RETAIL STORE STOCK INVENTORY ANALYTICS

PROJECT REPORT

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CONTENTS

1. INTRODUCTION

1.1 Project Overview

As a retail business owner, one of the worst scenarios that can occur to the stores are product stock-outs, dead stock or excess inventory. In order to overcome such disadvantage this project was developed.

1.2 Purpose

Our project “Retail Store Stock Inventory Analytics” is done in order to help stores and ecommerce sellers satisfy the customer, reduce costs and increase profits.

2. LITERATURE SURVEY

2.1 Existing Problem

The maintenance of inventory manually is hard. It’s hard to determine the demands and satisfy the customer at same time. The shortage of stock and overflow of stock is the major problem in retail inventory management.

2.2 References

1. Data-driven segmentation of customer behavior in the retail industry

Author: Carmichael, Chen & Luo

Customer segmentation has become an important part of marketing analytics because it allows the customers to be grouped based on their purchase behaviors, segment demographics, and behavioral evolvement. This segmentation is used to create tailored marketing campaigns based on the target customers to have an idea of the effectiveness of a campaign for each segment

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2. Recommendation systems using recommender algorithms

Author: Chavan & Mukhopadhyay

All big companies such as Amazon and Netflix personalize the content for the user based on their shopping habits and behavior patterns. An effective recommendation system can increase sales manifold, by presenting users

with items that they would need before the user even recognizes they need it. The hybrid recommendation algorithms improve the quality and efficiency by providing the user with a great shopping experience.

3. The importance and usage of Business intelligence technologies in the retail industry

Author: Gang, Kai & Bei

The increase in data available due to the modern technologies have made the decision-making process in business become complicated. The key technologies used in business intelligence are Data Warehouse, Data Mining and Release & Express technology. The main applications of a BI system are profit analysis and Key Performance Indicators Management, Client service management and Environment analysis.

