Project Report

Date	14 November 2022
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Project Name	Project - Global Sales Data Analytics

1. INTRODUCTION

1.1 Project Overview

Even with loads of data available at hand, a lot of companies struggle to identify key information such as how they can boost their sales or where they can minimise their losses. This is when they approach companies that offer analytics services. Through these services, businesses will be able to get useful insights into how well (or bad) their business is doing and they end up making impactful business decisions.

1.2 Purpose

To analyse and identify trends in given data in order to make impactful business decisions.

2. LITERATURE SURVEY

2.1 Existing problem

Shopping online is currently the need of the hour. Because of this COVID, it's not easy to walk in a store randomly and buy anything you want. So try to understand a few things like, Customer Analysis and Product Analysis of this Global Superstore.

2.2 References

S.No	Paper/Title	Year	Journal	Method	Advantage	Disadvantages
1	Effects of 3D Virtual "Try-On" on Online Sales and Customers' Purchasing Experiences	September 2020	IEEE Access (Volume: 8)	1)VTO technology consists of making a virtual body model from the customer's own body size, 3D garment modelling, and interactive try-on and mix-and-match of garments. Many studies explain the method of making a virtual body by scanning or measuring the customer's body. 2)We propose a new method, instead of 2D CAD	1) Virtual try-on (VTO) is a new technology used to help customers try on and mix and match apparel without a fitting room. 2)It appeared when conventional shops were in crisis because of consumers' shift to online retailers. VTO technology has been adopted because it has many advantages in both retail channels	The thing to overcome is the psychological barrier on the side of the customer, and convincing them to use and trust virtual try-on applications. That requires being extra clear about what's happening with user data such as images and videos, where they're processed, how they're used, and so on.

				patterns, we use 3D garment photos; to make a 3D garment mesh surface because 2D CAD patterns are always copyrighted and require		
2	Sales Analytics and Big Data Developments Needed Now to Address Practitioner-Identified Emerging Biopharmaceutical Sales Force Strategic and Operational Issues	March 2021	Research Paper	The association of cancer drug costs and total cancer treatment costs per cancer site uses two methods: Kaplan-Meier Sample Average (KMSA) method and an approach similar to the Cox proportional hazard model. Generalised Propensity Score (GPS) based weighting with bootstrap standard errors can be used to estimate the marginal effect of detailing on drug utilisation.	This paper provides a commercial/sales analytics, big data management, and organisational blueprint for companies on how to prepare and operate successfully in this evolving sales force pharma landscape. Focuses largely on patient,payer,sales and marketing analytics.	Survey respondents from biopharmaceutical consulting companies also noted expertise focus is not in the areas identified here required for the industry to respond effectively to change environmental trends.
3	Impact of big data analytics on sales performance in pharmaceutical	April 2021		This study is related to the quantitative research method. This method emphasises the statistical, mathematical,	Sales performance effectively and efficiently achieves the targets in the sales process by examining opportunities and improving closing rates	The data were collected from a developing country, and the results of this research may be different in developed countries.

	organisations			or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques.		
4	Visual Analytics for Decision Support: A Supply Chain Perspective	June 2021	IEEE Access (Volume: 9)	1. Visualisation types suitable for particular analytical goals in each of the SC activities, i.e Visualisation Techniques. 2. Analytical reasoning by analysts involved in the process of analysis, i.e., tactics.	1. The lack of identifying specific SC business decisions that can be supported by VA. 2. The lack of exploring various analytical capabilities of SC VA systems. 3. The lack of identifying the state of the art in visualisation techniques and tactics have been resolved.	First, the application of VA in supporting the source and make processes of the SC may be explored, such as cost modelling of different sources and production scheduling. Second, visualising the impact of external variables on different SC operations such as the effect of weather forecast on sales may be investigated more extensively.

