GLOBAL SALES DATA ANALYTICS

A PROJECT REPORT

SUBMITED BY

TEAM LEADER - **Sahin inbaraj.M**

TEAM MEMBERS-

Gokul.B

Laxmanan .R

Mohamed althaf .M

in partial fulfillment for the award of degree of

Bachelor of Engineering (B.E.) in

COMPUTER SCIENCE AND ENGINEERING

SYED AMMAL ENGINEERING COLLEGE

ANNA UNIVERSITY NOVEMBER 2022

ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our **Faculty Mentor** and **IndustryMentor** for their support and guidance in completing our project on the Global Sales and Data Analysis

We would like to extend our gratitude to the **IBM** for **Nalaiya Thiran** project for providing us with all the facility that was required.

It was a great learning experience.We would like to take this opportunity to express our gratitude.

DATE: 18 November 2022

TEAM LEADER -

Sahin inbaraj.M

TEAM MEMBERS-

Gokul.B

Laxmanan.R

Mohamed Althaf.M

TITLE

1. **INTRODUCTION**
2. **LITERATURE SURVEY**
    a. Existing Problem
    b. Reference
    c. Problem Statement Definition
3. **IDEATION AND PROPOSED SOLUTION**
    a. Empathy Map
    b. Ideation and Brainstorming
    c. Proposed Solution
    d. Problem Solution Fit
4. **REQUIREMENT ANALYSIS**
    a. Functional Requirements
    b. Non- Functional Requirements
5. **PROJECT DESIGN**
    a. Data Flow Diagram
    b. Solution & Technical Architecture
    c. User Stories
6. **PROJECT PLANNING & SCHEDULING**
    a. Sprint Planning & Estimation
    b. Sprint Delivery Schedule
7. **CODING & SOLUTIONING**
8. **RESULT**
9. **ADVANTAGES & DISADVANTAGES**
10. **FUTURE SCOPE**
11. **CONCLUSION**

1 INTRODUCTION

1.1 Project Overview

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, this project is done to try to understand a few things like, Customer Analysis and Product Analysis of this Global Super Store.

If you want to achieve your sales goals month after month, then guesswork and intuition aren't your best friends. You need to perform a strategic sales analysis and get cold, hard data.

1.2 Purpose

By the end of this Project, you will:

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

Regular sales data analysis provides an understanding of the products that your customers are buying and helps you dissect why they are behaving in a certain way. You can also find patterns in your lead conversions and drop offs. All of these aspects enable you to optimize you.

2 LITERATURE SURVEY

EXISTING PROBLEM

Crafting a good sales pitch from sales data analysis can be difficult. Getting the right data, hitting the right client pain points, crystallizing why your services are better than the competitors, all takes hard work. Honing your sales pitch to an art takes time, and even with a perfect picture, new clients take time to acquire. One of the best ways we've found to build a good sales pitch is to use data you already have. In the digital world, there is no shortage of data, which translates into no shortage of potential competitive insights and advantages. With databases, data warehouses, corporate intranets, best practice sharing, web analytics, voice of the customer information, and QA or Six Sigma data, you are well-poised for discovering good information.

Problem Definition Statement

The overall purchase power of the consumer and also sales capacity of company. Unavailability of products equally between the consumers. There is no proper distribution of products among the customer The customers are not getting the products they prefer. By hearing out to the consumers and collecting their user preference data. Data analytics and data visualization is used for this.

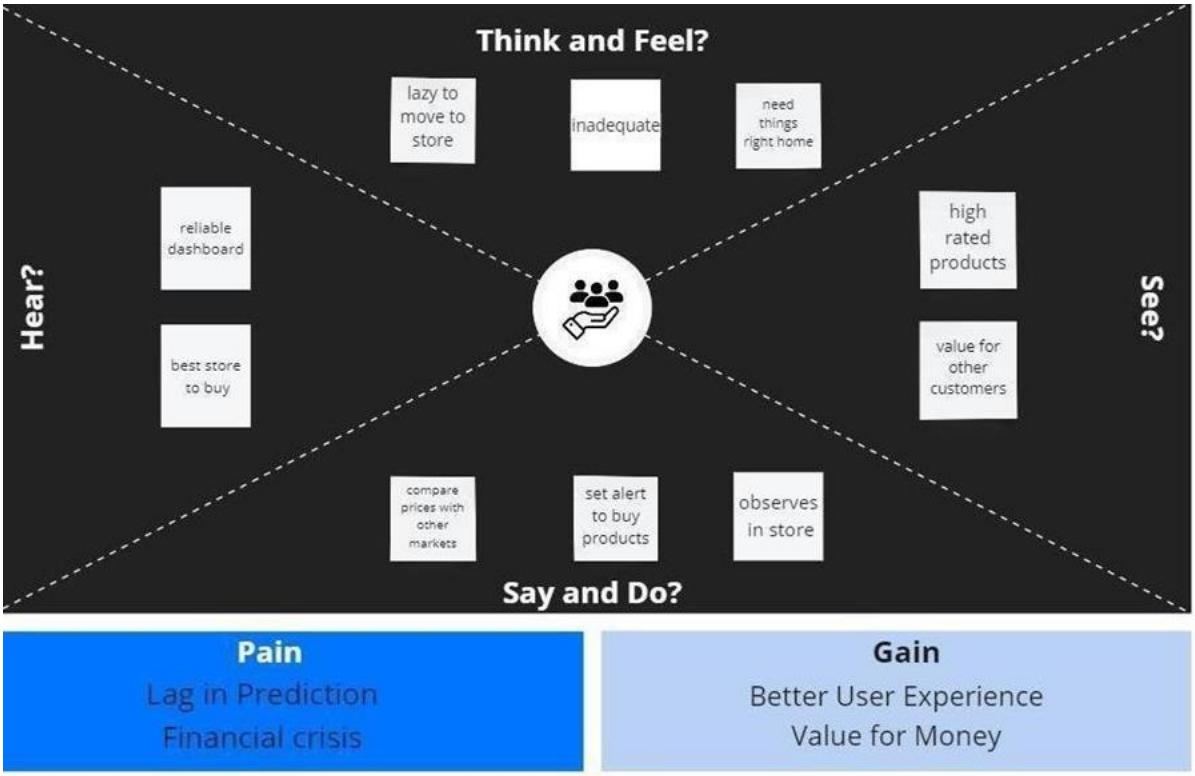
3 IDEATION & PROPOSED SOLUTION

Empathy Map Canvas

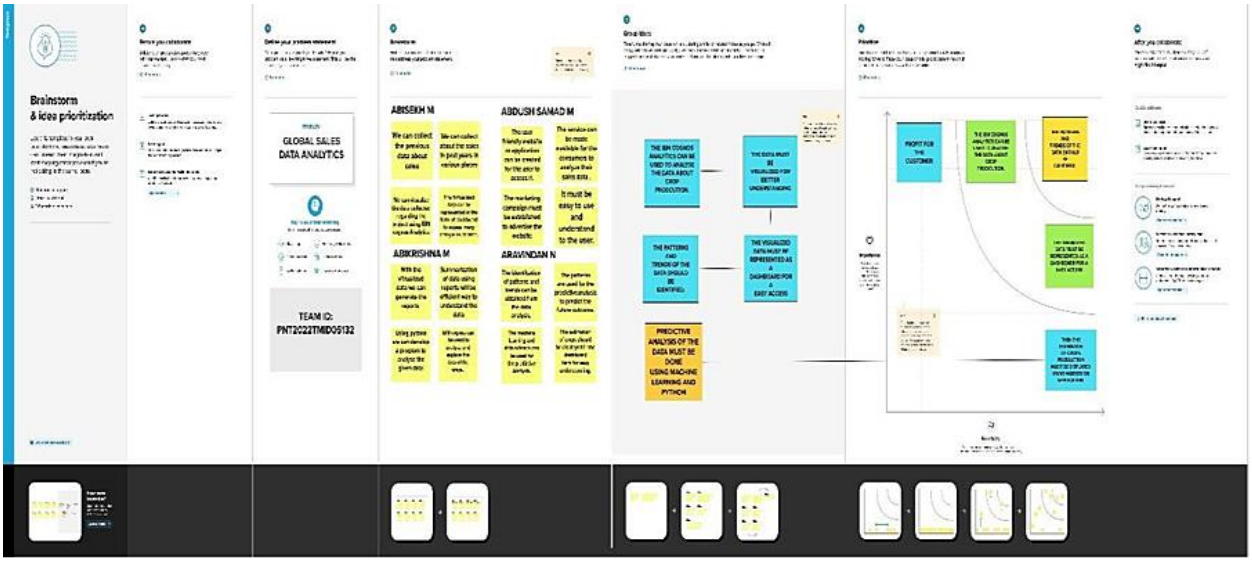
An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviors and attitudes.

