Global Sales Data Analytics

Project Report

Introduction

1.1 Project Overview

Sales is the movements of every sort engaged with offering an item or administration to a customer or business. It is significant for sales and promoting teams to audit their procedures also, execution to make enhancements. One method for estimating execution is with sales analytics. Sales analytics alludes to the utilization of innovation to gather and utilize sales information to determine significant bits of knowledge. It is utilized to recognize, advance, and conjecture sales. It utilizes various measurements and KPIs to design an effective sales model that creates higher income for the business. This is one such analysis of the global sales data in order to increase the sales.

- To increase the sales and profit for the user.
- Increase the efficiency of inventory
- Reduce the investment cost
- Optimized purchase for the business

1.2 Purpose

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

Literature Survey

2.1 Existing Problem

In the existing systems like FieldProxy and Glew, they have implemented a broad and variety of features a user as a business owner will be looking for. The features include Job Management, Preventive Maintenance, Equipment Management, Visit Plan Optimization, Work Order Management, Bid Management, Live Activity Dashboards, Booking Management, Calendar Sync and Management, Agent Route Scheduling, Project Billing, Quotes and Estimate Generation, Field Payment Collection, Alerts and Notifications and Inventory control. All these create a better and great impact on the economy of the business in the firm. This Global sales data is also one such thing that a market is demanding for having an improved and optimized solutions for their management of products. The product management is completely supervised by the model created by the charts and exploration of the data. The insights drawn out of it are used for finding and creating new information that helps the business owners to decrease their stress in purchasing new products. This also helps in increasing the sales and profit.

2.2 References

Paper 1 : Survey on Growth of Business using Data Analytics for Business Intelligence in Real-Time world [Madamanchi Brahmaiah, Talluri Sreekrishna, 2021]

Data analytics techniques can screen improvements and measurements data could in some other case be lost with inside the mass of realities. These realities can then be used to upgrade techniques to development the general exhibition of a business venture or framework. Data analytics is the innovation of concentrating on uncooked records to make ends roughly that realities. Large numbers of the procedures and

methodology of records analytics has been programmed into mechanical strategies and calculations that artworks over uncooked records for human utilization. Data analytics is the innovation of perusing uncooked measurements to make ends roughly data. The procedures and approaches of insights analytics were modernized into mechanical methodologies and calculations data artistic creations over uncooked insights for human utilization. Data analytics help a business streamline its presentation. Organizations wherever in the global attempt also, get the benefits from get passage to the insights to work on their in general execution and blast their income, but handling heterogeneous assortments of data to separate the valuable data is an enormous problem that numerous organizations attempt and settle. One of the most fundamental improvements is "Big Data Analytics", an age for Putting away, Handling, and examining the data, bunches are Overseeing data to apply it in new ranges and direct leaders. Organizations can utilize the experiences they advantage from insights analytics to tell their choices, fundamental to higher results. Data analytics eliminates bunches of the mystery from arranging showcasing efforts, choosing what content material to make, developing items, and that's just the beginning. Data analytics moreover offers you helpful experiences into how your missions are showing up with the goal that you could fine-follow them for first in class results. Data analytics offer you with additional bits of knowledge into your clients, allowing you to tailor client service to their requirements, offer additional personalization, and develop more powerful associations with them.

Paper 2 : PERFORMANCE ANALYSIS OF SALES BIG DATA PROCESSING USING HADOOP AND HIVE IN CLOUD [Hanindia Prami Swari, Kadek Susila Satwika,Putu Susila Handika,2020]

The business data will be handled in an equal plan on the cloud server and afterward oversaw utilizing Hadoop and hive. The exploration shows that the more VMs utilized, the lower handling time required, yet this is conversely relative to the computer processor time required. Though, from the side of block size testing the examination result shows that the lessening in the hour of question execution is entirely apparent by the adjustment of the utilization of block size from 2MB to 4MB

and 8MB, however the adjustment of the block size from 4MB to 8MB doesn't altogether influence the speed of question execution. The development of data is expanding quickly step by step because of the quickly expanding populace, sensors use, utilization of virtual entertainment, the increases on IoT project and so forth. Numerous datasets have explicit level of heterogeneity in types, structures, semantics, associations, granularity, and furthermore openness. Data portrayal is a significant part in big data, - and it plans to make data more valuable for the examination with PC and the comprehension of clients . Big Since a very long while prior, the development of data created and put away to address business issues in the corporate has grown quickly. Through the presence of IoT, distributed computing and Man-made consciousness, company creates more data than any time in recent memory . The presence of web and online entertainment adds to creating circumstances to fundamentally perplex. Consistently, roughly 6.000 tweets on normal are tweeted on Twitter.

Paper 3 : RESEARCH ON REFINED SALES MANAGEMENT, DATA ANALYSIS AND FORECASTING UNDER BIG DATA [Wenhui Shan, 2020]

The motivation behind this article is to assist with peopling give full play to the upsides of big data innovation applications and advance the solid improvement of the venture economy. With regards to the fast improvement of social and financial levels, the quantity of items delivered by endeavors is expanding, and the recurrence of item refreshes is likewise quickly expanding. Be that as it may, there are big contrasts in item quality at the application stage. In the time of broadening, it is challenging to accomplish deals development by depending exclusively on mechanical advancement. After the change of the undertaking, the application benefits of big data innovation are utilized to do refined administration of the whole deals interface. Simultaneously, working really hard of data investigation and guaging can diminish the expense of item deals, yet additionally increment item deals and speed up the financial advancement of endeavors.

