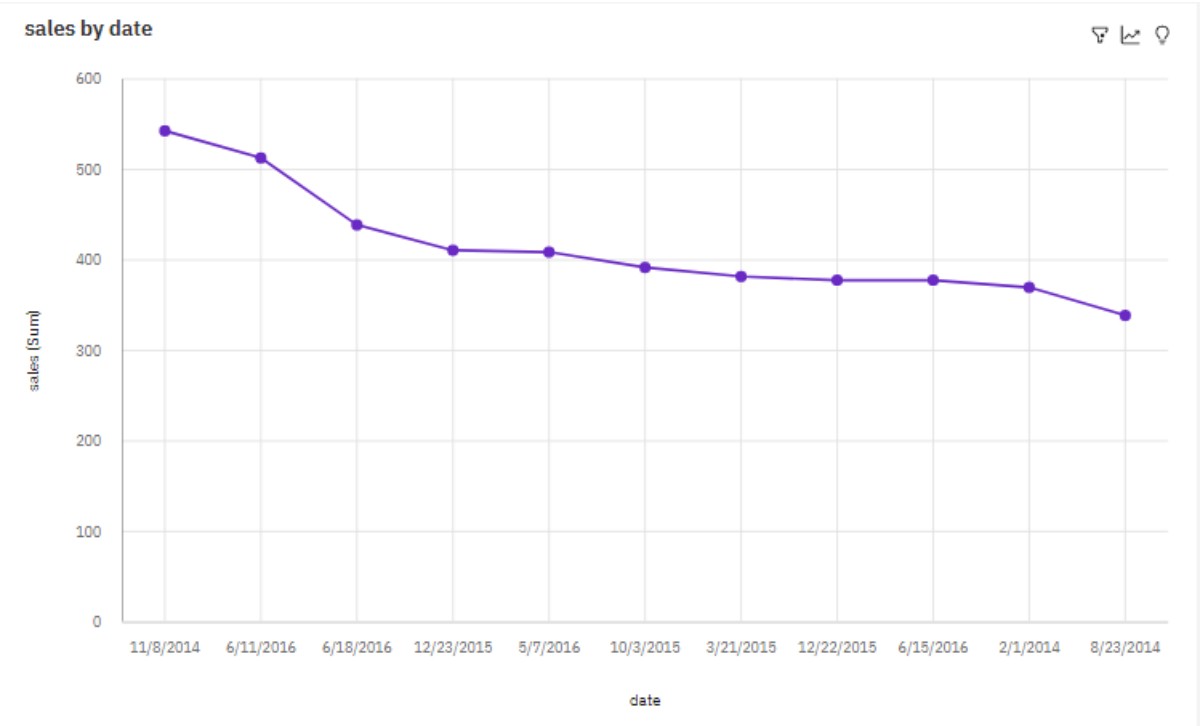


4. Year wise sales using line graph

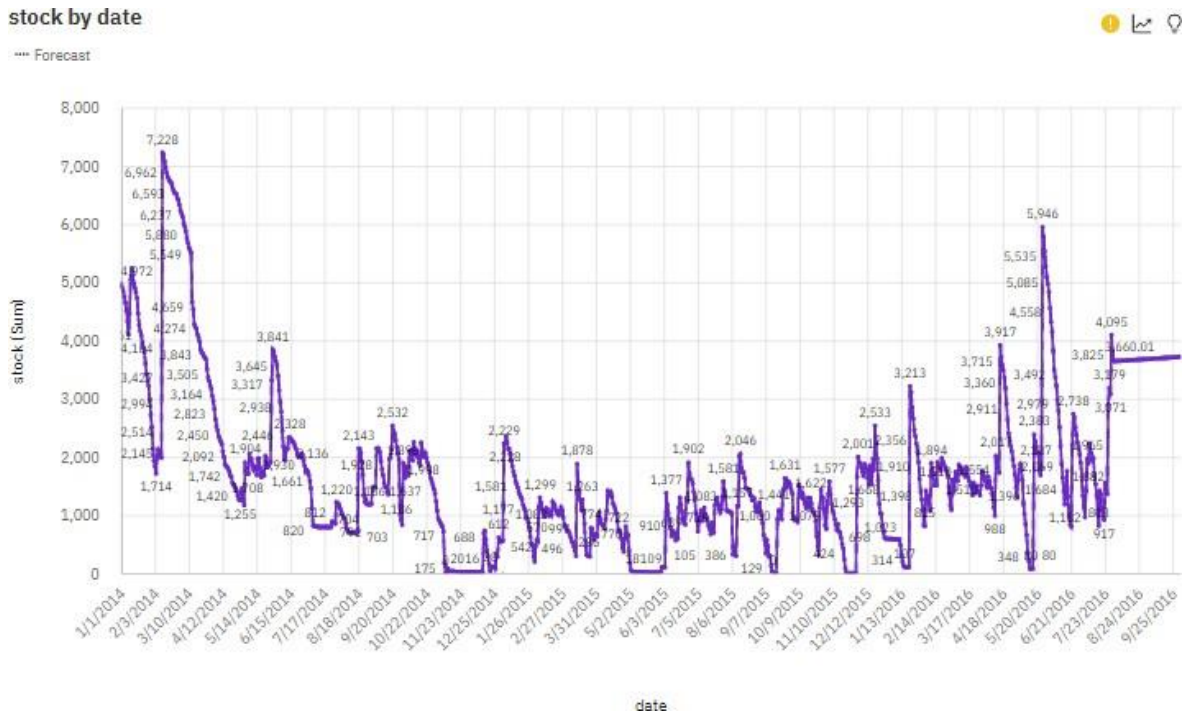


5. Top 10 sales by year using line graph

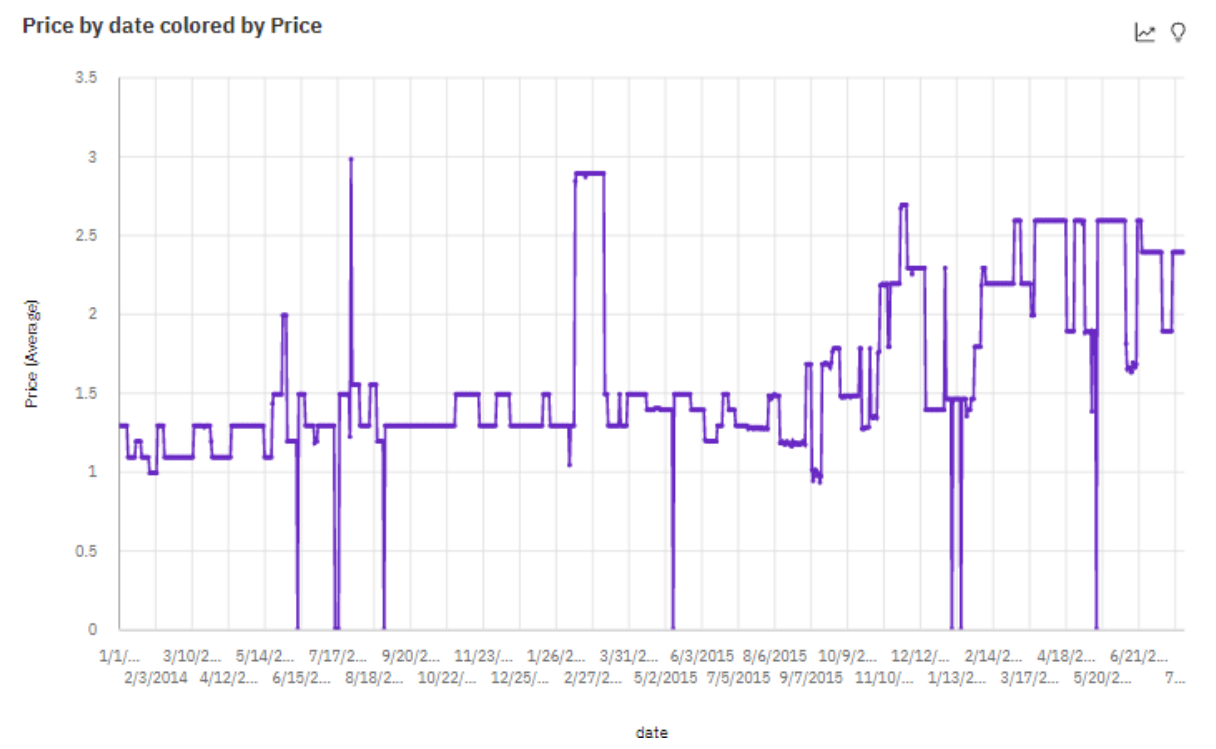