It is a useful tool to helps teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

Example:



Ideation & Brainstorming



Key rules of Brainstroming To run a smooth and productive session Stay in topic. Listen to others uDefer judgment. Encourage wild ideas A GO for volume. a If possible, be visual Mogul Pranav P Manibalan B egg Sales analytics refers to the technology and processes used to gather sales data and gauge sales

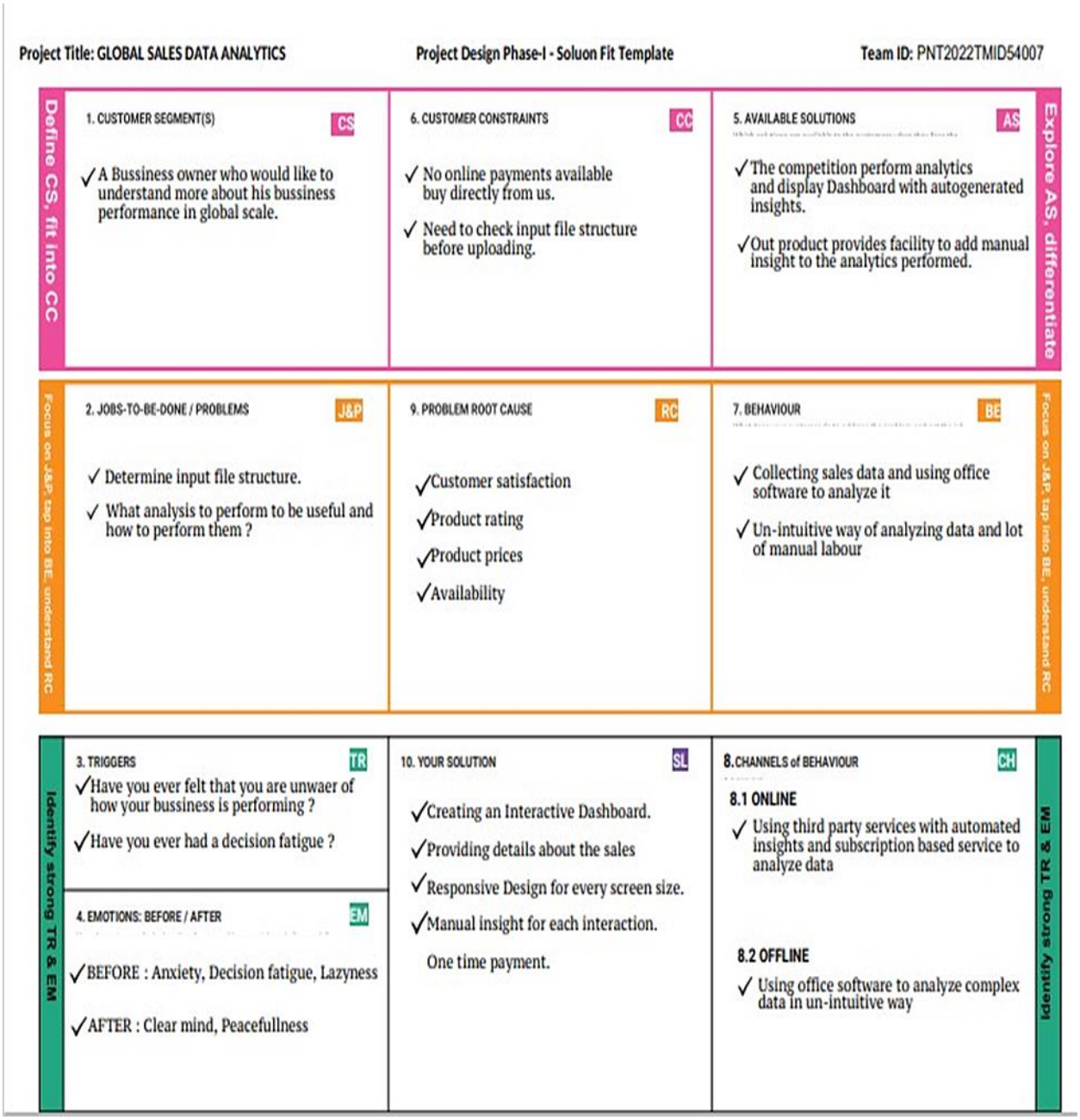
proposed solution

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

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Sales include all the actions involved in the product sale, consumer service and business service. For the sales and marketing team to review their performance data visualization techniques called sales analytics is used. In sales analytics, technology is used to collect and use the sales data to produce productive results and they are in turn used to identify and optimize the sales. Various attributes are used to plan an efficient sales model which will benefit both customer and business.
2.	Idea / Solution description	Developing web application that would take all data and do analysis and give reports for visualization of data in a dashboard to identify trends for future analysis.

3.	Novelty / Uniqueness	During the analysis, extraction of new features will be done. With that, more understanding can be made and we can come up with better decisions which will increase the salesperson's profit.
4.	Social Impact / Customer Satisfaction	This sales data analytics improves the firms sales and future visions. and also Customer should know the available products and nearest location of the shops which gives the idea to customer for purchase.
5.	Business Model (Revenue Model)	basic model: minimal analysis dashboard subscription: reports on future prediction
6.	Scalability of the Solution	the solution will be scalable even when the organisation productivity goes down

problem solution fit



4 REQUIREMENT ANALYSIS

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	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	Create Dashboard	Analysation of the dataset's Key performance indicator
FR-7	Reporting	The reporting function helps users have complete control over their business. The real-time reporting collects current information and displays the data on an intuitive user interface.