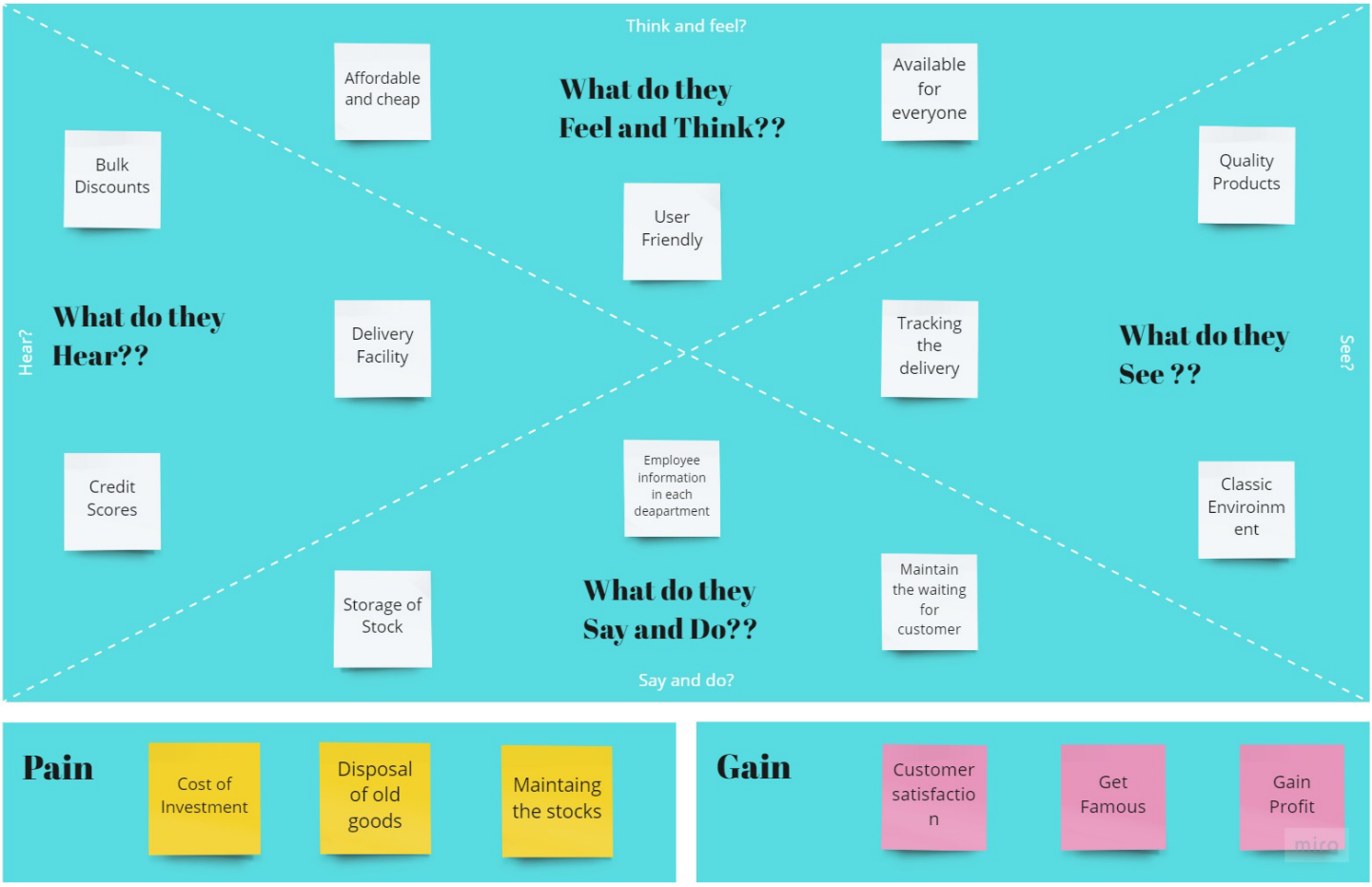
2.3 Problem Statement Definition

The major problem in retail store stock inventory is to predict the demands of the stocks in accordance with customer. The big problem in inventory is the overflow of stocks. Sometimes the stock remains dead because of the lack of demand for that particular stock. At times there is shortages of stock due to the demand in that certain period. Taking care of inventory manual is very hard. It need a lot of labour.

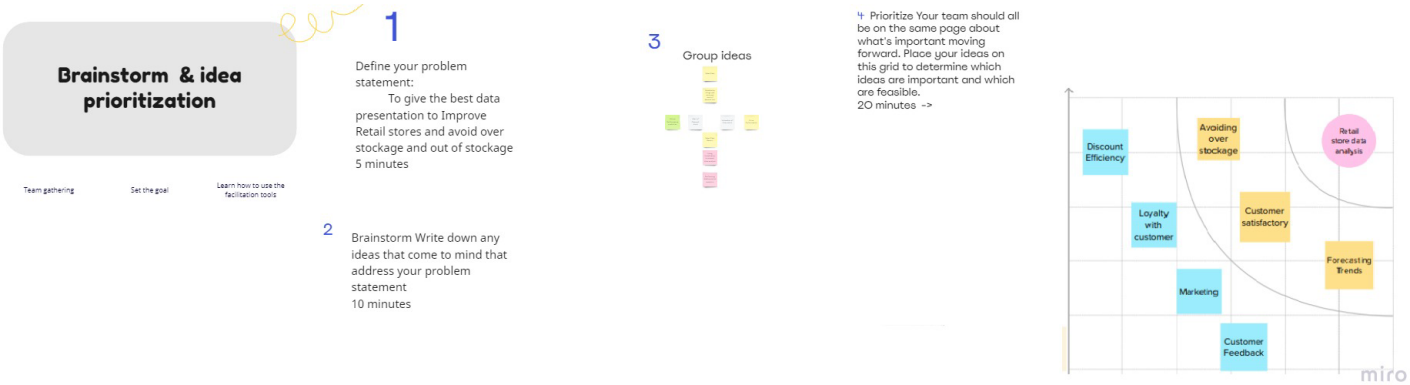
So this project was developed to meet all the problems mentioned above.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