Paper 4 : IMPACT OF BIG DATA ANALYTICS ON SALES PERFORMANCE IN PHARMACEUTICAL ORGANIZATIONS: THE ROLE OF CUSTOMER RELATIONSHIP MANAGEMENT CAPABILITIES [Muhammad Shahbaz,Changyuan Gao,Lili Zhai,Fakhar

Shahzad,Adeel Luqman,Rimsha Zahid, 2021]

An examination model was tried in view of 416 substantial reactions gathered from drug organizations through an organized poll. Primary condition demonstrating (SEM) was utilized utilizing Brilliant PLS3 to affirm the commitment of BDA to further developing CRM capacities and deals execution. The investigation discovers that singular attributes like self-adequacy, perkiness, and normal practices, alongside hierarchical qualities like intentionality, client inclusion, client interest, and the executives support, are positive indicators of salesforce impression of BDA. This positive impression of BDA expanded the individual innovation fit in the salesforce, which eventually expanded the CRM capacities and deals execution. Presentation Current advances in data innovation (IT) and the rising pattern of online entertainment have significantly impacted the way salespersons perform day to day schedule exercises. Most frequently, the salesforce is outfitted with a salesforce computerization (SFA) framework to upgrade client relationship the board (CRM) capacities and deals execution . SFA frameworks are a bunch of instruments that work with association by giving investigated data from accessible data to oversee client connections and deals related exercises . A SFA framework gives data with respect to client cooperations, stock control, deals guaging, deals, correspondence history, and pipeline valuable chances to proficiently accomplish everyday objectives.

Paper 5 : IMPLEMENTATION OF BUSINESS INTELLIGENCE FOR SALES DATA MANAGEMENT USING INTERACTIVE [Ricky Akbar, Meza Silvana, Mohammad Hafiz Hersyah, 2021]

In executing the BI application, the BI Guide is used as a justification for driving investigation starting from the unmistakable evidence of issues to be picked. From there on out, the organizing stage is finished by surveying the establishment and orchestrating projects. Then, the assessment stage revolves around finishing a positive examination of business issues and possible entryways from BI execution. Next is the arrangement stage through doing the information stockroom design process and ETL using the Pentaho Information Mix (PDI). Then, the execution stage is finished, specifically the assurance and usage of BI application contraptions to

perform Information Discernment. It is believed that this assessment can convey reports as Savvy Dashboard Discernment that can be used by head bosses to make better decisions. Paper 6 : DATA ANALYSIS AND VISUALIZATION OF SALES DATA [Kiran Singh, Rakhi Wajgi, 2019] Data made by an extending number of sensors in the climate, for example, traffic cameras and satellites, web exercises on person to person communication locales, medical services database, government database, deals data and so on, are illustration of immense data. Handling, breaking down and imparting this data are a test. Internet shopping sites get overflowed with voluminous measure of deals data consistently. Dissecting and visualizing this data for data recovery is a troublesome undertaking. In this manner a framework is required which will really examine and envision data. This paper centers around a framework which will imagine deals data which will help clients in applying knowledge in business, income age, and navigation, overseeing business activity and following advancement of undertakings. Data perception is a cycle which expects to impart data really and obviously to the client through graphical portrayal. Powerful and proficient data perception is the vital piece of the revelation cycle.

Paper 7 : WALMART'S SALES DATA ANALYSIS- A BIG DATA ANALYTICS PERSPECTIVE [Manpreet Singh, Bhawick Ghutla, Reuben Lilo Jnr, Aesaan F S Mohammed, Mahmood A Rashid, 2019]

Data innovation in this 21st century is arriving at the skies with huge size of data to be handled and examined to figure out data where the conventional methodology is not any more powerful. Presently, retailers need a 360-degree perspective on their purchasers, without which, they can miss upper hand of the market. Retailers need to make compelling advancements and offers to meet its deals and promoting objectives, if not they will swear off the significant open doors that the ongoing business sector offers. Commonly it is difficult for the retailers to fathom the economic situation since their retail locations are at different geological areas. Huge Data application empowers these retail associations to use earlier year's data to all the more likely conjecture and anticipate the approaching year's deals. It likewise empowers retailers with significant and scientific bits of knowledge, particularly deciding clients with wanted items at wanted time in a specific store at various

geological areas. In this paper, we dissected the data sets of world's biggest retailers, Walmart Store to decide the business drivers and foresee which divisions are impacted by the various situations, (for example, temperature, fuel cost and occasions) and their effect on deals at stores' of various areas. We have utilized Scala and Python Programming interface of the Flash structure to acquire new experiences into the purchaser ways of behaving and fathom Walmart's promoting endeavors and their data-driven systems through visual portrayal of the dissected data.

2.3 Problem Statement Definition

Ideation and Proposed Solution

3.1 Empathy Map Canvas

Empathy Map Canvas

What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations

- More efficient UI Daily in and out product list and Product trackers.
- Order Priority data must be observed.

What do they HEAR?
what friends say
what boss say
what influencers say

- which Product has highly purchased?
- Area of sales improvement comparative chart data
- Review about the purchased product

What do they SEE?
environment
friends
what the market offers

- Sales Report
- Aesthetic of the dashboard Filter
- Variety of Products

What do they SAY AND DO?
attitude in public
appearance
behavior towards others

- Want something Reliable
- Discounts must be evaluated

PAIN
fears
frustrations
obstacles

- Accuracy of the results
- Analysis of damage is tough
- High expense

GAIN
"wants" / needs
measures of success
obstacles

- Track product growth
- Area of expenditure is known
- Success in Job

3.2 Ideation and Brainstorming Ideas

3.3 Proposed Solution

S. No.	Parameter	Description
1	Problem Statement (Problem to be solved)	The major challenge faced by the present companies is that their inventory management is dependent on the fast changing world. Improving their inventory and sales helps in increasing the revenue generated for the organisation. Datasets are to be studied and identify the trends to improve the business and help in taking appropriate decisions.
2	Idea / Solution description	An interactive, simple yet powerful dashboard to be created such that visualisation of data helps identifying the trends and patterns in the charts.
3	Novelty / Uniqueness	● Interactive Dashboard and simple UI ● Satisfying Customer's specific needs ● Location based inventory management
4	Social Impact / Customer Satisfaction	Make analysis of data patterns and trends very simple and help in making data driven decisions and Visible profits driven by informed decisions and Optimise sales and marketing.
5	Business Model (Revenue Model)	Two tier pricing- Standard, Premium ● Standard: Limited Dashboard features. ● Premium: Customised Dashboard features with automated reports
6	Scalability of the Solution	E-commerce and product based D2C companies