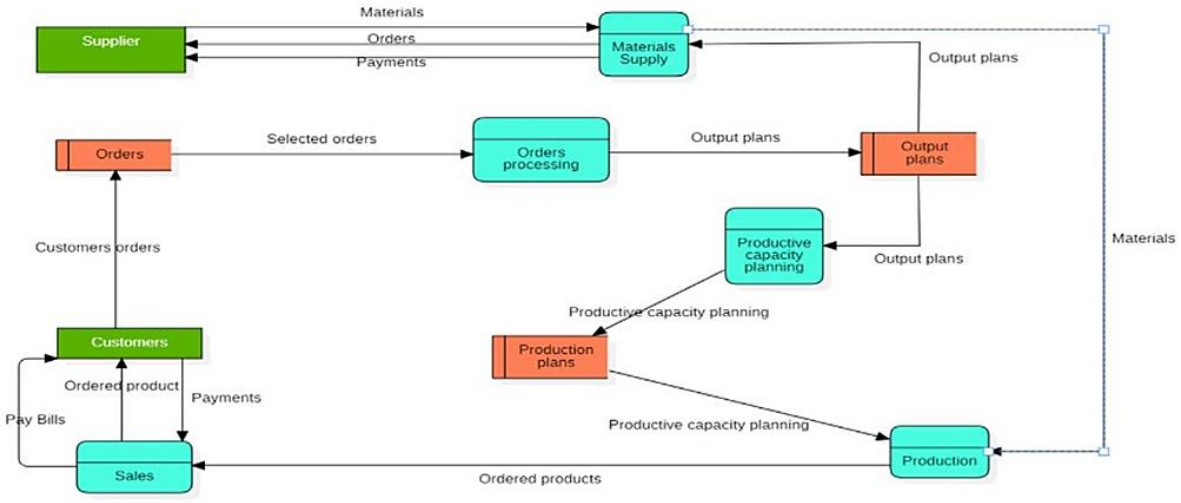
Non-Functional requirements

Following are the Non functional requirements of the proposed solution

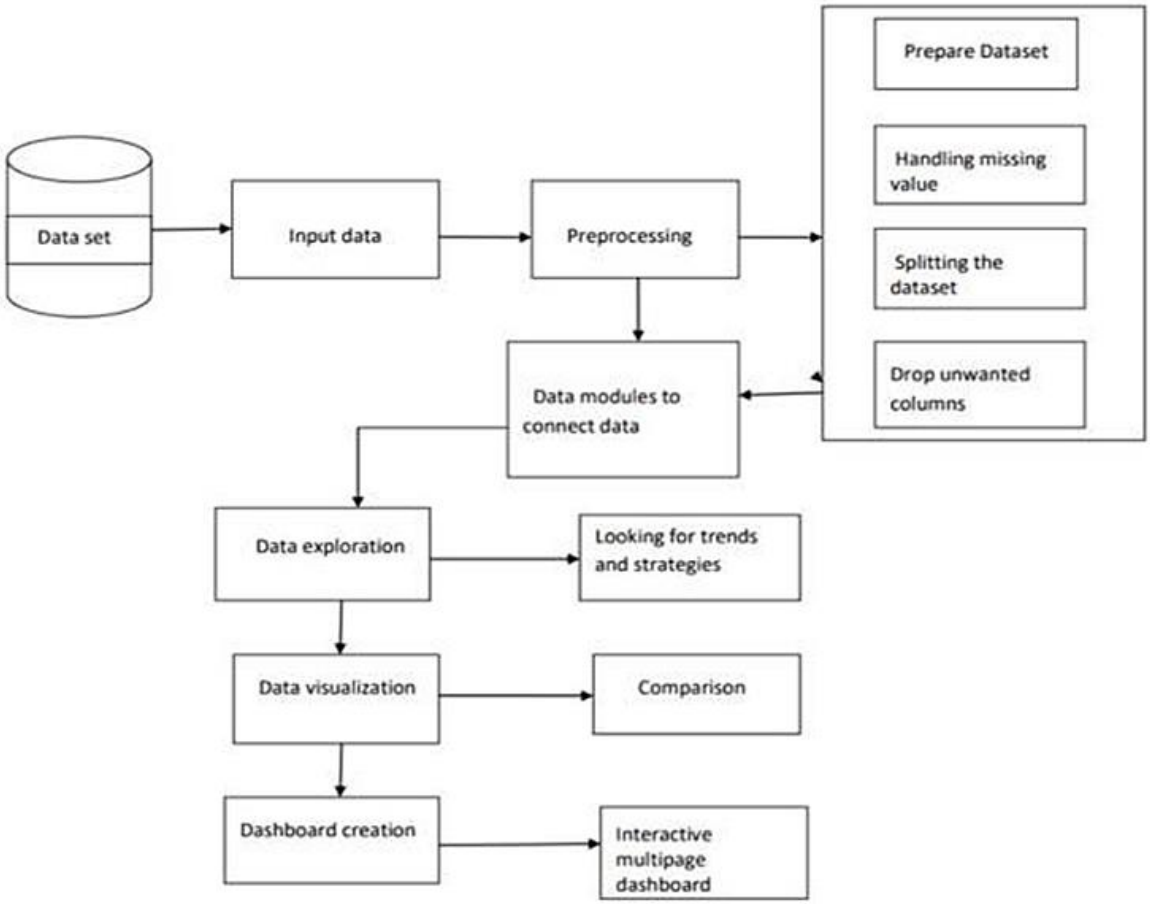
NFR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	It should be easier to understand the insights for the customers.
NFR-2	**Security**	The data is protected from unauthorized access.
NFR-3	**Reliability**	App could be run offline while server maintenance takes place. Server traffic would not 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**	Dashboards/Templates are very much Scalable, the user can modify the metrics whenever they want.

5 PROJECT DESIGN

Data Flow Diagram



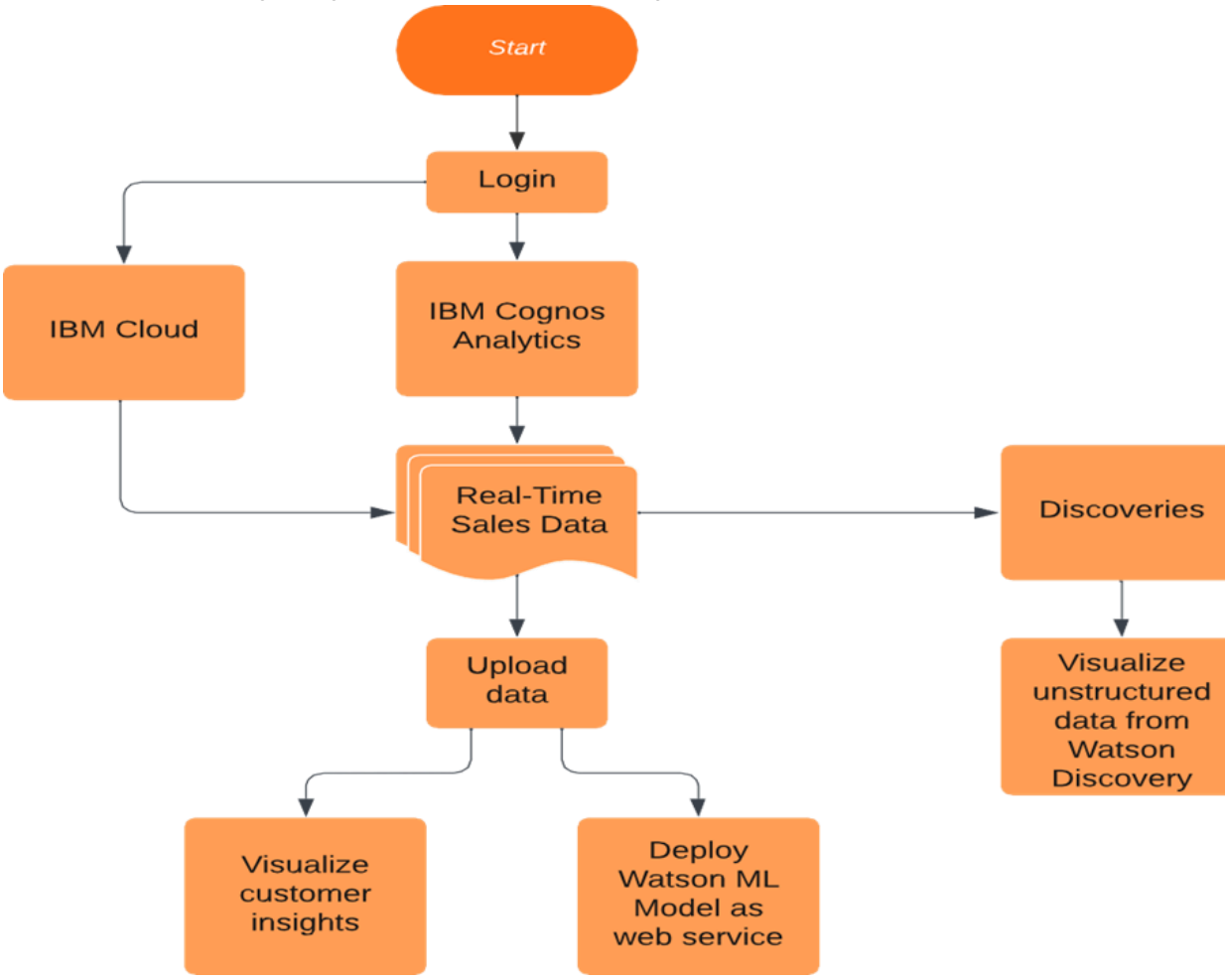
Solution & Technical Architecture



Solution Architecture: Solution architecture for Global Sales Data Analytics consists of the following.

1. Users must authenticate themselves using the device.
2. Data to be gathered include sales data and customer data.
3. Data cleaning to remove empty and duplicate data.
4. IBM Cognos Analytics with Watson is IBM's cloud analytics platform used.
5. Data must be submitted and then prepared before being linked to relationships. • Our user interface is provided with integration with Cognos analytics.

Architecture and data flow of the Global Sales Data Analytics



6 Project Planning & Scheduling

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	Abikrishna M, Abhishek M
Sprint-2	Dashboard	USN-2	As a user, I can enter my sales information to clean it up and get it ready for analysis, and I can also locate my information to perform a business analysis.	3	High	Aravindan N, Abdush Samad M
Sprint-3	Customer Care	USN-3	As a user, I can enter my sales information to clean it up and get it ready for analysis, and I can also locate my information to perform a business analysis.	2	Low	Aravindan N, Abikrishna M, Abdush Samad M
Sprint-4	Administrator	USN-4	As an admin, I can modify the user interface to meet the needs of the users.	3	High	Aravindan N, Abdush Samad M, Abikrishna M, Abhishek M

IBM Cognos Analytics:

Create a Cognos Analytics account and login using the respective credentials.

Download the Dataset:

https://www.kaggle.com/apoorvaappz/global-super-store-dataset

The Global Super Store Dataset is downloaded from Kaggle and observed.

Analyzing the dataset:

Except the postal code column, there are no missing values in the dataset.

Uploading the dataset:

Upload Global_Superstore.csv file in Cognos Analytics with Watson.

Understanding the dataset:

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	7	6	24 Oct 2022	14 Oct 2022	7	29 Oct 2022
Sprint-2	5	6	31 Oct 2022	15 Nov 2022	5	05 Nov 2022
Sprint-3	3	6	07 Nov 2022	18 Nov 2022	3	12 Nov 2022
Sprint-4	5	6	4 Nov 2022	19 Nov 2022	5	19 Nov 2022

Preparing the dataset:

1. Once the data is loaded, it needs to be cleaned and processed.
2. Prepare calculations of year, month and day fields and create related navigation paths.
3. Create a few more calculations – target sales, min sales range, max sales range and mid sales range.

Data cleaning and Data Pre-Processing:

Removing the null values

Data Calculations:

Create calculation to make the data prepared.

1. Extracting year from order date column.

2. Extracting month from order date column.

3. Extracting day from order date column.

4.Creating calculation for target sales.

Explore the data:

Explore the data and create relationships among the data.