Paper links:

1. Effects of 3D Virtual "Try-On" on Online Sales and Customers' Purchasing Experiences

https://ieeexplore.ieee.org/document/9189849

2. Sales Analytics and Big Data Developments Needed Now to Address Practitioner-identified Emerging Biopharmaceutical Sales Force Strategic and Operational Issues

https://www.pmsa.org/jpmsa-vol05-article01

3. Impact of big data analytics on sales performance in pharmaceutical organisations

https://doi.org/10.1371/journal.pone.0250229

4. Visual Analytics for Decision Support: A Supply Chain Perspective

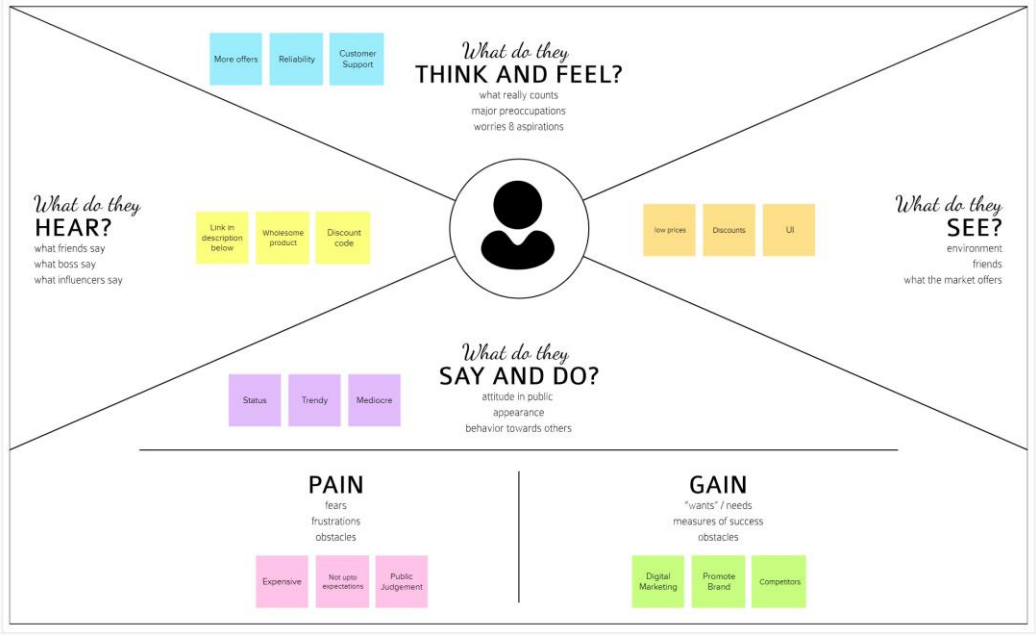
https://ieeexplore.ieee.org/document/9445829

2.3 Problem Statement Definition

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	a customer	buy a product	it is not in stock	it is in demand and many people are placing orders	annoyed
PS-2	a customer	replace a product that I bought	customer support is not responding	of too much traffic	frustrated
PS-3	a customer	buy a product	it is overpriced	of its demand	disappointed
PS-4	a customer	buy a product	there is something odd about the reviews	the product as such isn't the best in its domain	vexed