3.4 Problem Solution fit

Define CS, fit into CC			Explore AS, differentiate
1. CUSTOMER SEGMENT(S) `CS` Direct-to-customer business and E-commerce organization owners willing to improve their sales globally.	**6. CUSTOMER CONSTRAINTS** `CC` The datasets need to be collected in an organised form. Decisions has to be made by themselves with all the coclusion produced.	**5. AVAILABLE SOLUTIONS** `AS` The dashboard is prepared to display the results of the charts and other analysis. The mannual is also created to help them use the dashboard.	

Focus on J&P, tap into BE, understand RC			Focus on J&P, tap into BE, understand RC
2. JOBS-TO-BE-DONE / PROBLEMS `J&P` Analysing the data and identifying the trends for improving their sales.	**9. PROBLEM ROOT CAUSE** `RC` The urge to improve sales globally and earn profit in the maximum level.	**7. BEHAVIOUR** `BE` Data sets of the sales is collected and the analysis made using IBM cognos. Then the trends and patterns are identified.	

Identify strong TR & EM			Identify strong TR & EM
3. TRIGGERS `TR` The urge to make appropriate decisions and the fear of not knowing the future of the business. **4. EMOTIONS: BEFORE / AFTER** `EM` Before: Anxiety, Fatigue and depression After: Clear Mind and Peacefullness	**10. YOUR SOLUTION** `SL` Creating an interactive, simple and powerful dashboard to interact with the customer in the form of various subscription model.	**8. CHANNELS of BEHAVIOUR** `CH` Online: The subscription based services are made to analyse and develop insights	

Requirement Analysis

4.1 Functional Requirement

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Signing up with Gmail Register or Log In
FR-2	User Confirmation	Email confirmation is delivered.
FR-3	Dataset	Dataset upload to Cognos Analytics Tool.
FR-4	Visualize/Analyse	Columns can be moved around to analyse the dataset.
FR-5	Create Dashboards	Create Charts , Graphs ,Tables etc.
FR-6	Log Out	After downloading the Dashboards, log out.

4.2 Non-functional Requirements

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

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Until the Dashboard contains the appropriate Store Sales Dataset, the user can view it.
NFR-2	Security	The Dashboards/Templates are accessible to anyone with the proper Log In credentials.
NFR-3	Reliability	Templates are trustworthy since we upload and access them over the cloud.
NFR-4	Performance	The user can easily drag to any metrics they want to view, and it works as intended.
NFR-5	Availability	Anyone who is interested in learning more about Sales Data can access it for free.
NFR-6	Scalability	Dashboards and templates are quite flexible; users can change the metrics at any time.

PROJECT DESIGN

5.1 Data Flow Diagrams

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.
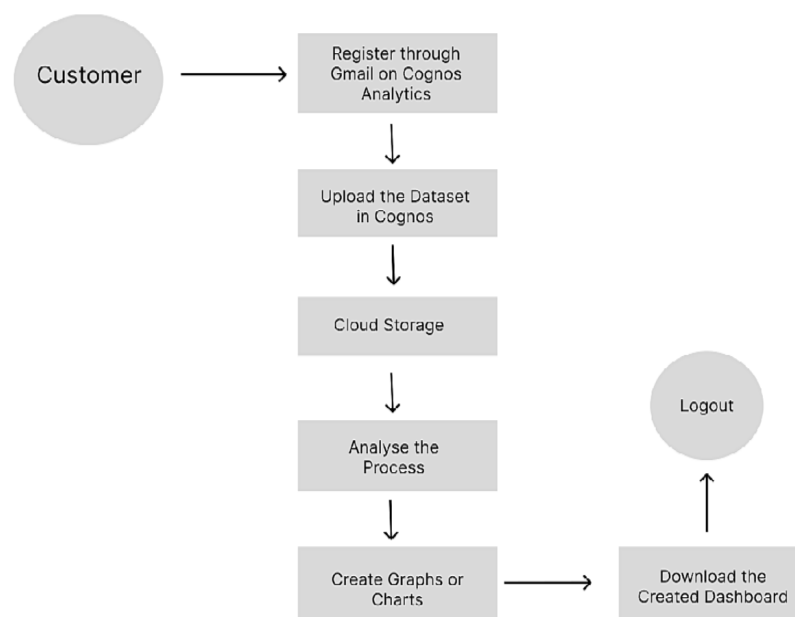
5.2 Solution & Technical Architecture