7 CODING & SOLUTION

Database Schema

Build the following

visualizations

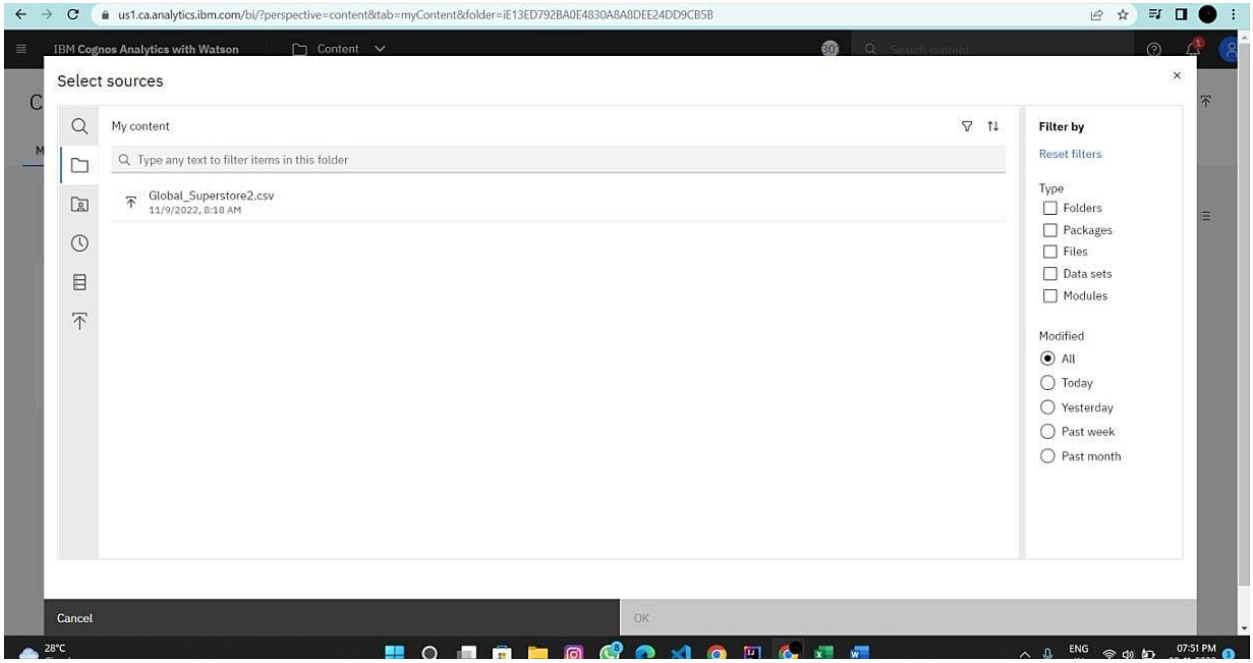
Global Superstore

Data Upload.

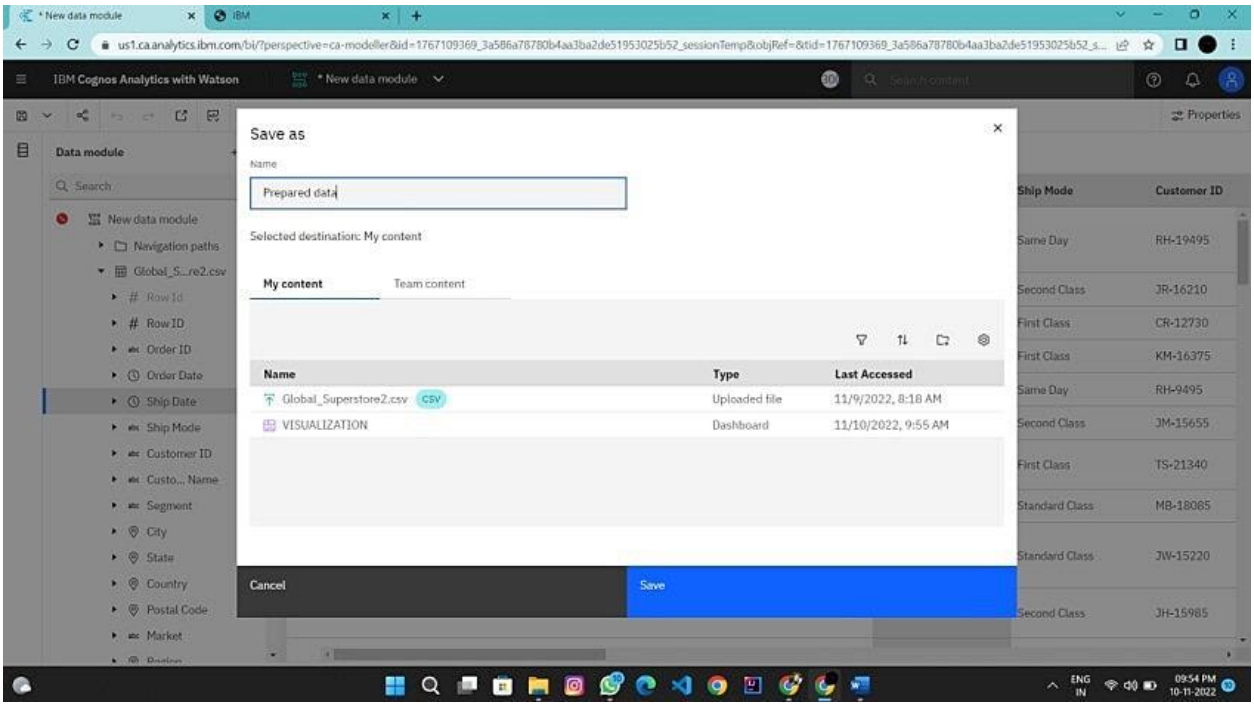
1. Global Superstore Data Prep.
2. Date Calculations and Navigation path.
3. Segment wise Sales, Profit and Qty.
4. Use Pie to showcase Sales by Order Priority and Sales by Market.
5. Use a Tree Map to present Sales by Sub-Category
6. Using a Bar chart present Sales by Region by the Sales Order.
7. Present Regional Sales using Map Country points -- Showcase Top 10 countries.
8. Present Sales (Bar), Profit (line) by Sub-Category using Line and Column Chart.
9. Sales vs Profit Scatter Plot with Sub-Category points and Region in Colour.
10. Sales and Profit Forecast by Month Country as Region and Region as Filter.
11. Sales vs Profit forecast by Month by Order Priority.
12. Show the Min, Max, and Avg Sales by Sub-Category using the Box plot.
13. By setting a 10% extra Target for Sales Present Segment-wise Sales use Bullet Chart.
14. Present Sales using Hierarchy Bubbles by Market / Region.
15. Using a Legacy Map Present Sales vs Profit by Country / Region.
16. Showcase Quantity Sold by Radar Chart across various Regions.
17. Present Monthly Sales by Sub-Category using Waterfall chart.