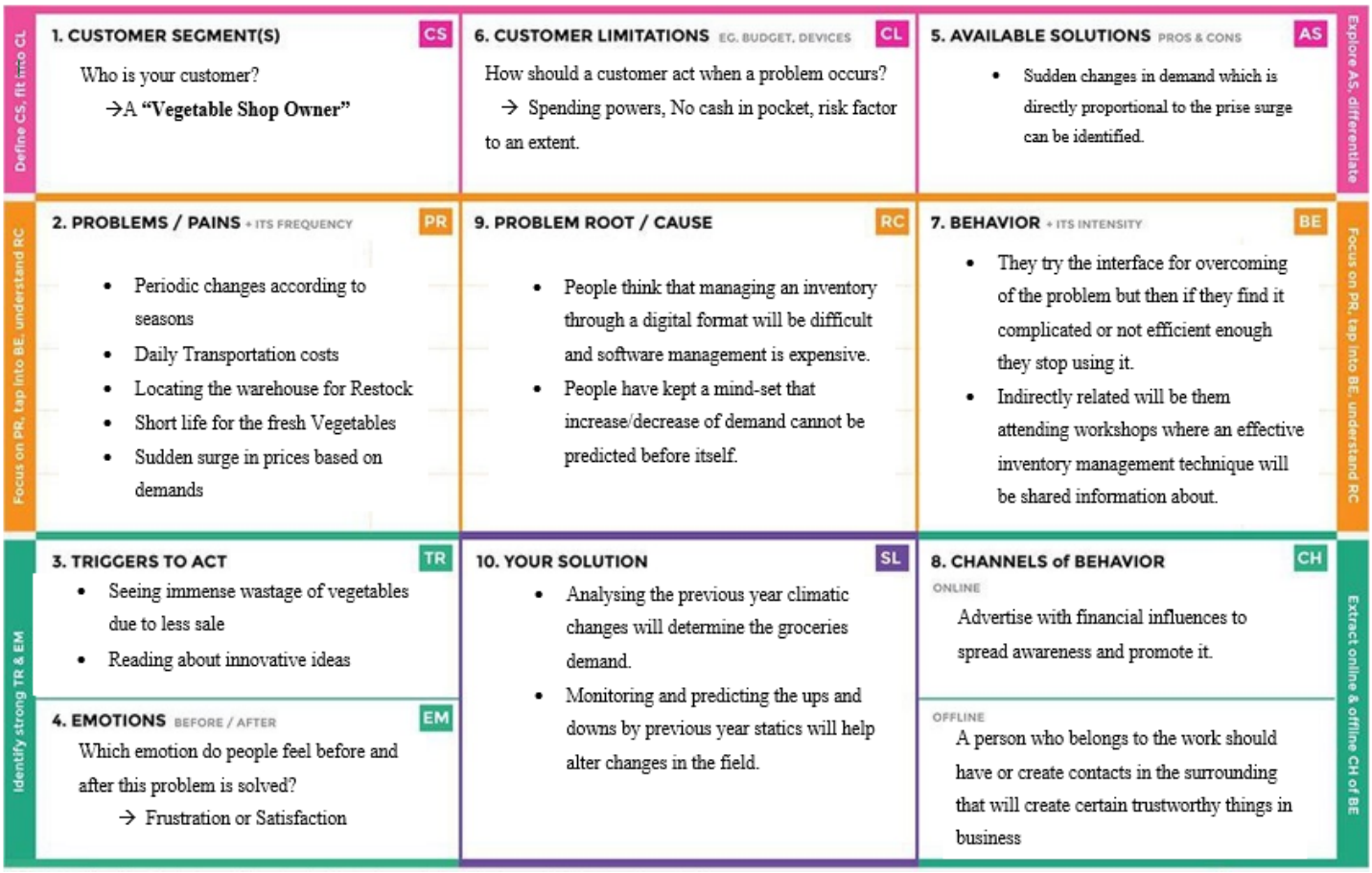
3.3 Proposed Solution

Proposed Solution :

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	It is difficult for a Retail Stock Manager to keep in track all the details to know what happening in the Store.
2.	Idea / Solution description	To create a dashboard to show all the inventory stock details.
3.	Novelty / Uniqueness	Dashboard showcases the whole analysis of the inventory stock details to maintain them without manual interpretation. Using this, the company will be more organised and tracking can be easily done.
4.	Social Impact / Customer Satisfaction	This helps the customer the most , because he/she will get to know the actual information about the product/service that is required.
5.	Business Model (Revenue Model)	Dashboard by data analysis, using IBM Cognos.
6.	Scalability of the Solution	1.To add more data analysis by creating more attributes to gain additional information. 2.Make it more efficient for very large dataset. 3.Make it suitable even for continuously growing data.