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming

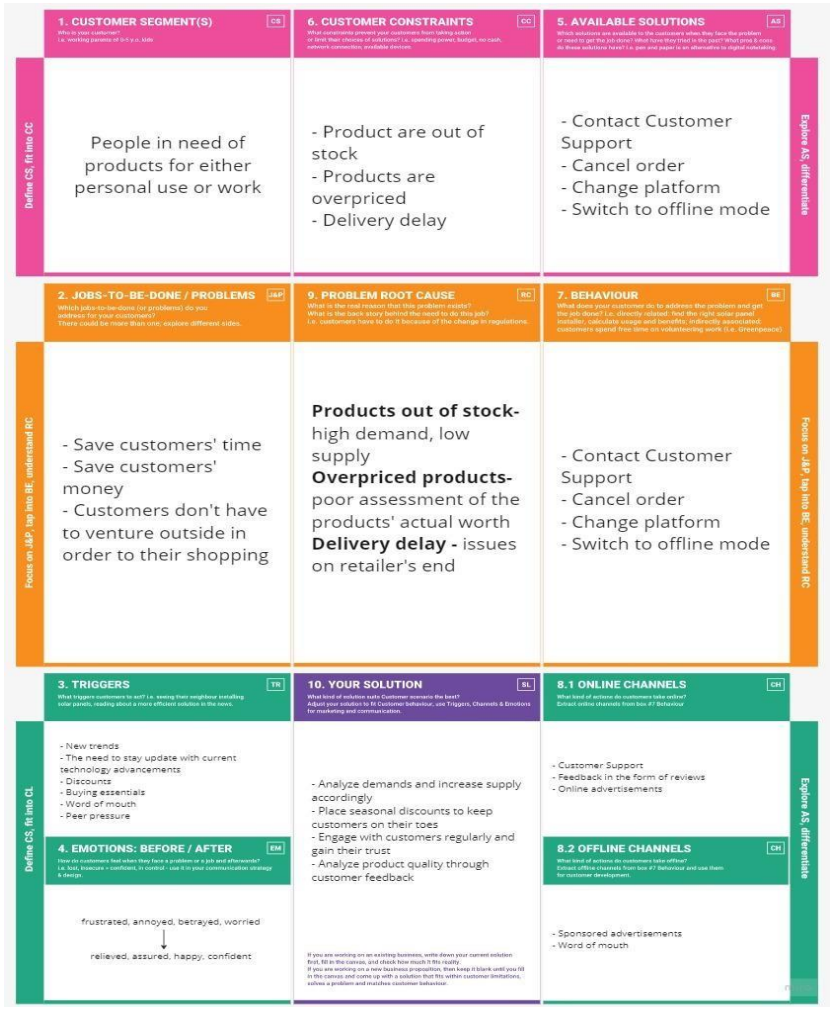
Top 3 ideas :

1. Identify which markets are thriving in each region/zone
2. Perform segment-wise analysis
3. Identify returning customers (if any)

3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Shopping online is currently the need of the hour. Because of this COVID, it's not easy to walk in a store randomly and buy anything you want.
2.	Idea / Solution description	Developing a dashboard with scalability of data for users to get important intel regarding sales of products online.
3.	Novelty / Uniqueness	Providing a hierarchy of products that are trending, useful for investors, business people as well as layman people who are curious about global sales.
4.	Social Impact / Customer Satisfaction	Information is wealth. This would help people in maximizing their profits and minimizing their losses. A clean and clear analysis understandable by all.
5.	Business Model (Revenue Model)	**Revenue Stream:** Outflow: investors analysing where to invest wisely by recognizing trends and demands. Inflow: boosted sales of various products in certain regions.
6.	Scalability of the Solution	On a wider market it could be used by investors, customers as well as layman people. Ease of access for users.

3.4 Problem Solution fit



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Collects Data	Providing CSV file Authentic Datasets
FR-4	Cleans the given Data	Prepares data for EDA purpose
FR-5	Visualisation of Data	Identifying trends in given data Accurate visualisation of provided numbers
FR-6	Dashboard	Analysation of the datasets Key performance indicator