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2
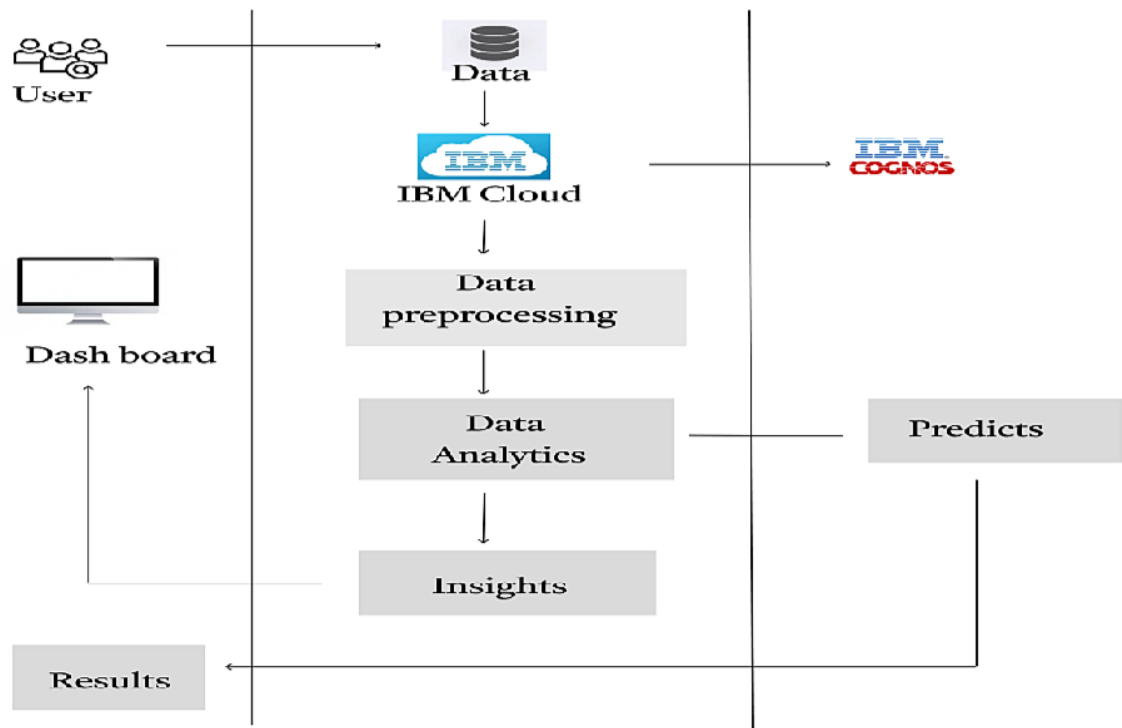
5.3 User Stories

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, I will receive confirmation email once I have registered for the 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		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-6	As a user, I can sign in to the dashboard using the credentials		High	Sprint-1
Customer (Web user)	Login	USN-1	As a user I can login using email, password provided	I can access dashboard	High	Sprint-1
Customer Care Executive	Chat	USN-1	Can be accessible by the user	User having the account can use this chat	High	Sprint-2
Administrator	Calling and Mailing	USN-2	Can be accessed by the business owner having the credentials	User having the account	High	Sprint-2

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.	10	High	Reshma G, Reshma K, Sridevimanju R, Roshini M
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application.	10	High	Reshma G, Reshma K, Sridevimanju R, Roshini M
Sprint-2	Data Extraction	USN-3	Extraction of data and modifying the data according to the need	12	Medium	Reshma G, Reshma K, Sridevimanju R, Roshini M
Sprint-2		USN-4	Loading of data and converting it into data module, preparing it	8	Low	Reshma G, Reshma K, Sridevimanju R, Roshini M
Sprint-3	Dashboard	USN-5	Creating an efficient and creative dashboard to display	12	High	Reshma G, Reshma K, Sridevimanju R, Roshini M

Sprint		USN				
Sprint-3		USN-6	Analysing and working with datasets to produce results.	8	Low	Reshma G, Reshma K, Sridevimanju R, Roshini M
Sprint-4	Report and Story	USN-7	Using data models to create report of the given global sales data.	10	Medium	Reshma G, Reshma K, Sridevimanju R, Roshini M
Sprint-4		USN-8	Using such data models to convey a story to the user.	10	Medium	Reshma G, Reshma K, Sridevimanju R, Roshini M

6.2 Sprint Delivery Schedule

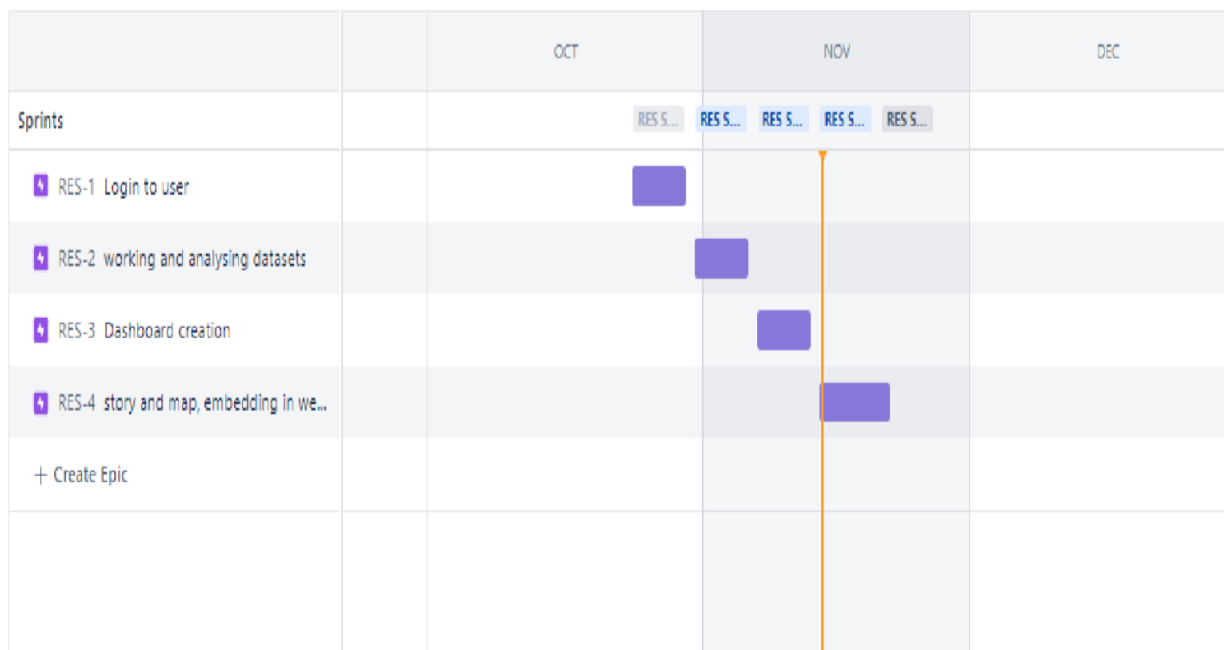| Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