Top 10 sales in line graph



6. Year wise stock using line graph

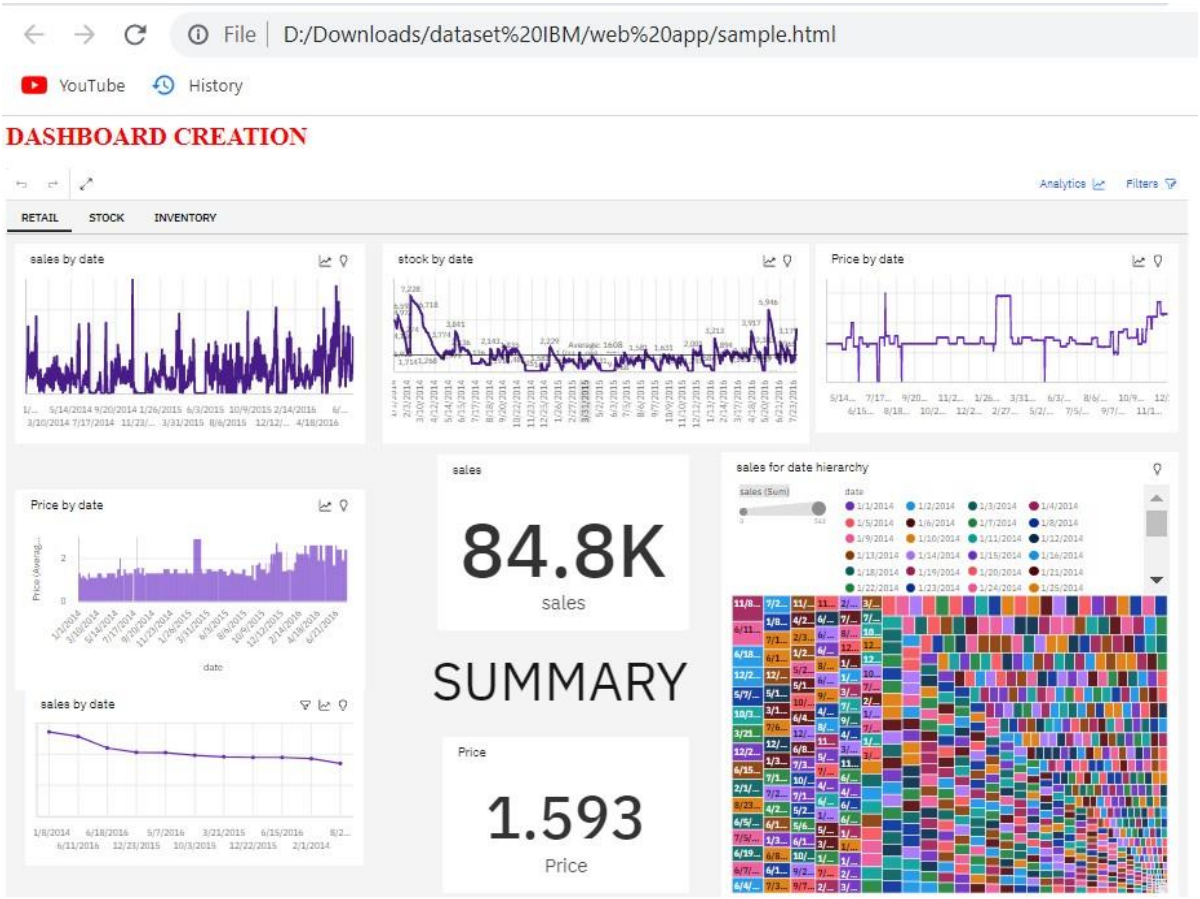


7. Year wise price using line graph



7.3 DELIVERY OF SPRINT-3

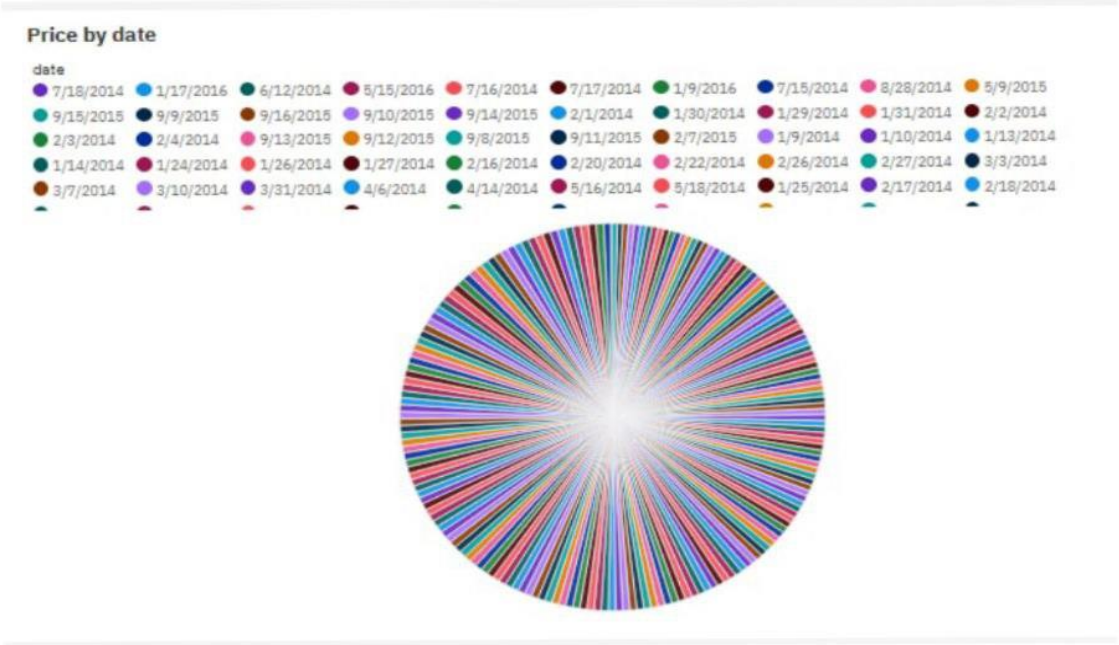