3.4 Problem Solution Fit



4. REQUIREMENT ANALYSIS

4.1 Functional Requirements

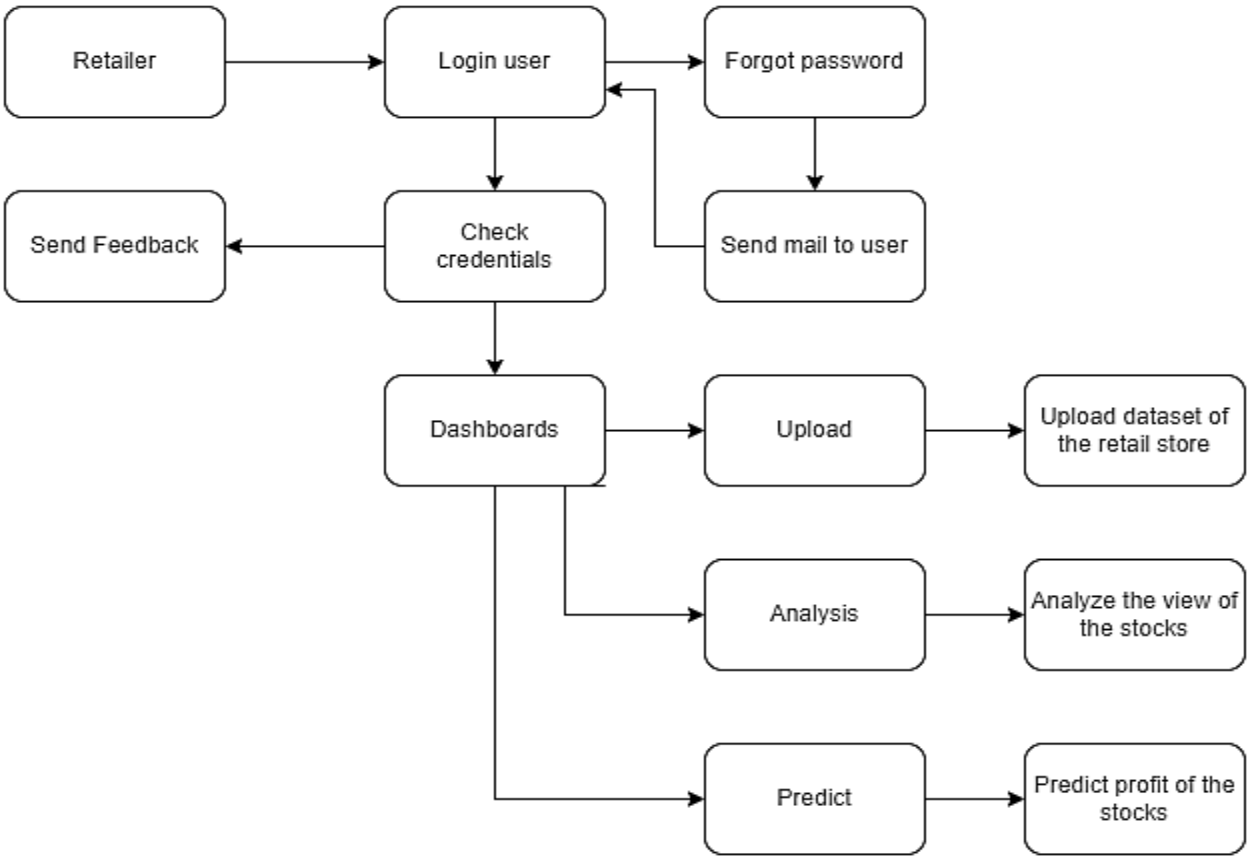
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Business regulations	Login with username Login with 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