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)

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

In the Global sales analysis the average velocity of our team is,

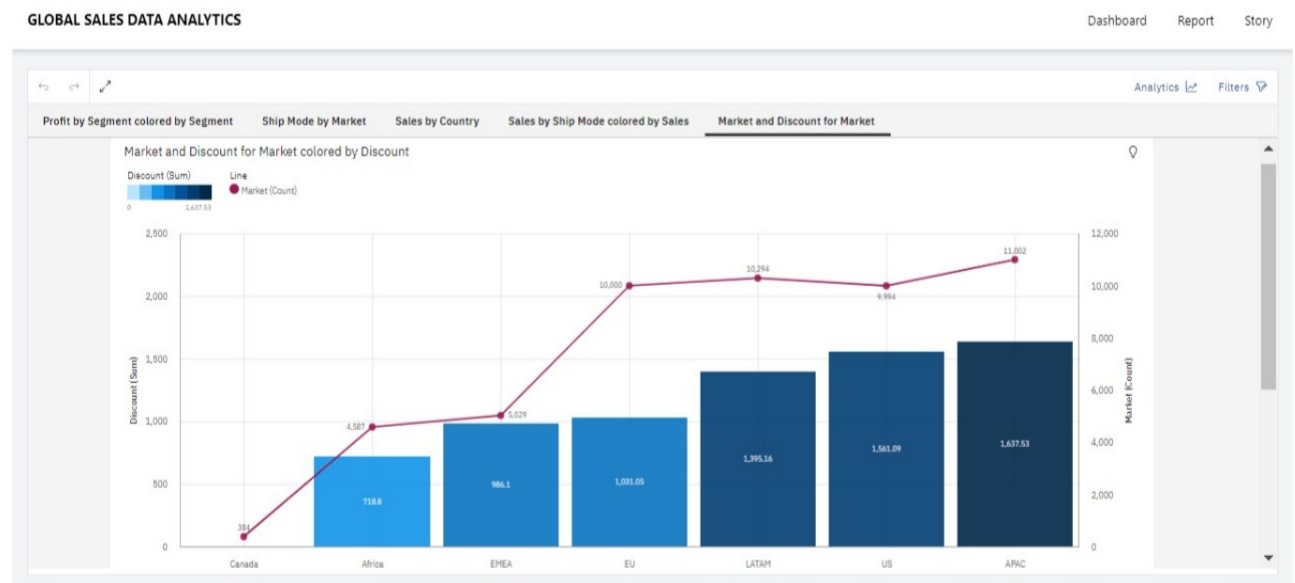**AV = 20/6 = 3.34**

6.3 Reports from JIRA

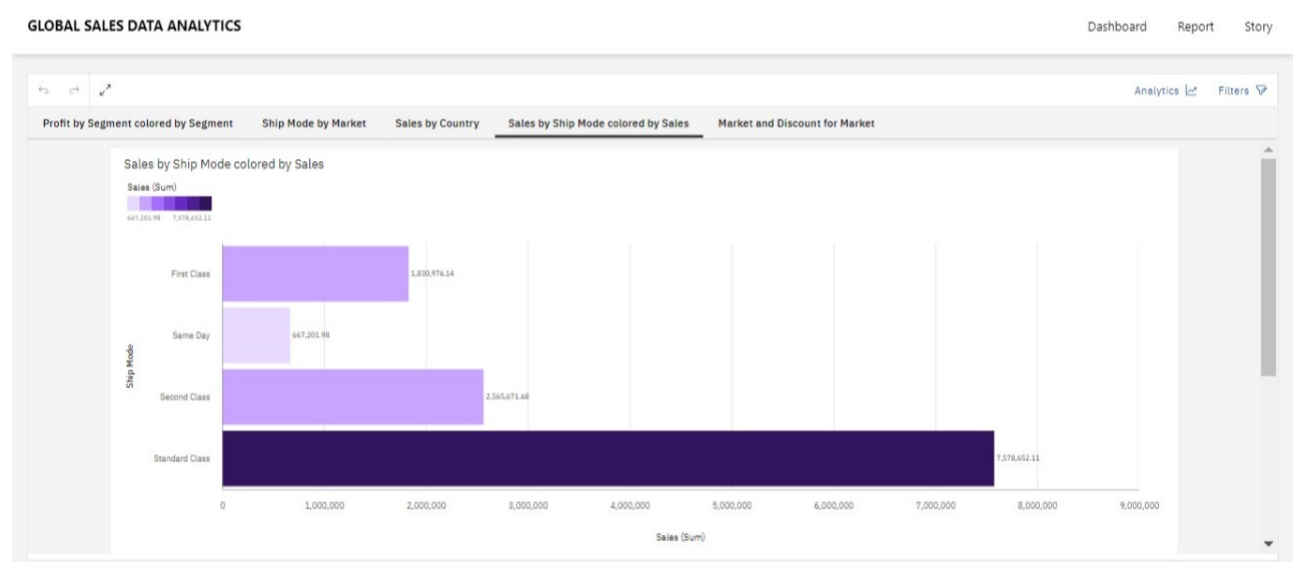|			OCT		NOV		DEC
Sprints				RES S... RES S... RES S... RES S... RES S...			
RES-1 Login to user							
RES-2 working and analysing datasets							
RES-3 Dashboard creation							
RES-4 story and map, embedding in we...							
+ Create Epic							