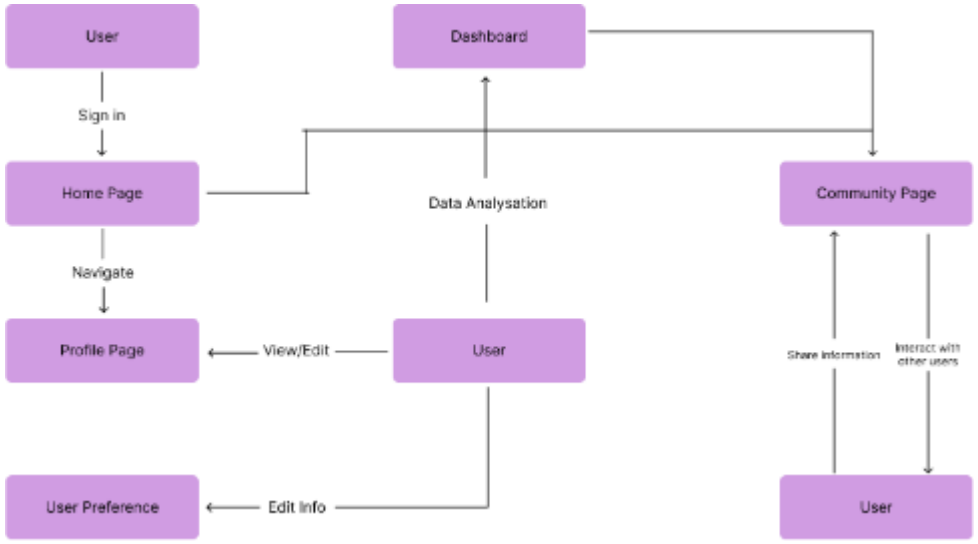
4.2 Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	User friendly design with interactive UI/UX
NFR-2	**Security**	Users could create accounts that require authentication by sending OTP to their Email address. They could share their datasets in the app's community or make their account private.
NFR-3	**Reliability**	App could be run offline while server maintenance takes place. Server traffic wouldn't be an issue.
NFR-4	**Performance**	Requires minimum system requirements, hence could be accessible in many devices with faster loading time.

NFR-5	**Availability**	Server is online 24/7 hence users could use the app at any time. App will work offline as well.
NFR-6	**Scalability**	Scalability reflects the ability of the software to grow or change with the user's demands.