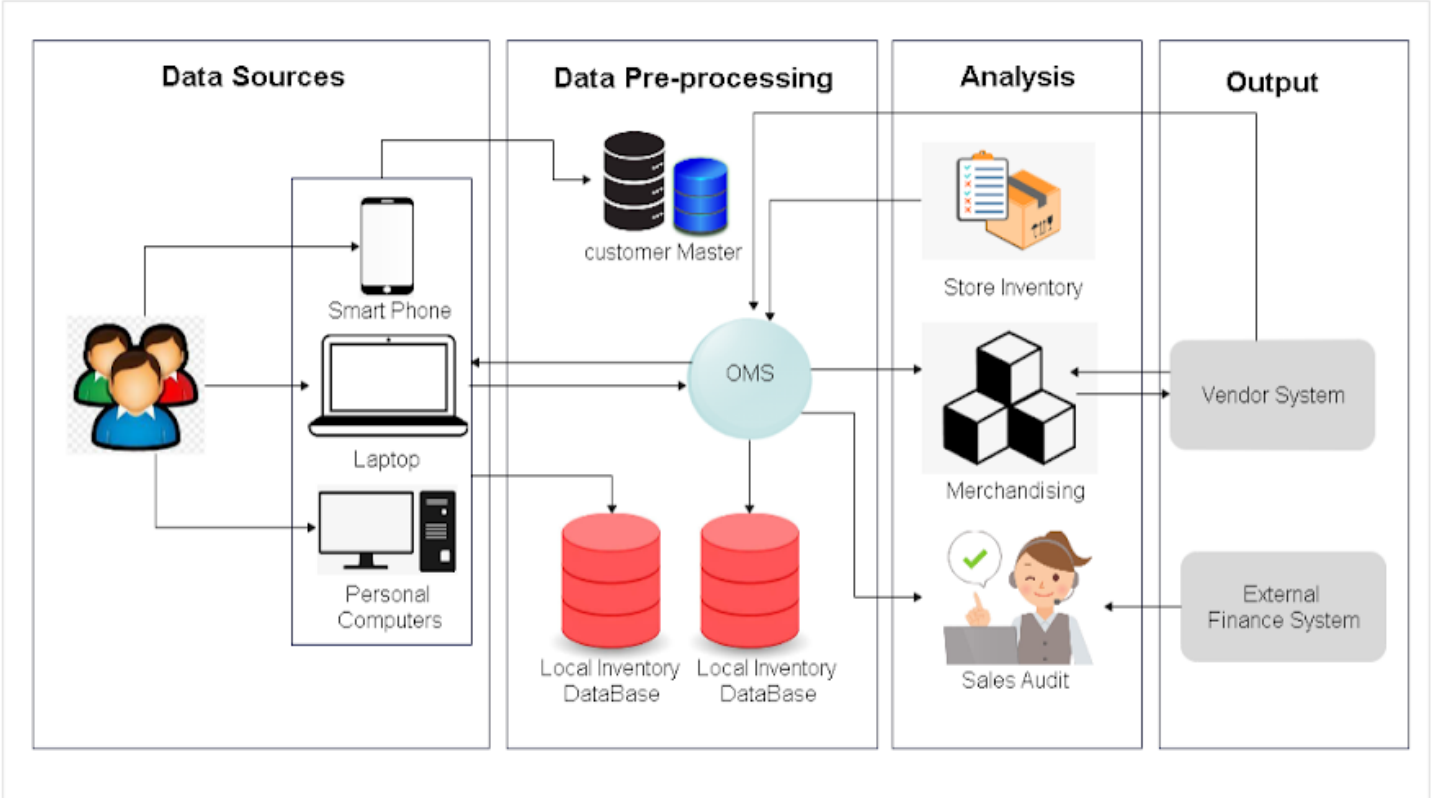
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	They are more likely to have enough inventory to capture every possible sale while avoiding overstock and minimizing expenses. This model can be supported on both desktop and mobile browsers
NFR-2	**Security**	This can be used only by the users who have their proper login credentials
NFR-3	**Reliability**	Avoid over or 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 in the dataset. From this, the model can predict the dead stocks and highly profitable stocks.

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture



5.3 User Stories

USER TYPE	FUNCTIONAL REQUIREMENT	USER STORY	ACCEPTANCE
Customer	Registration	The user can register by entering email, password, and confirming the password.	Account / Dashboard can be accessed.
		A confirmation mail will be sent once registered.	Confirm shall be clicked in the confirmation mail.
		The user can register through Google and LinkedIn also.	The dashboard can be accessed through Gmail and LinkedIn.
	Login	The user can log in to the application with their registered email id and password.	The dashboard can be accessed by logging in to the application.
	Dashboard	The user can view the chart and graphical representation of the dataset and the information in the dashboard.	The stocks in the retail store can be analysed.
Customer care Executive		The customer care executive will be available to clarify and solve the queries of the customer.	The customer care executive will analyse the complaints made by the customers and provide solution to it.
Administrator		The administrator manages the recovery and backup, database system, data modelling and design, distributed computing and data security.	The administrator can design, evaluate, review, update and maintain the data.

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

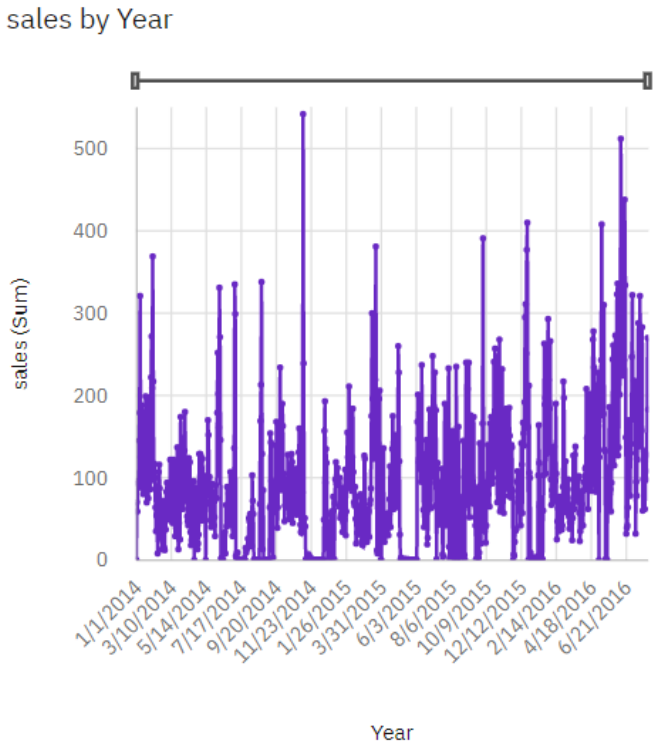
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Harini C
Sprint-1	Confirmation	USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Nachammai N
Sprint-1	Registration through Facebook	USN-3	As a user, I can register for the application through Facebook	2	Low	Nachammai N
Sprint-1	Registration through Gmail	USN-4	As a user, I can register for the application through Gmail	2	Medium	Akalya S
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	Aiswaryaa V
Sprint-2	Dashboard	USN-6	As a user, I can view my dashboard and can perform stock prediction and analysis	3	High	Aiswaryaa V
Sprint-2	View list of stocks	USN-7	As a user I can view the list of categorized products and their details	4	High	Harini C
Sprint-2	Search products	USN-8	As a user I can search through the product using barcode	2	Medium	Aiswaryaa V
Sprint-3	Report generation	USN-9	As a user I can generate reports based on product sales	5	High	Harini C