18. Present Sales Vs Profit of Countries by Word Cloud.
19. Sales dashboard with Summary Cards.

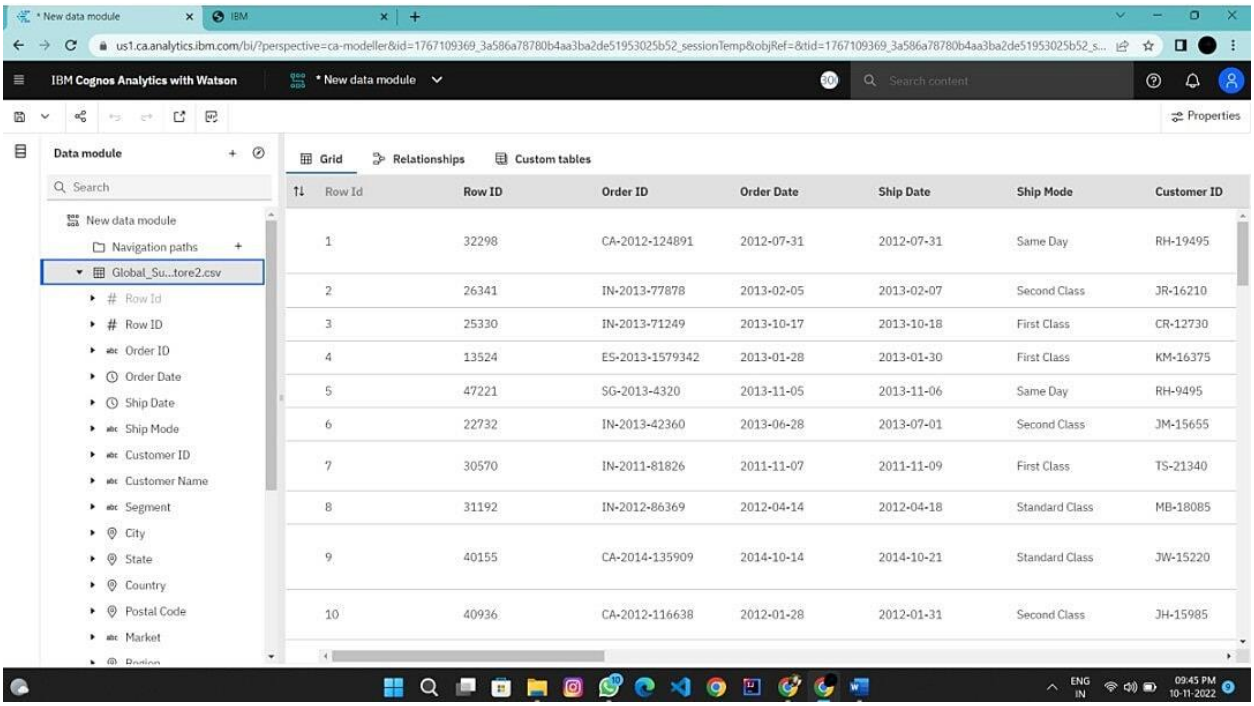
Global Superstore Data Upload



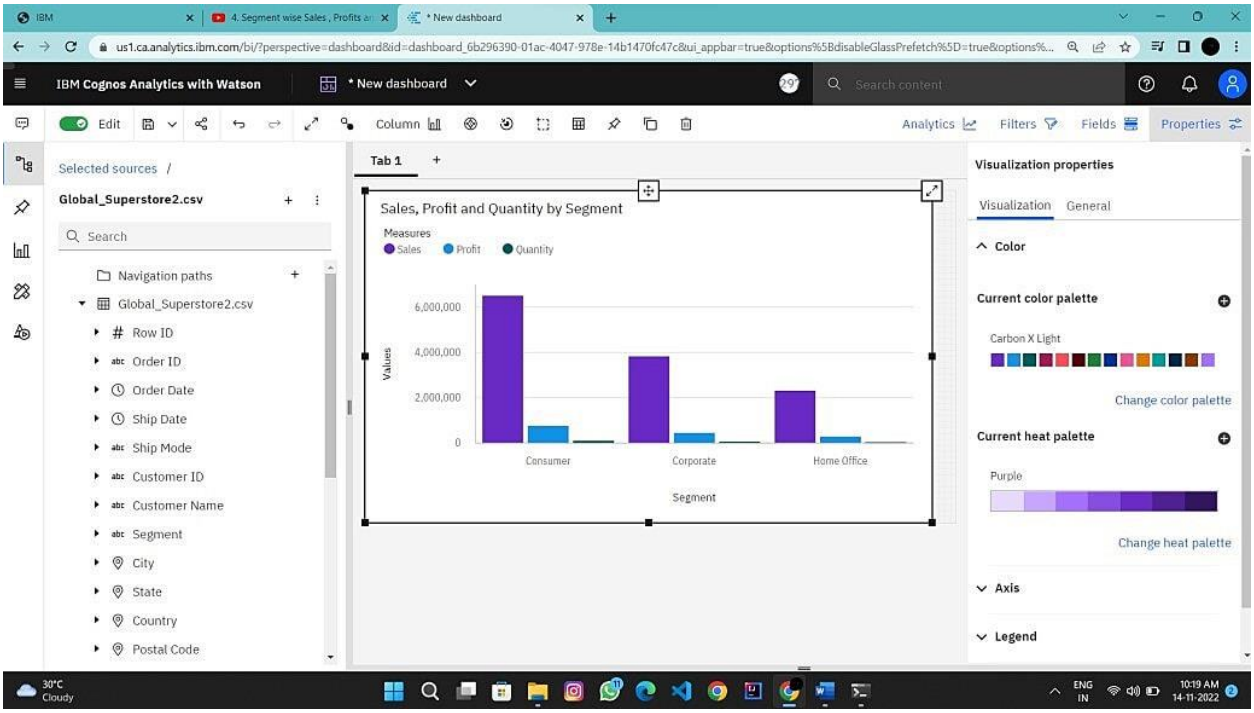
Global Superstore Data Prep



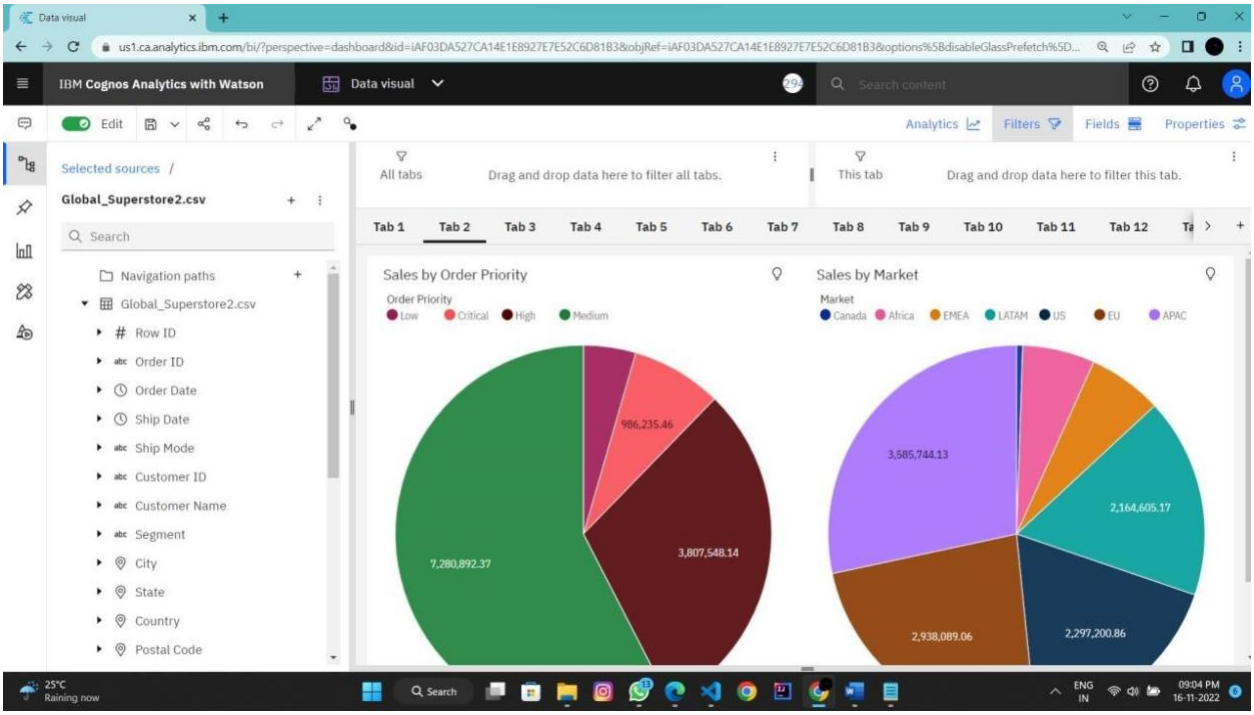
Date Calculations and Navigation path



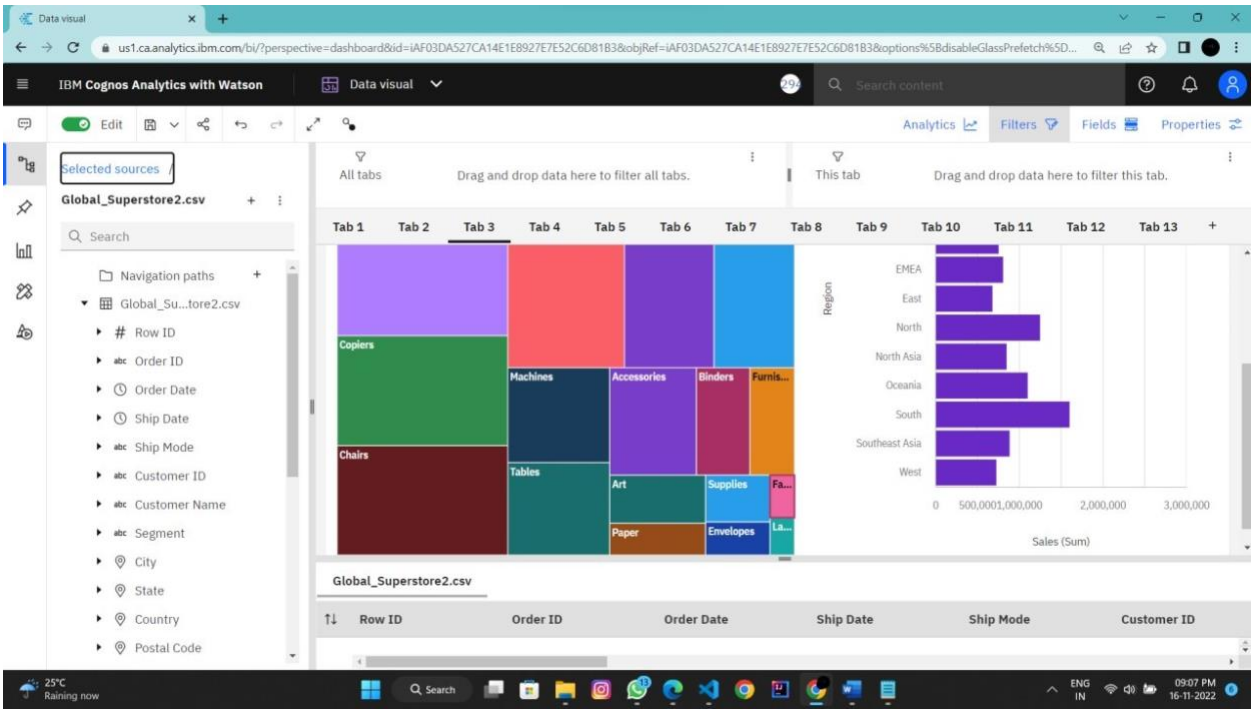