Dashboard Creation:

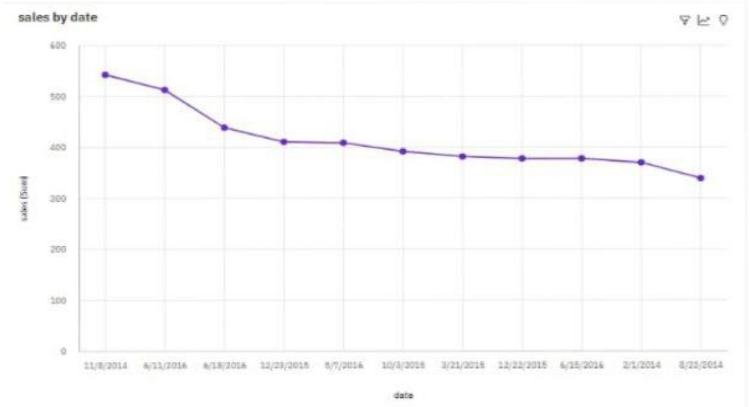


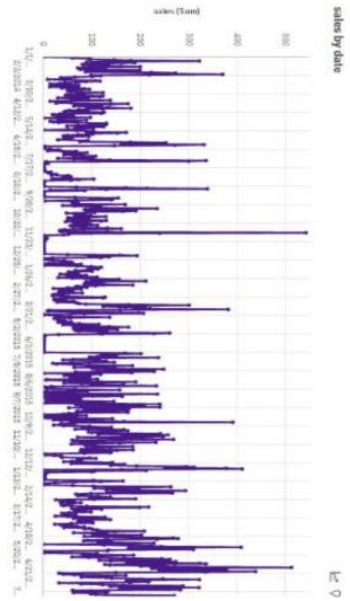
7.4 DELIVERY OF SPRINT-4

Report creation:

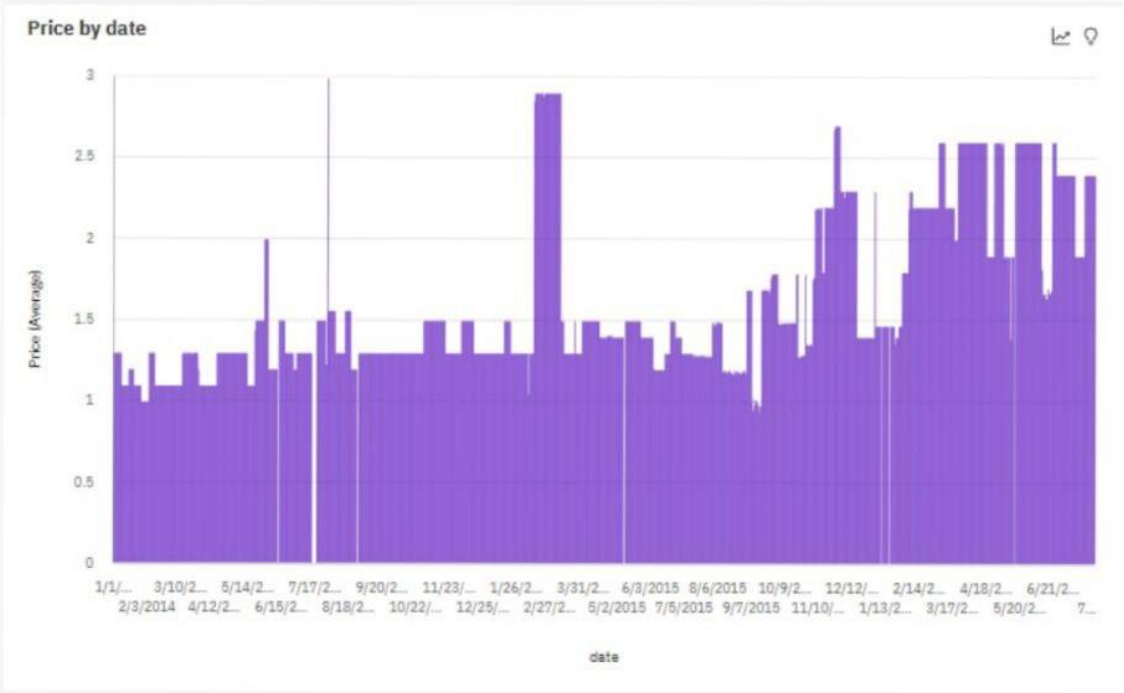
REPORT 1:



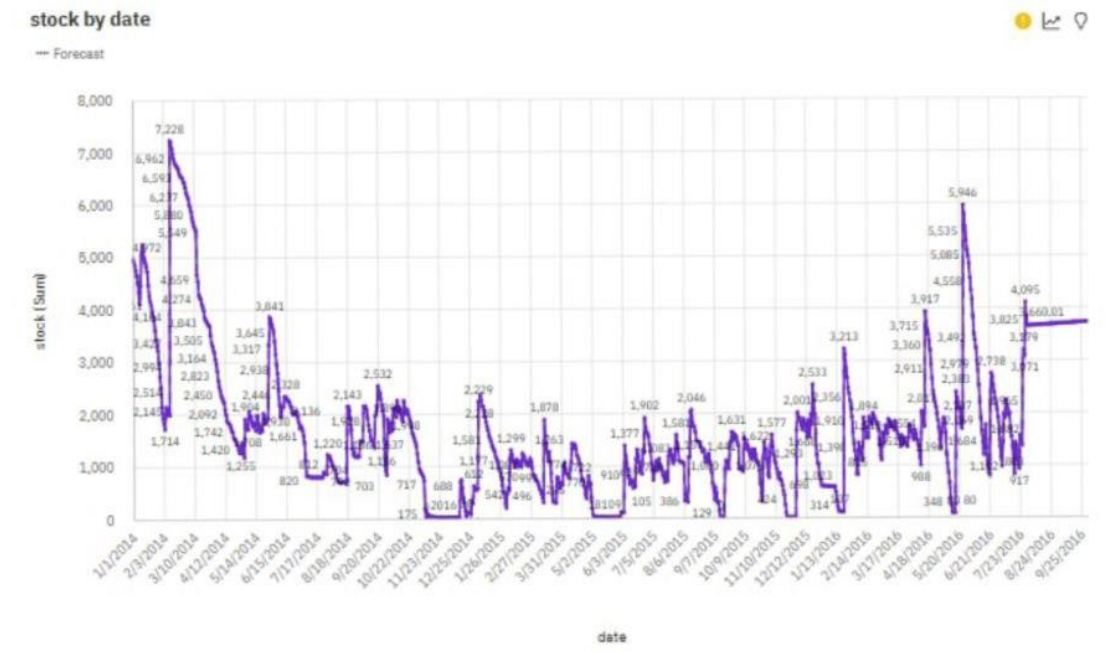




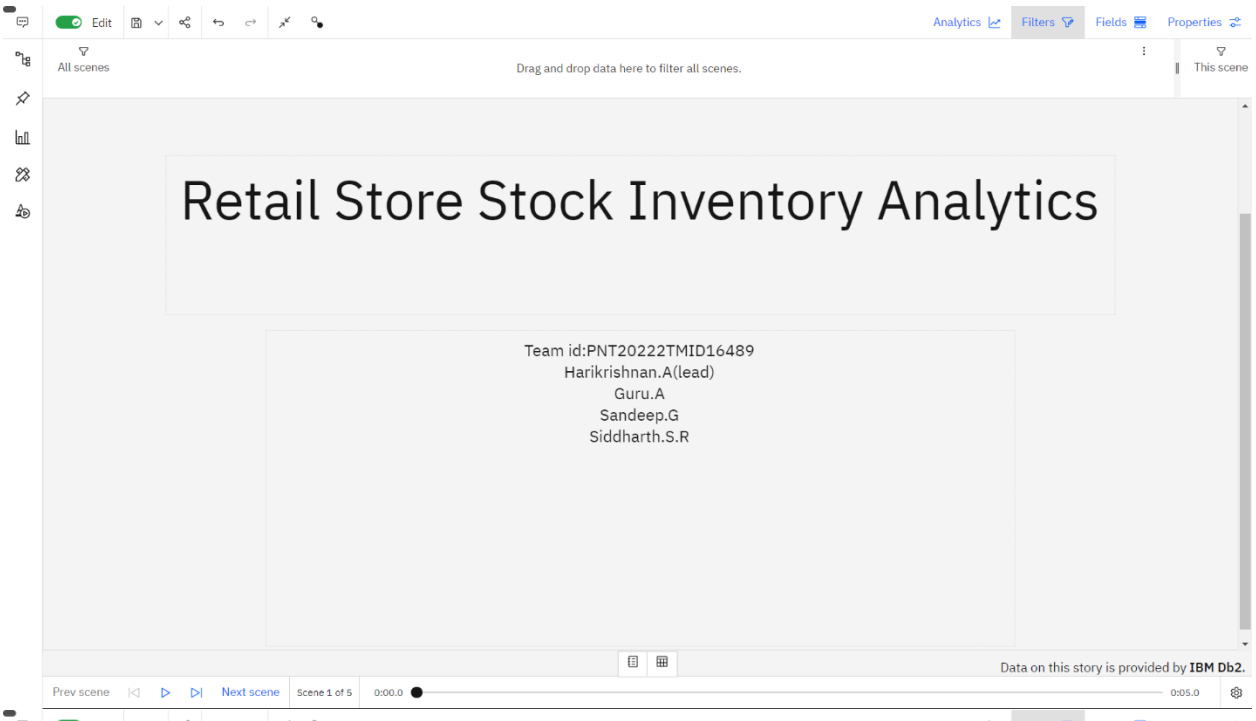
REPORT 2:

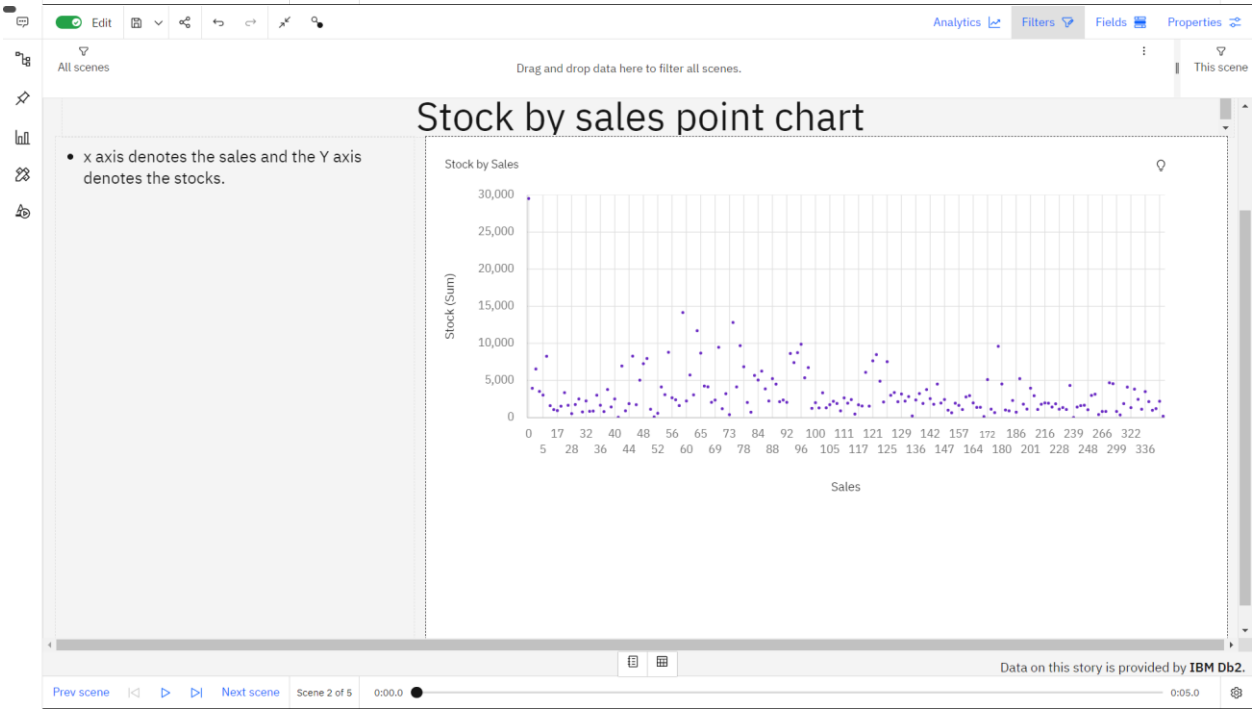


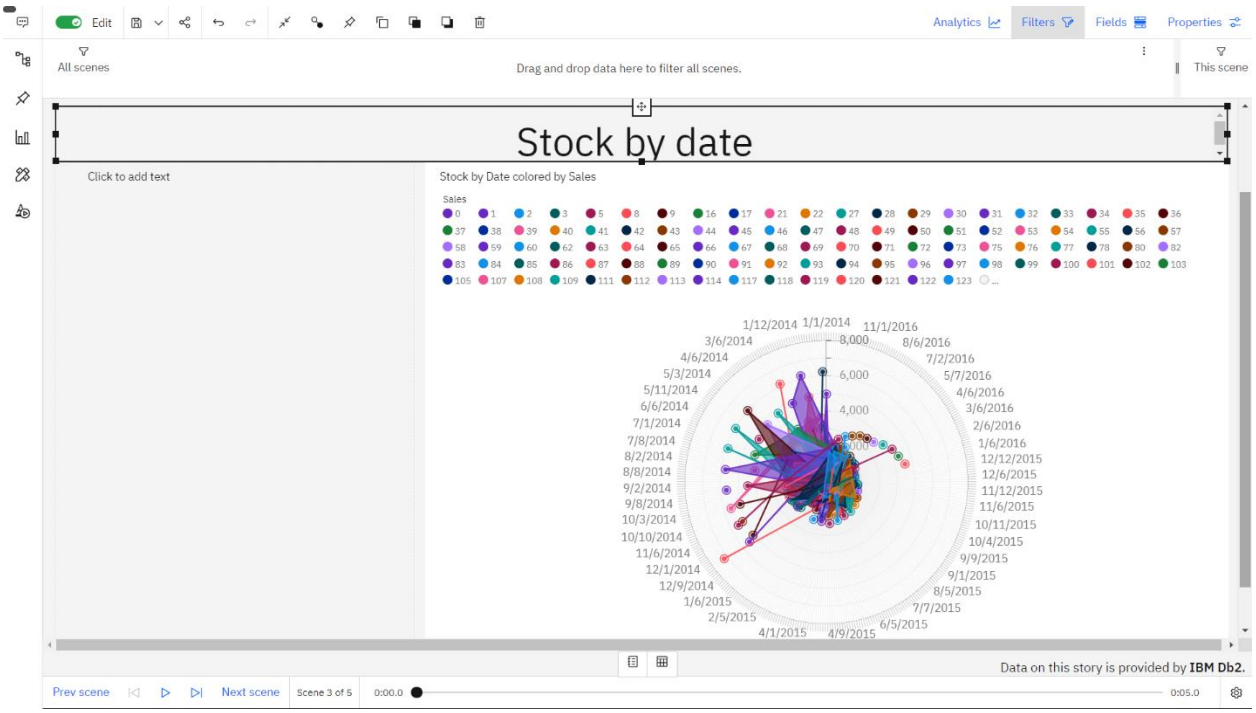
REPORT 3:

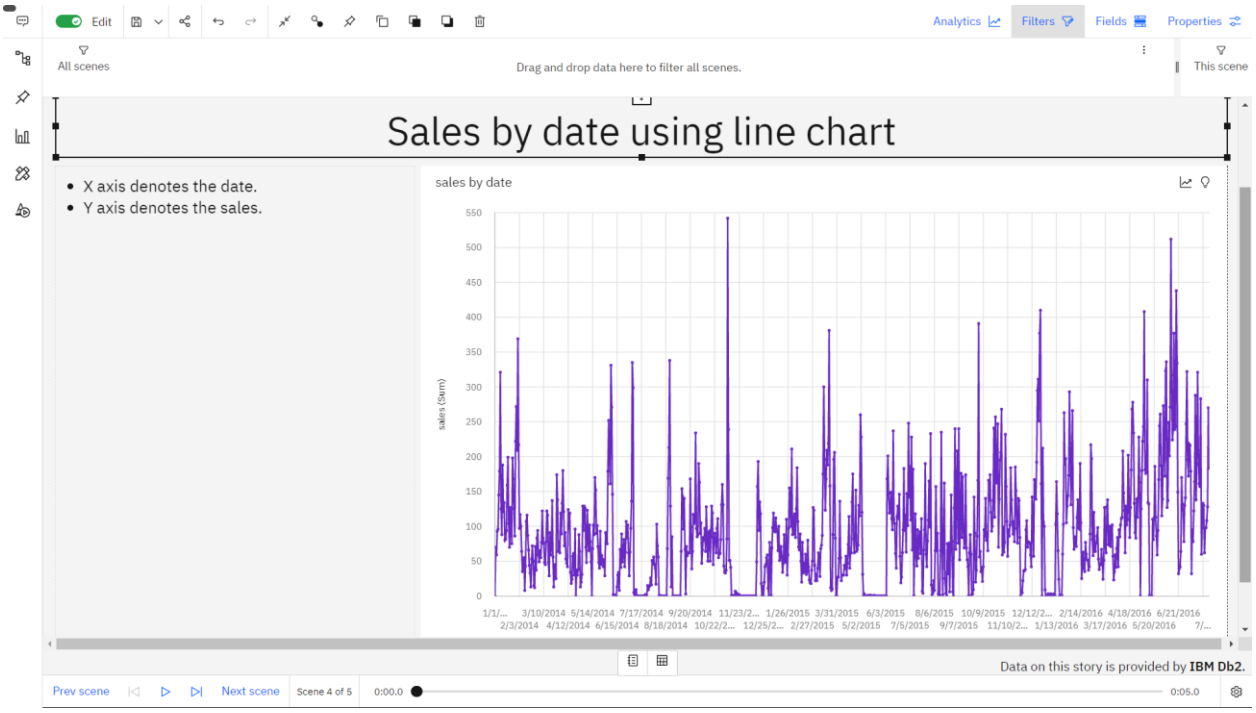


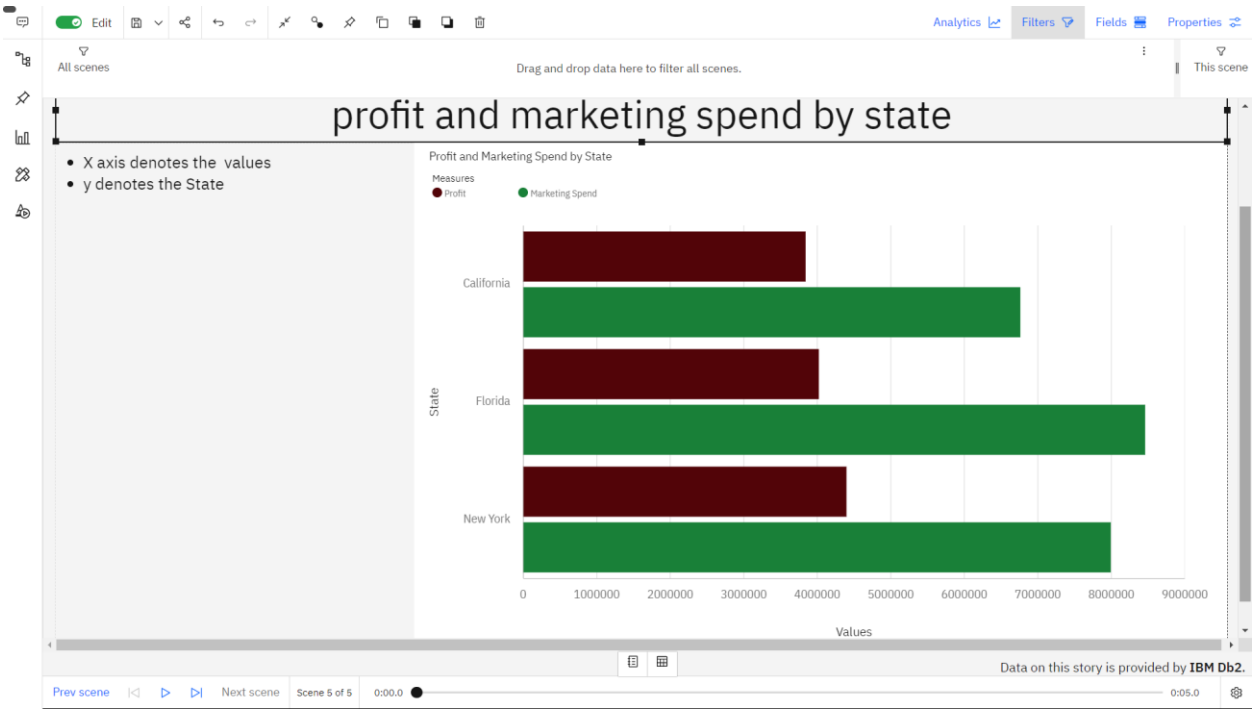
Story Creation:


Edit
Analytics
Filters
Fields
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
Retail Store Stock Inventory Analytics
Team id:PNT20222TMID16489
Harikrishnan.A(lead)
Guru.A
Sandeep.G
Siddharth.S.R
Data on this story is provided by IBM Db2.
Prev scene
Next scene
Scene 1 of 5
0:00.0
0:05.0


Edit
Analytics
Filters
Fields
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
Stock by sales point chart
x axis denotes the sales and the Y axis denotes the stocks.
Stock by Sales
Stock (Sum)
30,000
25,000
20,000
15,000
10,000
5,000
0
0 17 32 40 48 56 65 73 84 92 100 111 121 129 142 157 172 186 216 239 266 322
5 28 36 44 52 60 69 78 88 96 105 117 125 136 147 164 180 201 228 248 299 336
Sales
Data on this story is provided by IBM Db2.
Prev scene
Next scene
Scene 2 of 5
0:00.0
0:05.0


Edit
Analytics
Filters
Fields
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
Stock by date
Click to add text
Stock by Date colored by Sales
Sales
Data on this story is provided by IBM Db2.
Prev scene
Next scene
Scene 3 of 5
0:00.0
0:05.0


Edit
Analytics
Filters
Fields
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
Sales by date using line chart
X axis denotes the date.
Y axis denotes the sales.
sales by date
sales ($k/m)
Data on this story is provided by IBM Db2.
Prev scene
Next scene
Scene 4 of 5
0:00.0
0:05.0