CODING & SOLUTIONING

7.1 Dashboard :

Market and Discount for Market
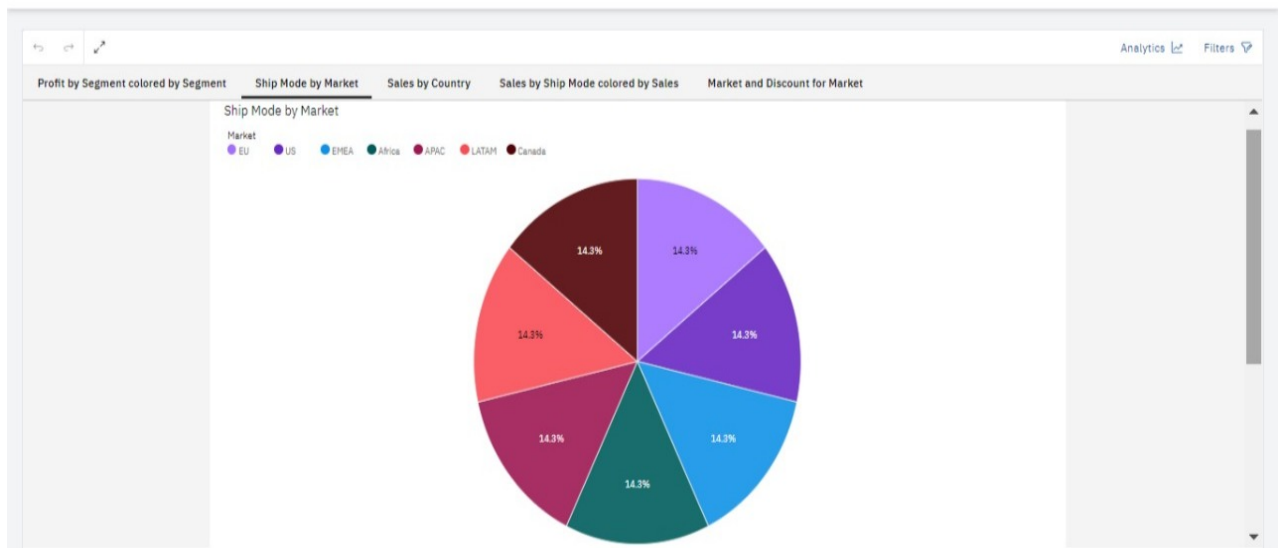

Sales By Ship Mode

GLOBAL SALES DATA ANALYTICS

Dashboard   Report   Story

Analytics   Filters

Profit by Segment colored by Segment   Ship Mode by Market   Sales by Country   Sales by Ship Mode colored by Sales   Market and Discount for Market

Sales By Country

GLOBAL SALES DATA ANALYTICS

Dashboard   Report   Story

Analytics   Filters

Profit by Segment colored by Segment   Ship Mode by Market   Sales by Country   Sales by Ship Mode colored by Sales   Market and Discount for Market