Segment wise Sales, Profit and Qty



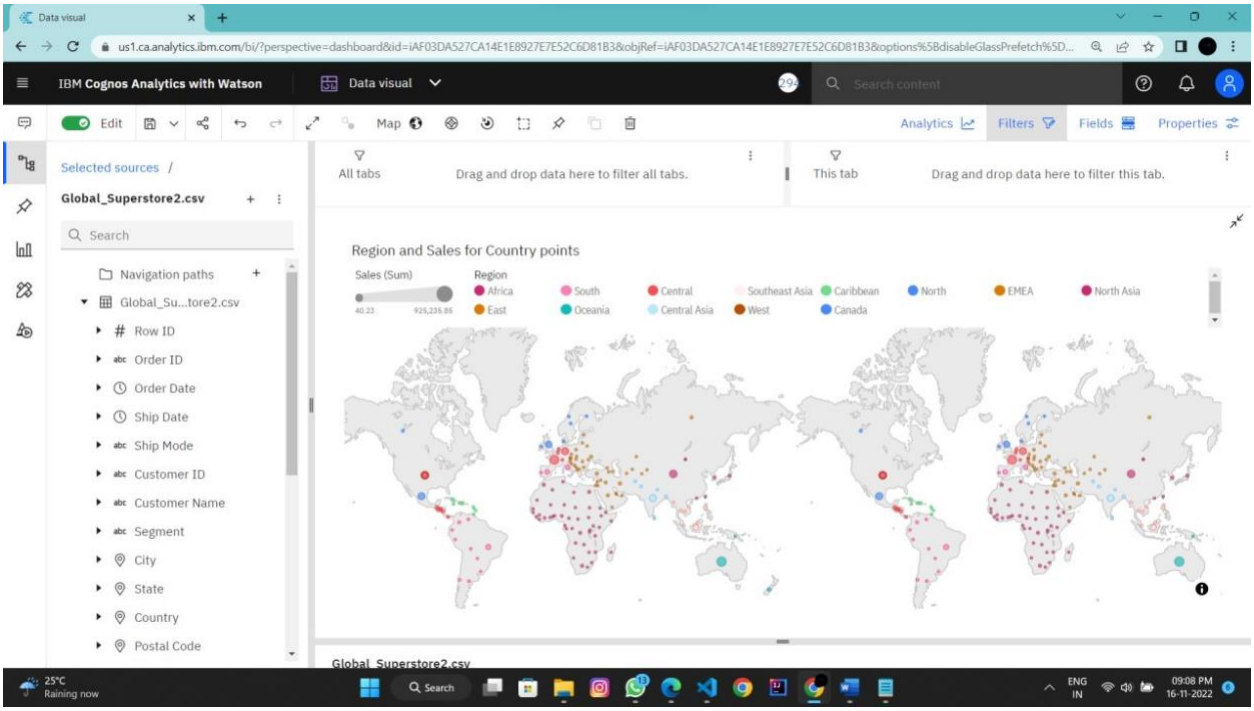
Use Pie to showcase Sales by Order Priority and Sales by Market



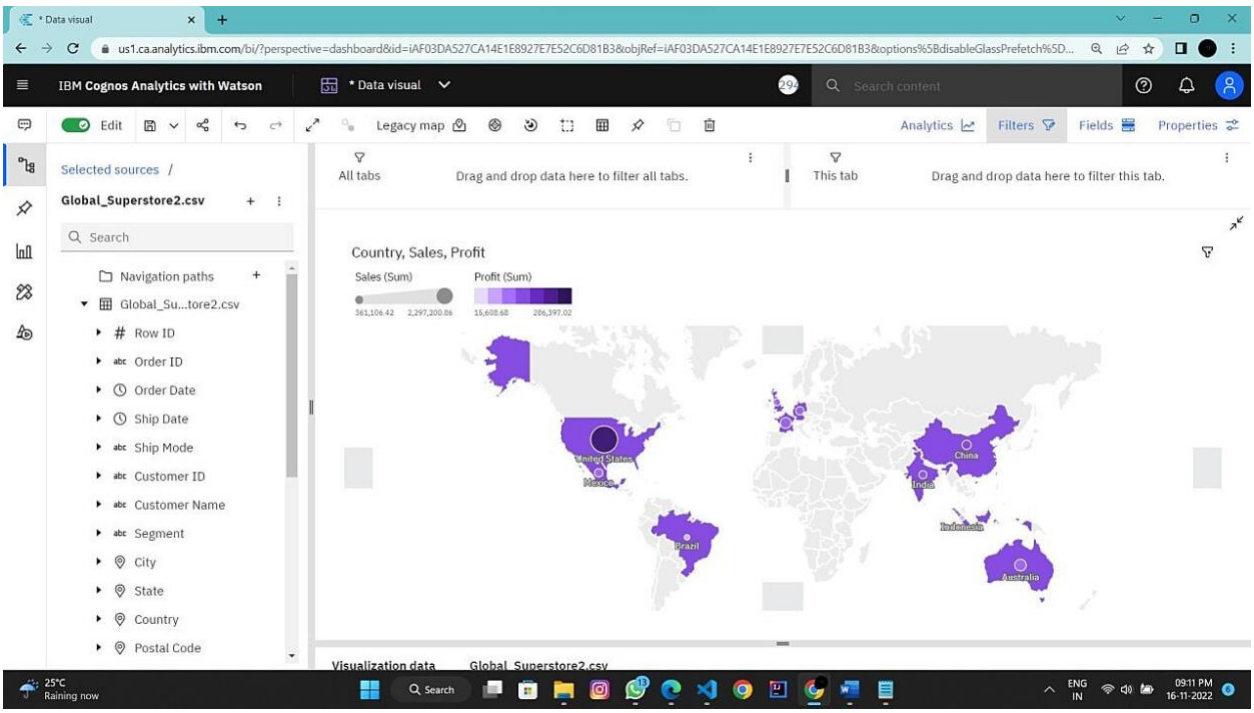
Use a Tree Map to present Sales by Sub-Category



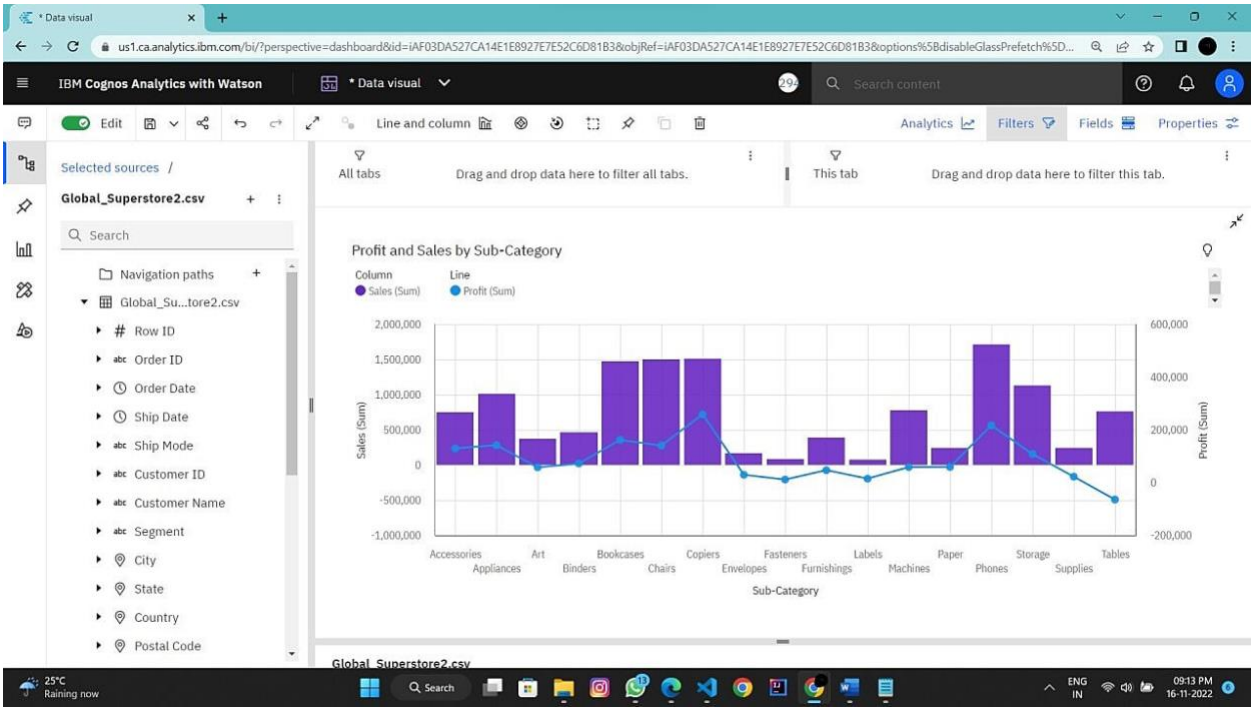
Using a Bar chart present Sales by Region by the Sales Order