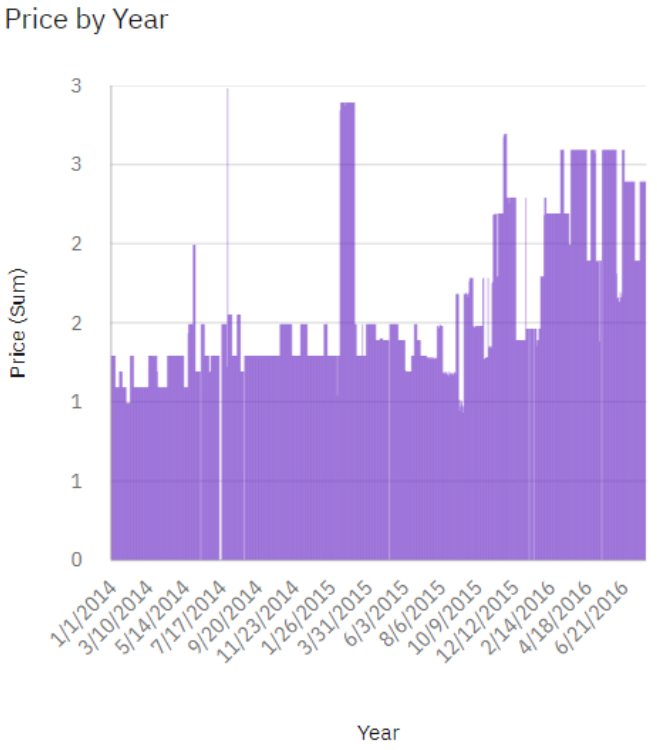
Sprint-3	Stock Prediction	USN-10	As a user I can predict out of stock and less stock for a product	5	High	Akalya S
Sprint-4	Notification system	USN-11	As a user I can view notification for expired and out of stock products	4	High	Nachammai N
Sprint-4	Re-Ordering stock	USN-12	As a user I can reorder stocks based on predictions and notification	3	High	Akalya S
Sprint-2	Updating stock	USN-13	As a user I can add/delete products	5	High	Aiswaryaa V
Sprint-4	Invoice generation	USN-14	As a user I can generate invoice calculating taxes, discount and calculate credits	4	High	Harini C
Sprint-4	Discount system	USN-15	As a user I can provide discount based on credit points	3	Medium	Aiswaryaa V