Ship Mode By Market

7.2 Report and Story :

Global Sales Data Analytics - Report
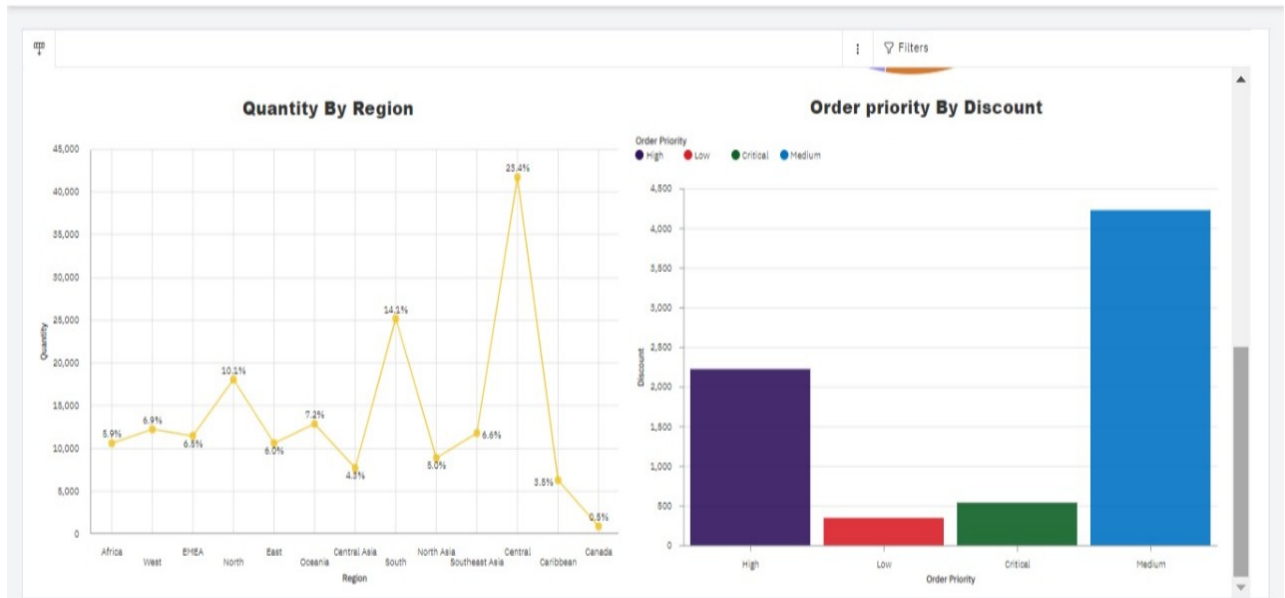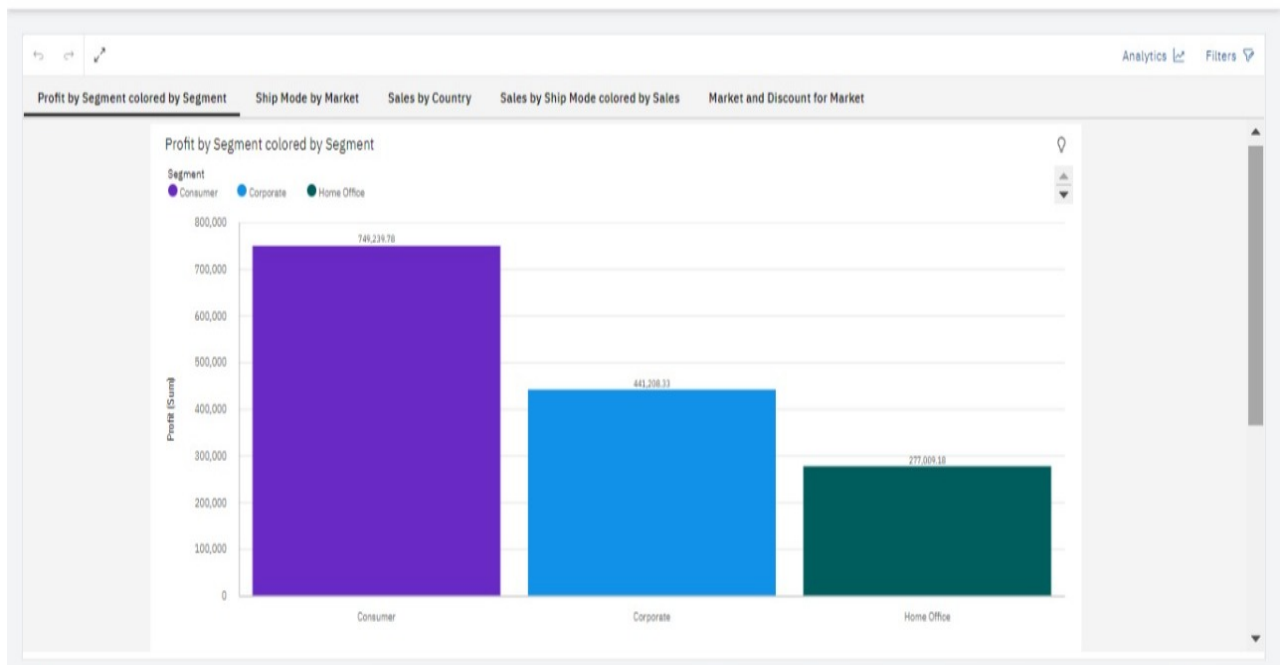
Shipping Cost by Market colored by Market

Market
● APAC ● Africa ● Canada ● EMEA ● EU ● LATAM ● US

Shipping Cost (Sum)
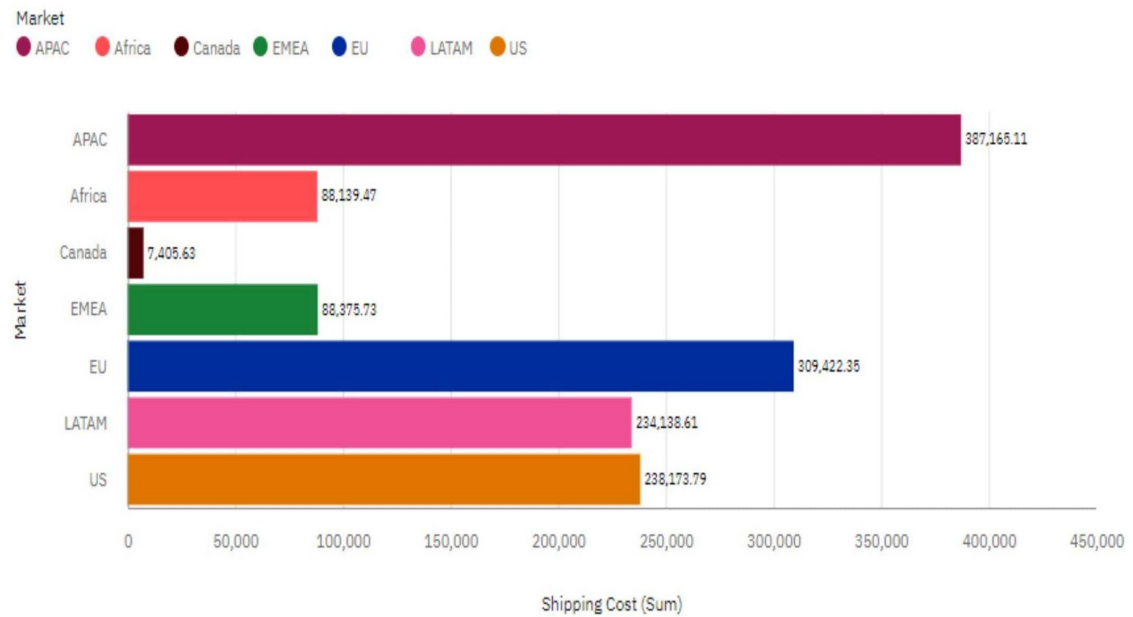
Discount by Category colored by Category