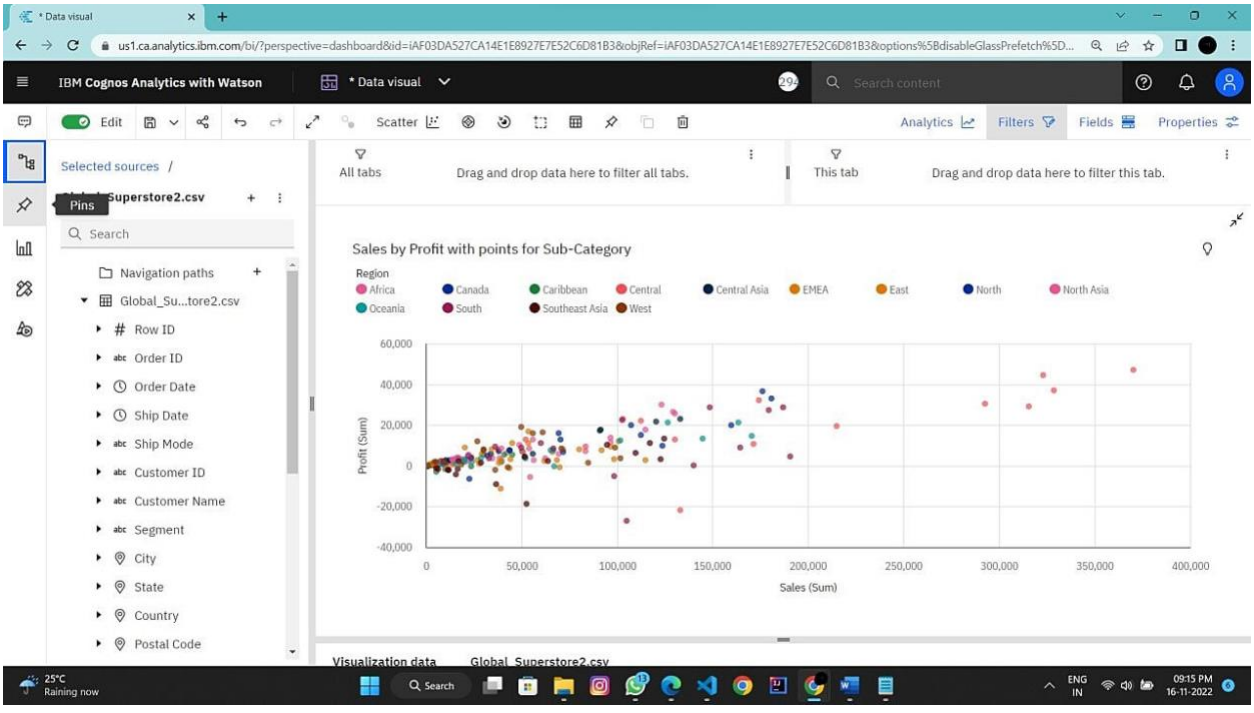
Regional Sales using Map Country points



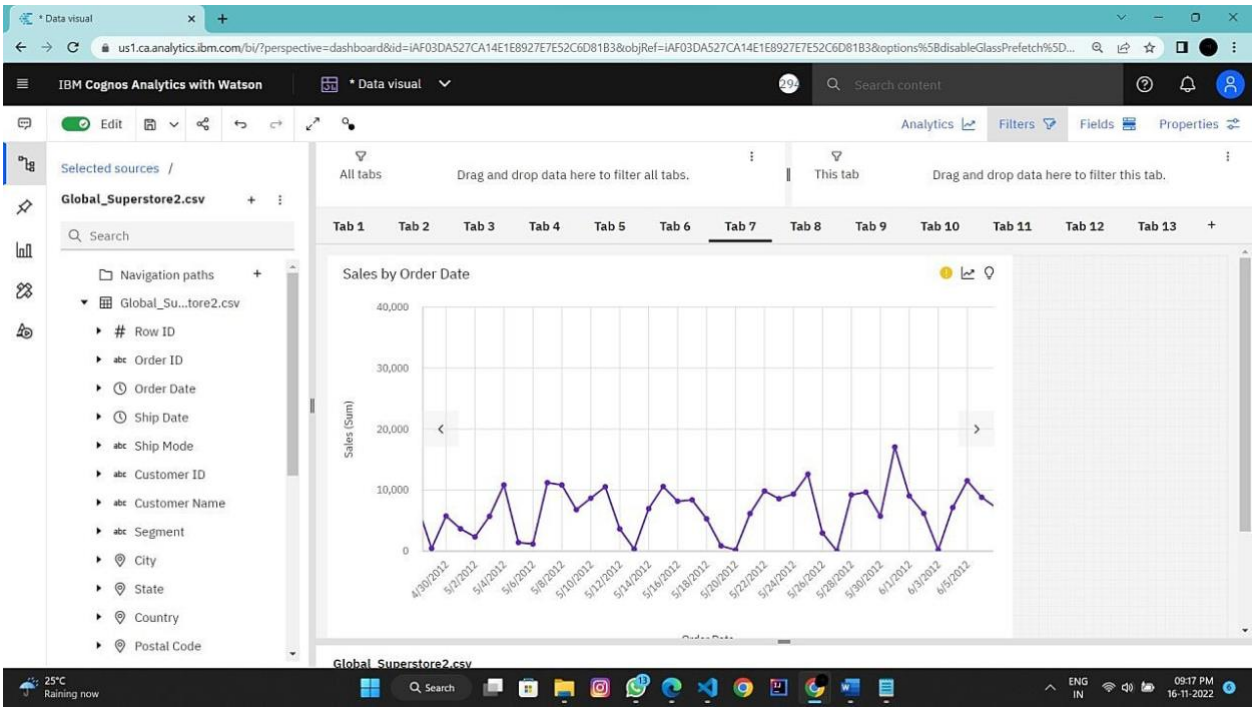
Sales (Bar), Profit (line) by Sub-Category



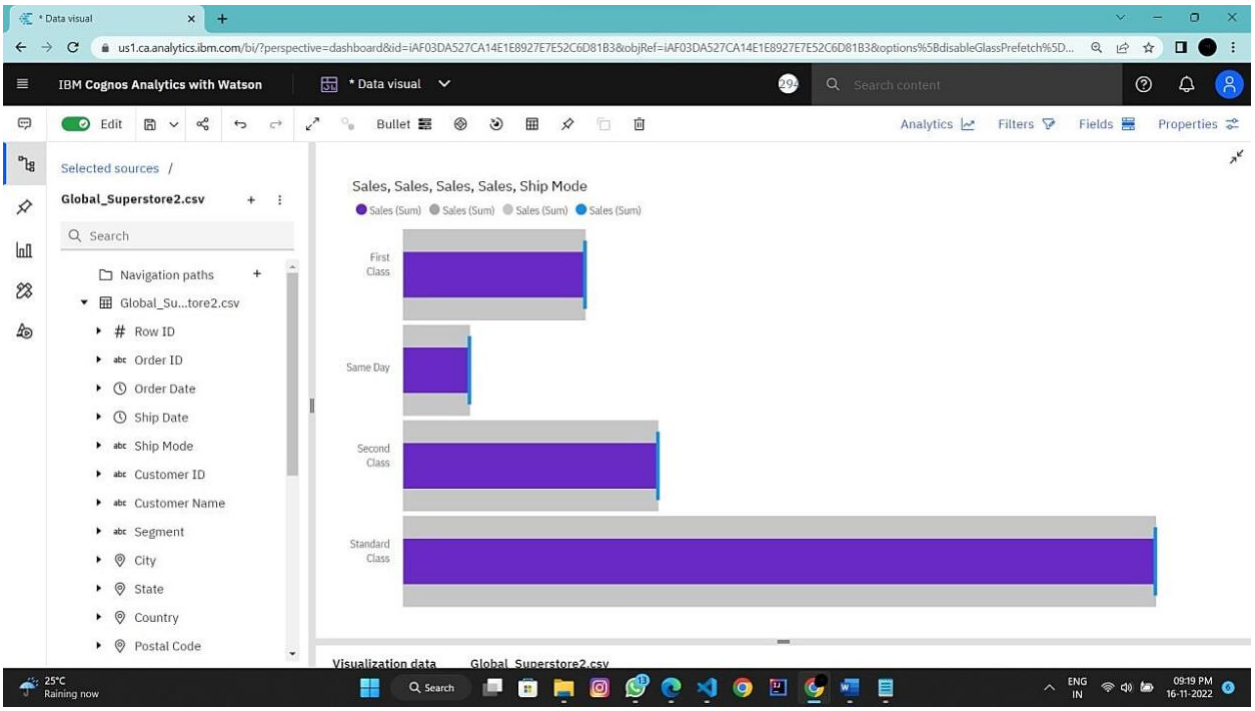
Sales vs Profit Scatter Plot with Sub-Category points