Edit
Analytics
Filters
Fields
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
profit and marketing spend by state
X axis denotes the values
y denotes the State
Profit and Marketing Spend by State
Measures
Profit
Marketing Spend
California
Florida
New York
State
0
1000000
2000000
3000000
4000000
5000000
6000000
7000000
8000000
9000000
Values
Data on this story is provided by IBM Db2.
Prev scene
Next scene
Scene 5 of 5
0:00.0
0:05.0

8.TESTING

Model Performance Test:

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	No of Visulizations / Graphs - 7-8 visualization/6-7 graphs
2.	Data Responsiveness	Users and Analyst or Developers
3.	Amount Data to Rendered (DB2 Metrics)	5 counrties
4.	Utilization of Data Filters	Sales ,profit, products, market rate and order id filtration
5.	Effective User Story	No of Scene Added - 30 user stories
6.	Descriptive Reports	No of Visulizations / Graphs - 4 visualizations/6 graph

User Acceptance Test:

Purpose of Document:

The purpose of this document is to briefly explain the test coverage and open issues of the Retail Store Stock Inventory Analytics project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis:

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved.

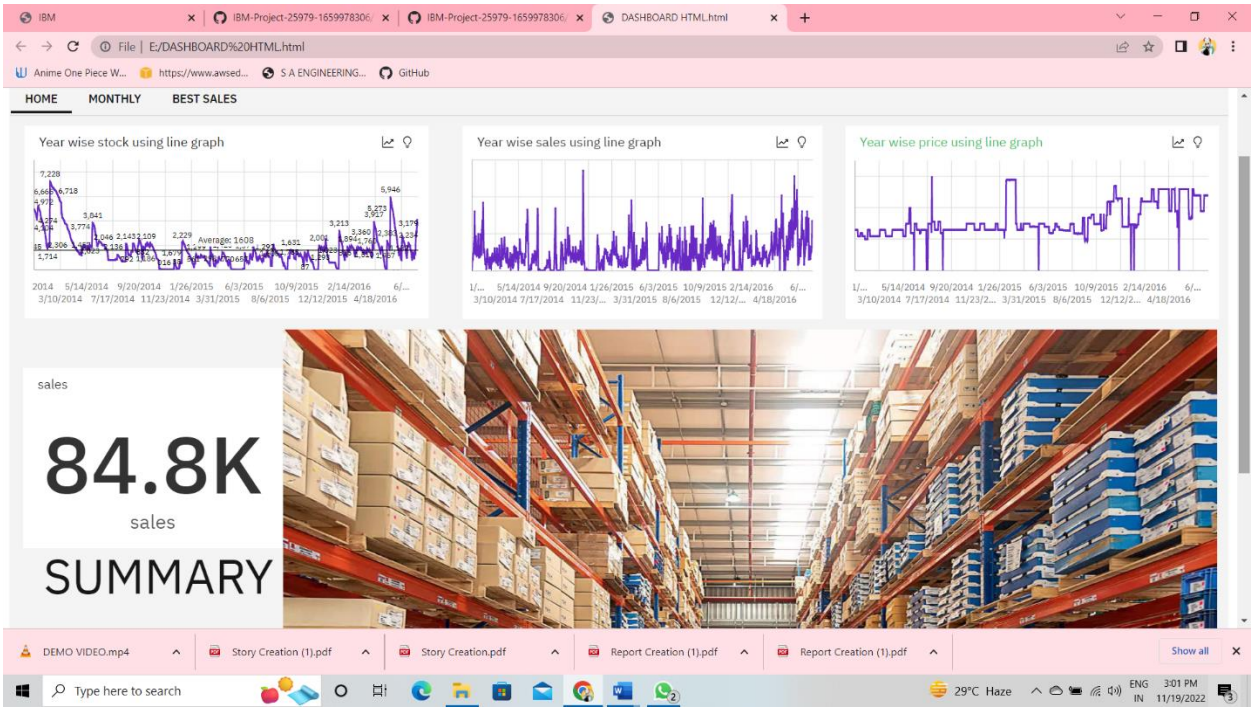
Resolution	Severity1	Severity2	Severity3	Severity4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won'tFix	0	0	0	1	1
Totals	24	9	11	26	71