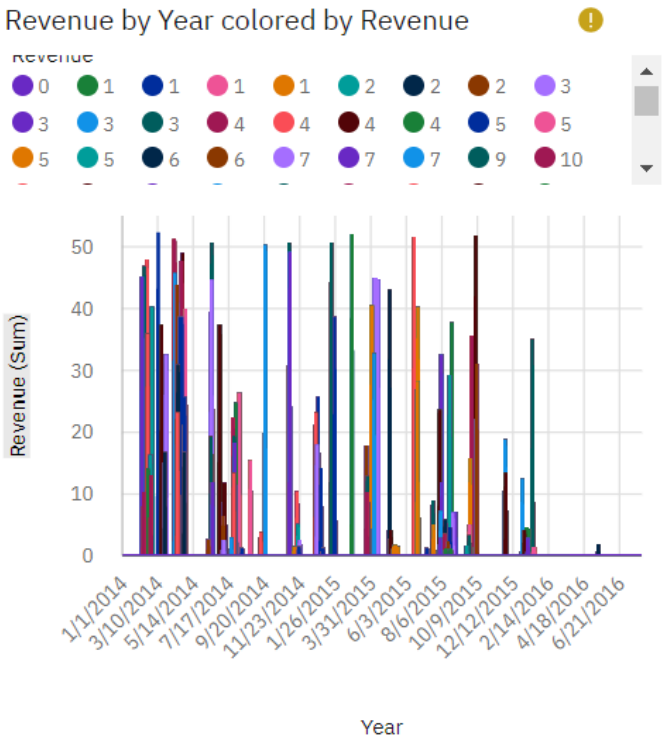
6.2 Sprint Delivery Schedule

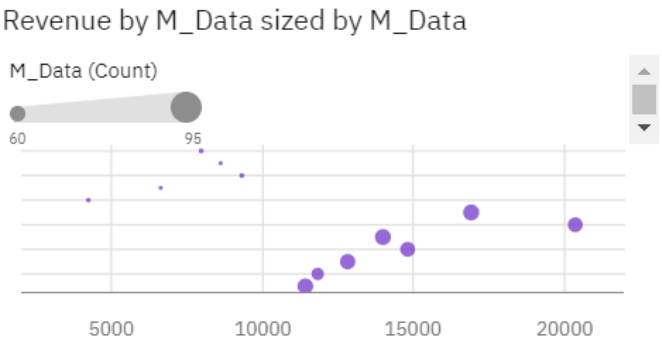
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	6	6 Days	24 Oct 2022	29 Oct 2022	6	29 Oct 2022
Sprint-2	16	6 Days	31 Oct 2022	05 Nov 2022	16	05 Nov 2022
Sprint-3	10	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
Sprint-4	14	6 Days	14 Nov 2022	19 Nov 2022	14	19 Nov 2022

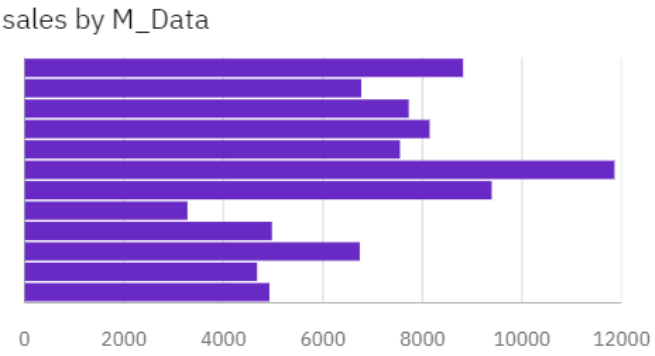
7. RESULTING


sales by Year
sales (Sum)
500
400
300
200
100
0
1/1/2014
3/10/2014
5/14/2014
7/17/2014
9/20/2014
11/23/2014
1/26/2015
3/31/2015
6/3/2015
8/6/2015
10/9/2015
12/12/2015
2/14/2016
4/18/2016
6/21/2016
Year


Price by Year
Price (Sum)
3
3
2
2
1
1
0
1/1/2014
3/10/2014
5/14/2014
7/17/2014
9/20/2014
11/23/2014
1/26/2015
3/31/2015
6/3/2015
8/6/2015
10/9/2015
12/12/2015
2/14/2016
4/18/2016
6/21/2016
Year

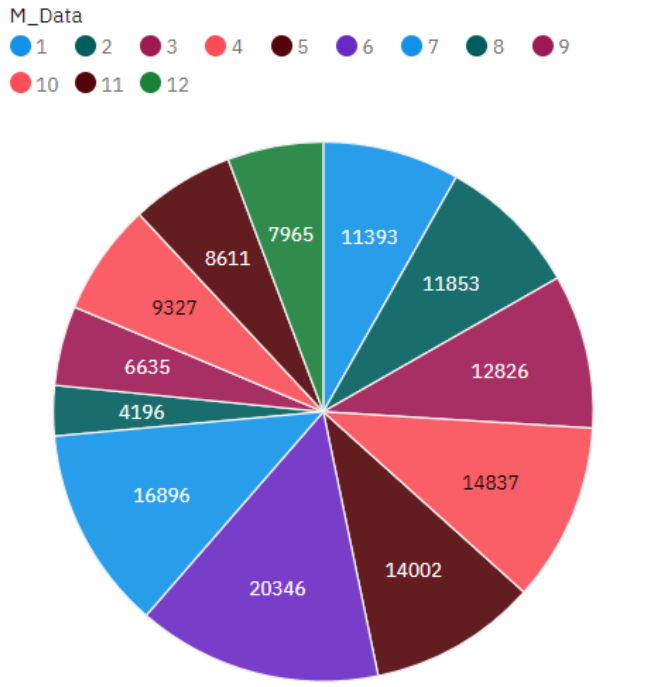

Revenue by Year colored by Revenue
Revenue (Sum)
50
40
30
20
10
0
1/1/2014
3/10/2014
5/14/2014
7/17/2014
9/20/2014
11/23/2014
1/26/2015
3/31/2015
6/3/2015
8/6/2015
10/9/2015
12/12/2015
2/14/2016
4/18/2016
6/21/2016
Year