Category
● Furniture ● Office Supplies ● Technology

Category

Global Sales Data Analytics - Story
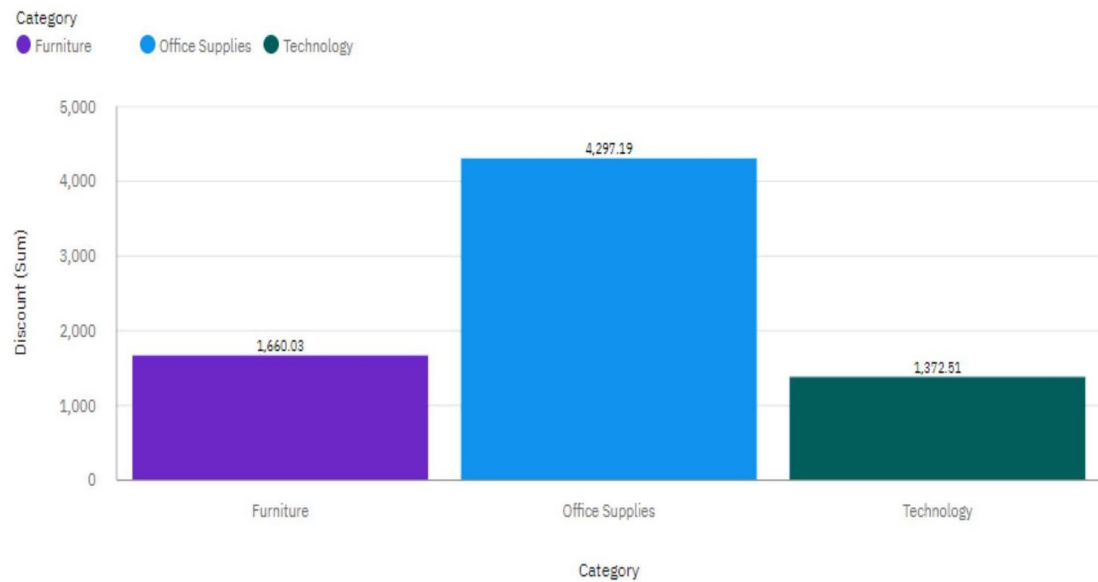
Advantages and Disadvantages

Sales data can help companies estimate future stocking based on past experience, and plan marketing campaigns ahead of time. Based on historicaldata, online retailers can predict future sales, and prepare a proper number of goods in the warehouse. Using social listening, they can discover new buzzwords and react promptly to catch golden opportunities to make more sales.

With Sales data analytics tools, business owners are enabled to look at the greater picture and monitor the pricing of competitors in real-time. This requires a large data set with all the prices of competitors, which needs to be updated time to time since the market price is always changing. Sales data analytics tools can track the buying journey of customers. They capture interactions a user previously had with a brand, including products viewed, clicks, past purchases, etc.

The data allows business owners to get the shoppers' information and understand the shoppers in depth- what they like and dislike, which products are in hot demand recently, what time of the year the demand for certain products rises, etc. Sales data analytics helps improve customer service in many ways.

By monitoring the average response speed, customer service staff can increase overall response timeliness; by sending out questionnaires and collecting customer feedback, it provides first-hand info to help improve the service quality and reduces the chance of bad service; by monitoring other data such as the delivery time of the goods, e-store owners can identify issues in the delivery process and avoid possible transportation problems.

- Data security

When dealing with analytics outsourcing partners, organizations have to be prepared for the risk of exposing sensitive organizational data. That said, there are numerous ways to ensure that an analytics provider is trustworthy and able to keep all company data confidential. Therefore, before working with an outsourcing partner, do your research to pick a provider that can ensure the safety of your data using clear, specific strategies.

- Low speed of data entry

There is no way a man can compete with the machine in term of processing speed. In data security situation involving going through millions of items to check for data integrity and data validation to ensure high accuracy of data element going into a system, the low-speed nature of manual data input will cause system failure. Imagine a surveillance system where human is allowed to check every person entering a premise manually the low speed in reviewing everyone incoming and outgoing people will create high traffic that may shut down the system

- Inconsistency

In an environment where consistency of data is crucial to the success of the system, manual data entry service is always a disadvantage as maintaining consistency for humans is a challenging task that must be avoided.

- High cost of training

One of the advantages of the automated system is the low cost of doing business, but using manual data entry system mean more personnel will be engaged to increase service delivery and each member of the workforce must be trained to meet the basic standard required to perform assigned tasks.

Source Code :

Github link : https://github.com/IBM-EPBL/IBM-Project-23263-1659875048

Project demo :

Conclusion

In this undertaking, Subsequent to making this application we guarantee that this application will assist its clients with dealing with their deals in a most effective way. It will direct them and make them mindful about their item deals and client connection. It will end up being useful for individuals who are disappointed with on examination of their business due to the mistaken in information and less assortment technique. So, this application will assist in examination of deals with designing and customer examination.

Future Scopes

- Business intelligence

One more sort of robotized information investigation is the formation of business insight measurements. These cycles commonly track arising patterns in your business. For instance, business knowledge can analyze which geographic areas are delivering the most orders, and contrast these numbers with the advertising financial plan in those areas. These examinations likewise permit you to make exact assessments about where publicizing is the best.

- AI models

AI programs make measurable models for following changes in business activities. AI models can likewise assist with foreseeing changes in the market that could

influence the market. Utilizing AI models, organizations can figure out what activities can assist them with remaining serious in an industry.

Source Code Link:

https://github.com/IBM-EPBL/IBM-Project-23263-1659875048

Project Demo Link:

https://drive.google.com/file/d/1fNzbdqsSpCs45MC6mw8eW2EA1YU7B8dG/view?usp=sharing