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture

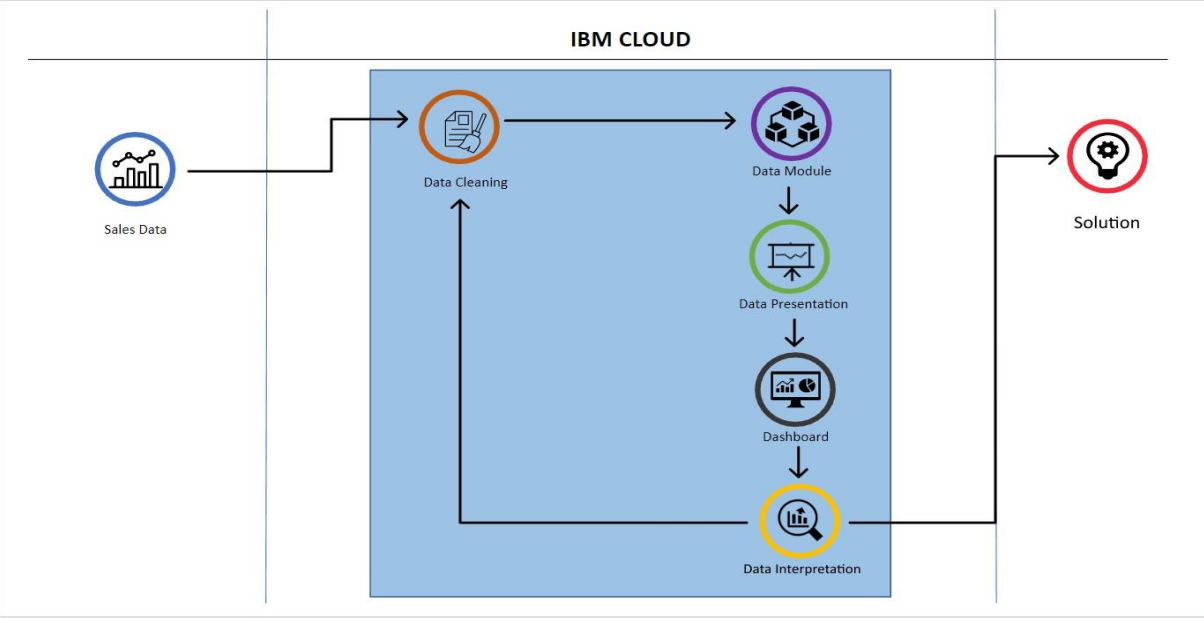


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	IBM Cognos Analytics with Watson
2.	Storage Infrastructure (Cloud)	Customer sales data is uploaded in cloud through interface	IBM Cloud
3.	Working with Dataset	Uploading, Cleaning and Processing dataset	IBM Cognos + IBM Cloud
4.	Data Exploration	Upload data is explored to identify trends	IBM Cognos

5.	Data Visualization	Multiple types of graphs are shown according to customer data and requirements	IBM Cognos Dashboard
6.	Cloud Database	Database Services on Cloud	IBM DB2, IBM Cloudant etc.
7.	Viewing Data	User logins to application to view visualizations for uploaded data	IBM Cognos Dashboard
8.	External API	Enables users to integrate Cognos UI into other applications	Cognos API

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	IBM Cognos, IBM Cloud ,IBM Watson
2.	Security Implementations	Secure user information and data	Active Directory
3.	Scalable Architecture	Supports various data sizes	Web 3.0 IBM Cloud
4.	Availability	Multi page layout providing various visualizations of data and provide full support irrespective of platform and device specifications	Cognos Business Intelligence Server
5.	Performance	Withstand huge data and and process them without crashing	IBM Cognos , Performance Management Hub

5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Downloading data	USN-1	As a user, I can download data to be analyzed	Data can be downloaded	Low	Sprint-1
Customer	Data cleaning and preparation	USN-2	As a user, I can enter my sales data to clean and prepare it for analysis	Data is prepared and cleaned	High	Sprint-1
Customer	Exploratory Data Analysis	USN-3	As a user, I can identify trends and visualize them	Performed EDA	Medium	Sprint-2
Customer	Dashboard	USN-4	As a user, I can prepare an interactive dashboard	Can interact with dashboard	High	Sprint-3
Customer	Dashboard	USN-5	As a user, I can conduct business analysis to make business decisions	Can make business decisions	Medium	Sprint-3
Customer	Story	USN-6	As a user, I can make a story using cognos	Story can be made	Medium	Sprint-4
Customer	Web page	USN-7	As a user, I can make a web page and embed the dashboard in it	Interactive web page with dashboard embedded in it	High	Sprint-4

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	Downloading data	USN-1	As a user, I can download data to be analyzed	2	Medium	Atif, Rohith, Hamza, Tahir
Sprint-1	Data cleaning and preparation	USN-2	As a user, I can enter my sales data to clean and prepare it for analysis	3	High	Atif, Rohith, Hamza, Tahir
Sprint-2	Exploratory Data Analysis	USN-3	As a user, I can identify trends and visualize them	2	Medium	Atif, Rohith, Hamza, Tahir
Sprint-3	Dashboard	USN-4	As a user, I can prepare an interactive dashboard	3	High	Atif, Rohith, Hamza, Tahir
Sprint-3	Dashboard	USN-5	As a user, I can conduct business analysis to make business decisions	2	Medium	Atif, Rohith, Hamza, Tahir
Sprint-4	Story	USN-6	As a user, I can make a story using cognos	2	Medium	Atif, Rohith, Hamza, Tahir
Sprint-4	Web page	USN-7	As a user, I can make a web page and embed the dashboard in it	3	High	Atif, Rohith, Hamza, Tahir

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	5	6 Days	24 Oct 2022	29 Oct 2022	5	29 Oct 2022
Sprint-2	2	6 Days	31 Oct 2022	05 Nov 2022	2	05 Nov 2022