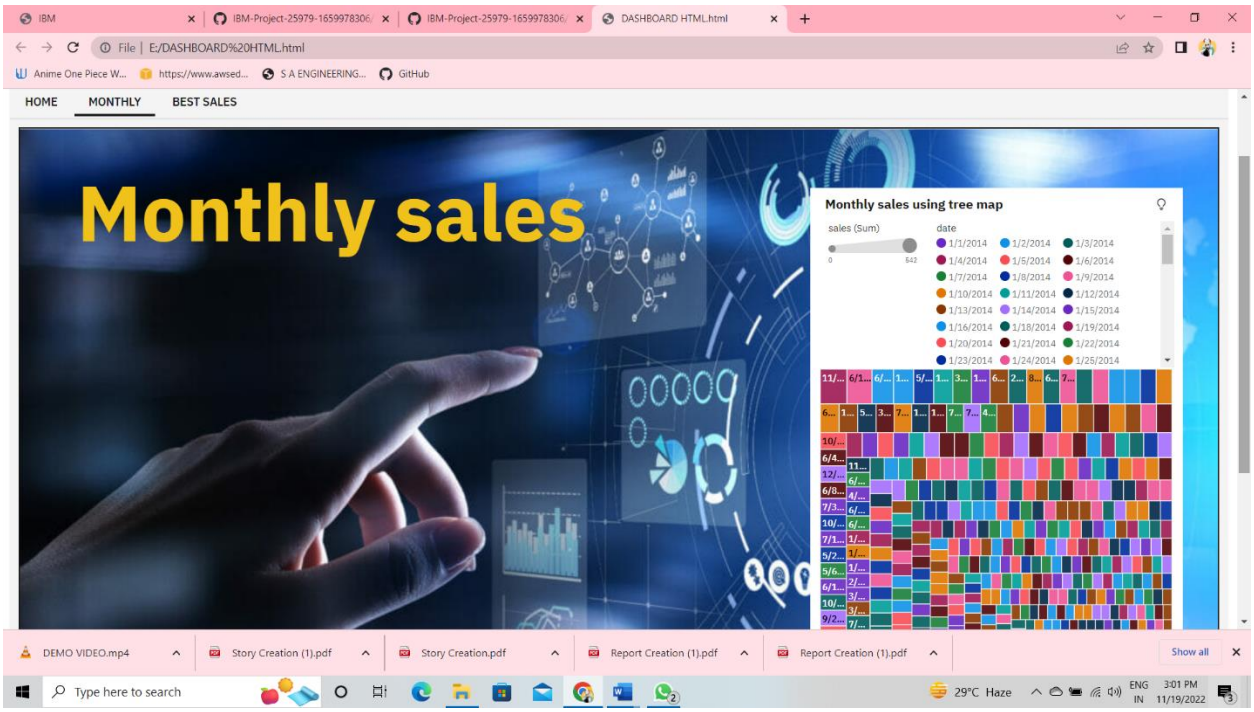
Test Case Analysis

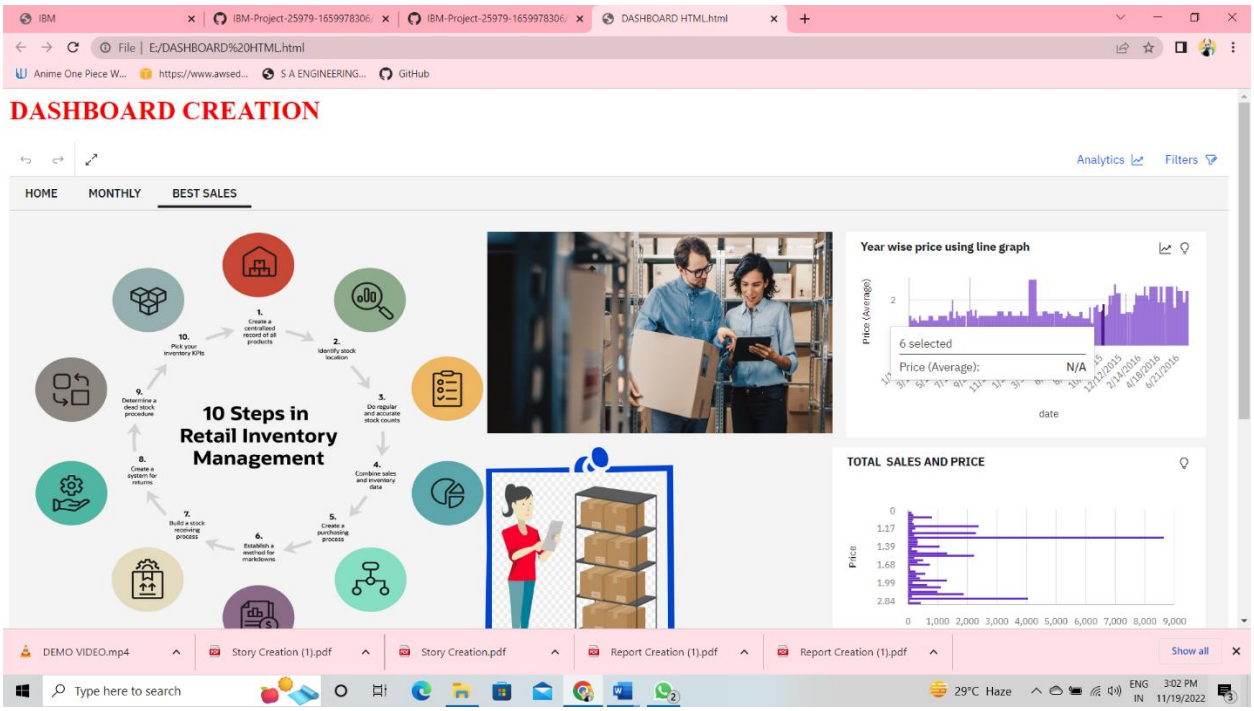
This report shows the number of test cases that have passed, failed, and untested

Section	TotalCases	Not Tested	Fail	Pass
PrintEngine	7	0	0	7
ClientApplication	51	0	0	51
Security	2	0	0	2
OutsourceShipping	3	0	0	3
ExceptionReporting	9	0	0	9
FinalReportOutput	4	0	0	4
VersionControl	2	0	0	2

OUTPUT


DASHBOARD HTML.html
File | E:/DASHBOARD%20HTML.html
HOME
MONTHLY
BEST SALES
Year wise stock using line graph
Year wise sales using line graph
Year wise price using line graph
sales
84.8K
sales
SUMMARY


DASHBOARD HTML.html
File | E:/DASHBOARD%20HTML.html
HOME
MONTHLY
BEST SALES
Monthly sales
Monthly sales using tree map
sales (Sum)
date


DASHBOARD CREATION
Analytics
Filters
HOME
MONTHLY
BEST SALES
10 Steps in Retail Inventory Management
Year wise price using line graph
6 selected
Price (Average):
N/A
date
TOTAL SALES AND PRICE
Price
DEMO VIDEO.mp4
Story Creation (1).pdf
Story Creation.pdf
Report Creation (1).pdf
Report Creation (1).pdf
Show all
Type here to search
29°C Haze
ENG
IN
3:02 PM
11/19/2022

ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- Customer Behavior Insights
- Improving Marketing ROI
- Optimizing In -Store Operation
- Managing The Basics
- Enhancing Loyalty

DISADVANTAGES:

- Loss Of Items
- Scanning Error
- Improper Inventory Tracking
- Hacking
- Theft

APPLICATIONS:

- Flex Your Ordering Muscles
- Be Proactive With Your Supply Chain
- Crunch Your Numbers
- Maximize Efficiency
- Prioritize Accuracy
- Use An Inventory Management System

CONCLUSION

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.

Retail companies have acquired significant importance within several countriesdue to their high economic contribution. Therefore, the need to analyze their KPIs becomes highly significant, as well as their different systems, methodologies, and tools used within inventory management and optimization. From the aspects mentioned above, the main trends in inventory management within companies were defined.

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GITHUB REPO LINK:

https://github.com/IBM-EPBL/IBM-Project-25979-1659978306

DEMO VIDEO LINK:

https://drive.google.com/file/d/1DCSt3ZvMyDq3QiL3kKMDWV_85CYqHgCi/view?usp=drivesdk