Revenue by M_Data sized by M_Data
M_Data (Count)
60
95
5000
10000
15000
20000

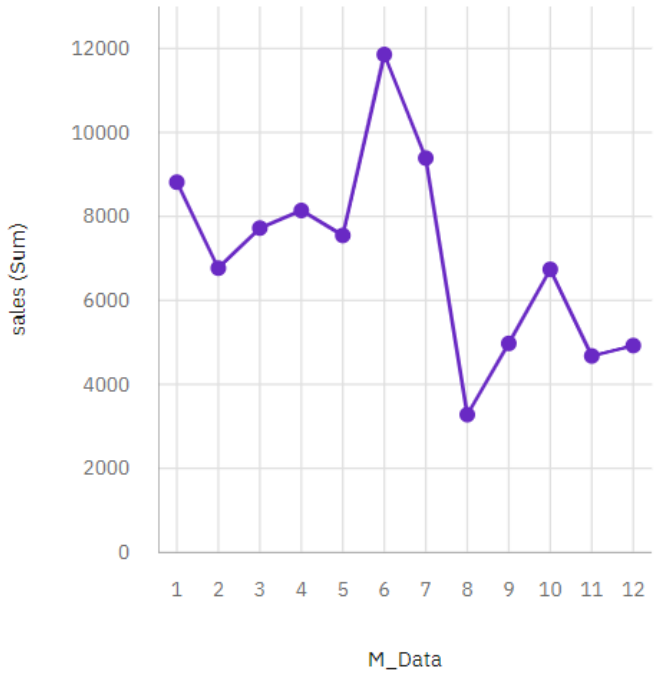

sales by M_Data
0
2000
4000
6000
8000
10000
12000

sales for M_Data hierarchy

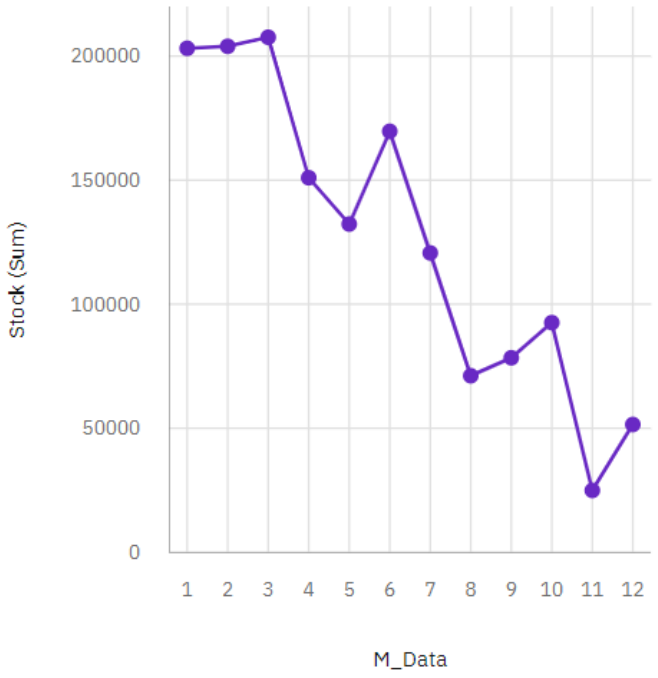
Revenue by M_Data



sales by M_Data



Stock by M_Data



8. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- It reduces manual labor.
- It helps to predict the demands.
- The correct prediction of demand leads to avoidance of dead stock and helps with the shortages of the stock.

DISADVANTAGES:

- If there occurs any error in prediction it cause loses.

9. CONCLUSION

The project “Retail Store Stock Inventory Analytics” was developed to satisfy the retailer or ecommerce customer and in order to maintain the stock at the demand level. It helps to overcome the crisis like overflow of stock or dead stock.

10. APPENDIX

Dashboard link:
https://us3.ca.analytics.ibm.com/bi/?perspective=content&folder=.my_folders%2FDashboards

Github link:
https://github.com/IBM-EPBL/IBM-Project-30240-1660142476