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-3	5	6 Days	07 Nov 2022	12 Nov 2022	5	12 Nov 2022
Sprint-4	5	6 Days	14 Nov 2022	19 Nov 2022	5	19 Nov 2022

Velocity:
The team's average velocity (AV) per iteration unit (story points per day) :

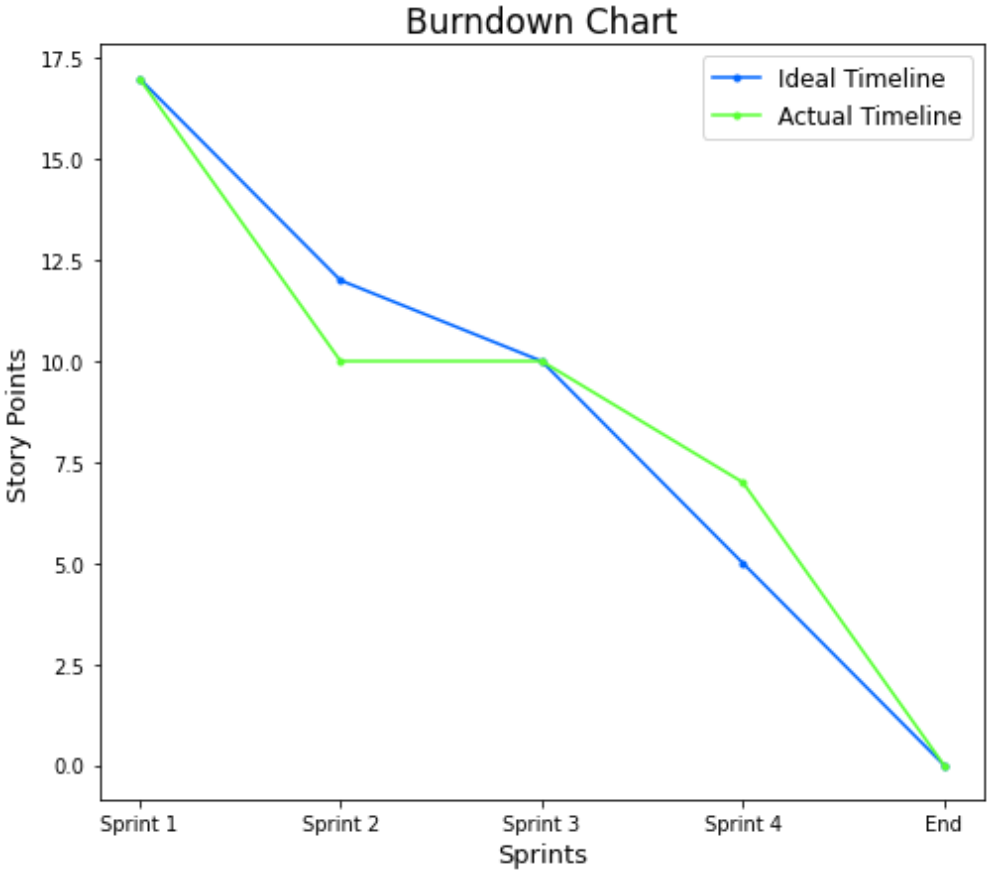
Sprint 1: AV= *Sprint duration/ velocity = 5/6 = 0.87*

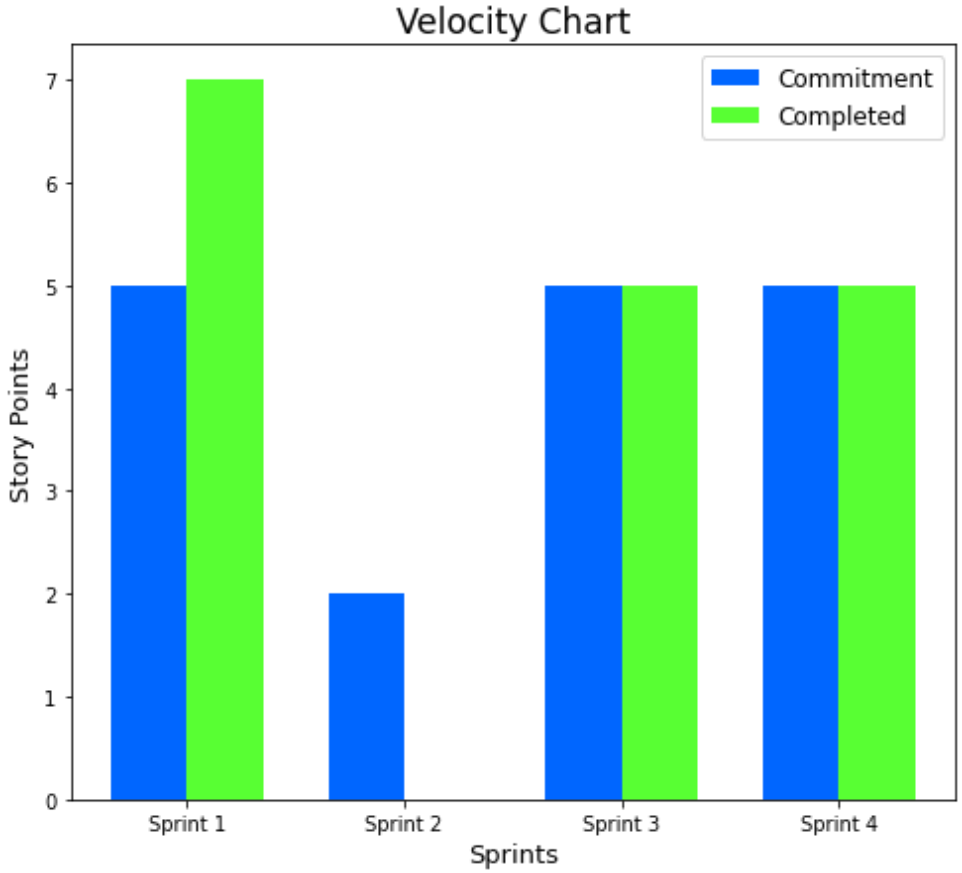
Sprint 2: AV= *Sprint duration/ velocity = 2/6 = 0.34*

Sprint 3: AV= *Sprint duration/ velocity = 5/6 = 0.87*

Sprint 4: AV= *Sprint duration/ velocity = 5/6 = 0.87*

6.3 Reports from JIRA





7. CODING & SOLUTIONING (Explain the features added in the project along with code)

7.1 Feature 1

An interactive dashboard has been embedded into our web page.

Code :

```
<iframe
src="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FGlobal%2BSuperstore%
2BDashboard&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;
action=view&amp;mode=dashboard"       width="100%"       height="800"       frameborder="0"       gesture="media"
allow="encrypted-media" allowfullscreen=""></iframe>
```

8. TESTING

8.1 Test Cases

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Expected Result	Actual Result	Status	Comments	TC for Automation (Y/N)	BUG ID	Executed By
Dashboard_TC_OO1	UI	Home Page	Verify user is able to see elements on the home page	User should have good internet connectivity	Enter the web page	UI elements of the home page are visible, such as: - Hero banner - Web page intro - Header	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_OO2	Functional	Home Page	Verify the user is able to interact with elements in the home page	User should have good internet connectivity	User should be able to click the functional buttons and view the animated illustrations	User could see the UI and interact with various button and elements in the web page	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_OO3	Functional	Home page	Verify the user is able to interact with the drop down elements on the home page	User should have good internet connectivity	Step 1 : Scroll down the Services section Step 2 : Click on the various drop down elements	User is able to interact with the drop down elements on the home page	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_OO4	Functional	Home page	Verify the user is able to enter details in the Conatct Us section	User should have good internet connectivity	Step 1 : Scroll down or Click on the Contact Us button present in the header Step 2 : Fill in your data in the form	User is able to fill in their data into to the Contact Us form	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_OO5	UI	Home page	Verify the user is able to view the Dashboard in the Portfolio section	User should have good internet connectivity	Step 1 : Scroll down to the Portfolio section Step 2 : View the cognos dashboard present	User is able to view the UI of the dashboard	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir

Dashboard_TC_OO6	Functional	Home page	Verify the user is able to interact with the Dashboard	User should have good internet connectivity	Interact wth various visulaizations present in the dashboard	User can interact and direct to the cognos dashboard where they can view various visualizations and analysis	Working as expected	Pass	Various visual charts could be viewed in the dashboard	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_OO7	Functional	Home page	Verify the user is able to click on the Portfolio link which leads them to a second page	User should have good internet connectivity	Click on the hyperlink to go to the Portfolio page	User is able to click on the Portfolio link which leads them to a second page	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_OO8	UI	Portfolio page	Verify the user is able to view the elements on the Portfolio page	User should have good internet connectivity	er the Portfolio p	User is able to view the UI elements on the Portfolio page	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_OO9	UX	Portfolio page	Verify the user is able to interact with the elements in the Portfolio page	User should have good internet connectivity	User should be able to click the functional buttons and view the animated illustrations	User could see the UI and interact with various button and elements in the web page	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_O10	UI/UX	Portfolio page	Verify the user is able to view the Dashboard	User should have good internet connectivity	Step 1 : Scroll down to the Portfolio section Step 2 : View the cognos dashboard present	User is able to view the UI of the dashboard	Working as expected	Pass	Various visual charts could be viewed in the dashboard	N	-	Atif, Rohith, Hamza, Tahir
Dashboard_TC_O11	Functional	Portfolio page	Verify the user is able to interact with the Dashboard	User should have good internet connectivity	Interact wth various visulaizations present in the dashboard	User can interact and direct to the cognos dashboard where they can view various visualizations and analysis	Working as expected	Pass	-	N	-	Atif, Rohith, Hamza, Tahir

8.2 User Acceptance Testing

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the Global Sales Data Analytics project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

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

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	0	0	0	0	0
Duplicate	0	0	0	0	0
External	0	0	0	0	0
Fixed	0	0	0	0	0
Not Reproduced	0	0	0	0	0
Skipped	0	0	0	0	0
Won't Fix	0	0	0	0	0
Totals	0	0	0	0	0

3. Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
Hero section	4	0	0	4
Contact Us Section	1	0	0	1
Drop down menus	1	0	0	1
Dashboard	5	0	0	5

9. RESULTS

9.1 Performance Metrics

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	No of Visualizations / Graphs - 29
2.	Data Responsiveness	Very responsive
3.	Amount of Data to be Rendered (DB2 Metrics)	11.5 MB (GlobalSuperstore2.csv)
4.	Utilization of Data Filters	Utilized to full effectiveness

5.	Effective User Story	No of Scenes Added - 7
6.	Descriptive Reports	No of Visualizations / Graphs - 10

10. ADVANTAGES & DISADVANTAGES

Advantages

- Data Visualizations
- Ease of use
- Integration capabilities

Disadvantages

- No prediction features available as of yet
- Need to improve security aspect of the product

11. CONCLUSION

To conclude, we will say that we are providing revolutionary solutions and insights for businesses and making their job a lot easier.

12. FUTURE SCOPE

We can improve our services that we offer by implementing more prediction based insights. Also, we can further exploit other domains as well and offer analytics services to them.

13. APPENDIX

Source Code - https://github.com/IBM-EPBL/IBM-Project-43167-1660713791/tree/main/Final%20Deliverables/Source%20Code

GitHub - https://github.com/IBM-EPBL/IBM-Project-43167-1660713791

Project Demo - https://drive.google.com/file/d/191SB9_xgaxjc3sfxmp3mnczvpHgQyyeC/view?usp=share_link