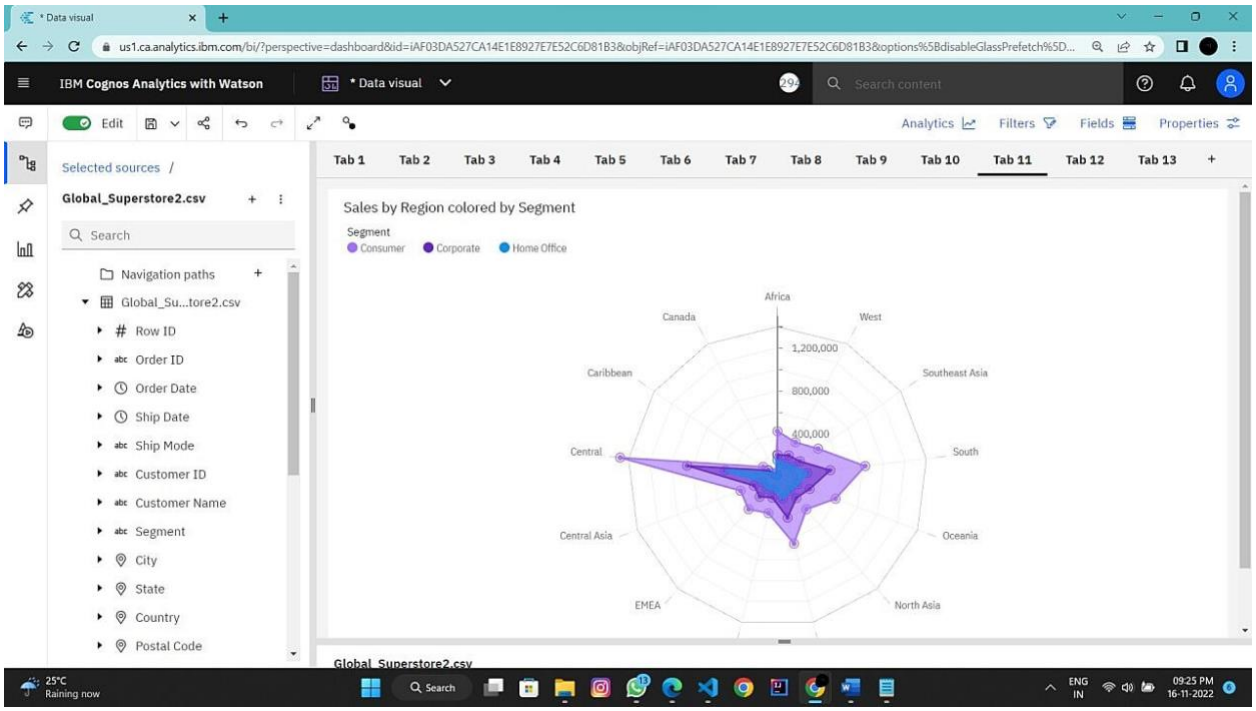
Sales vs Profit forecast by Month by Order Date



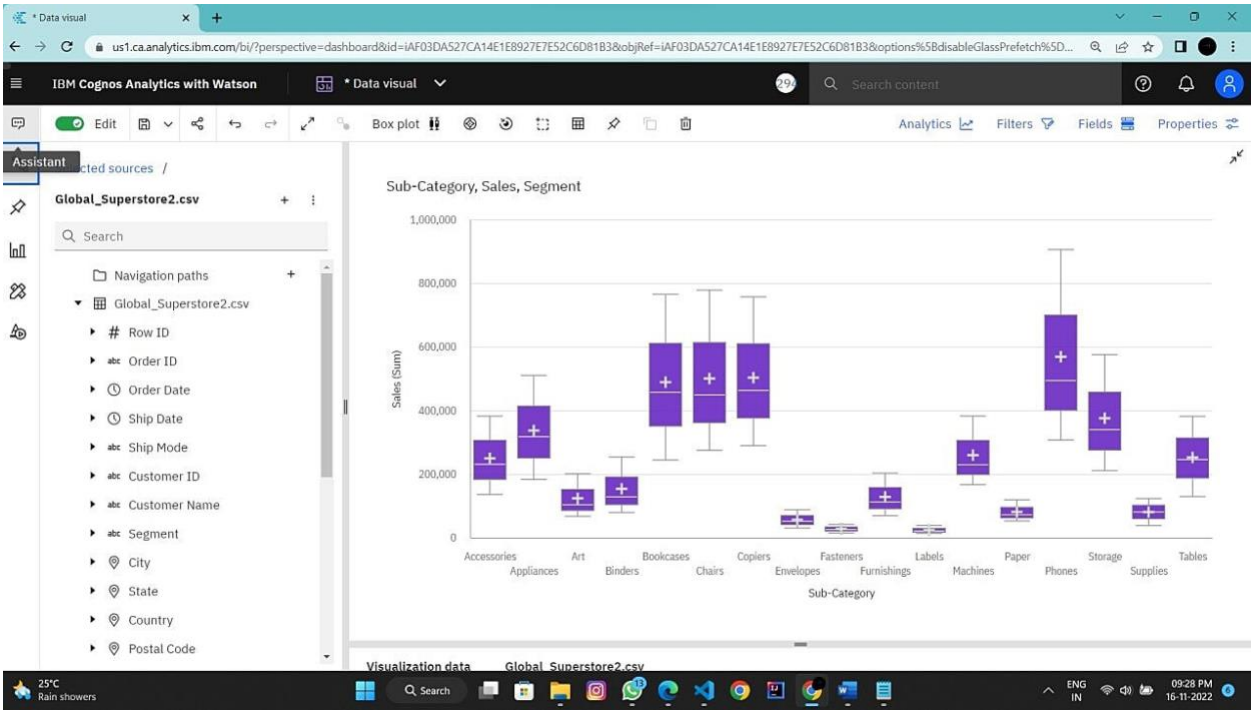
Target For Sales Present Segement Wise Sales Using Bullet Chart



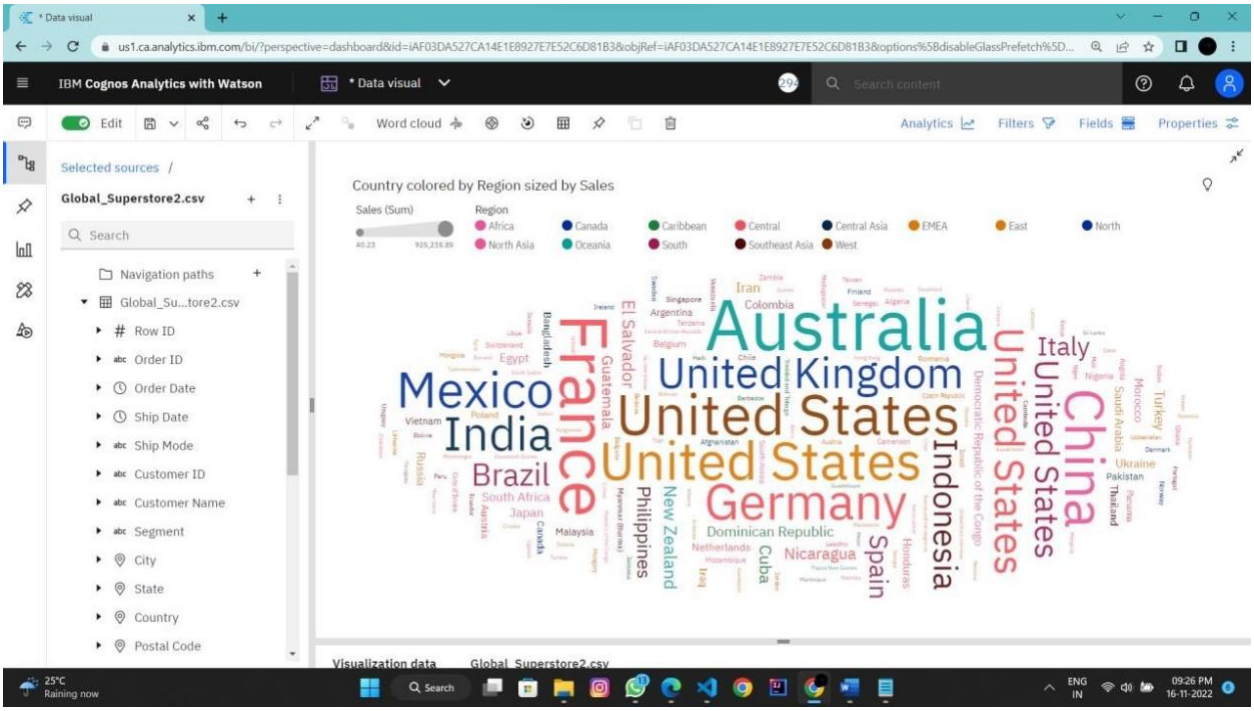
Radar Chart across various Regions



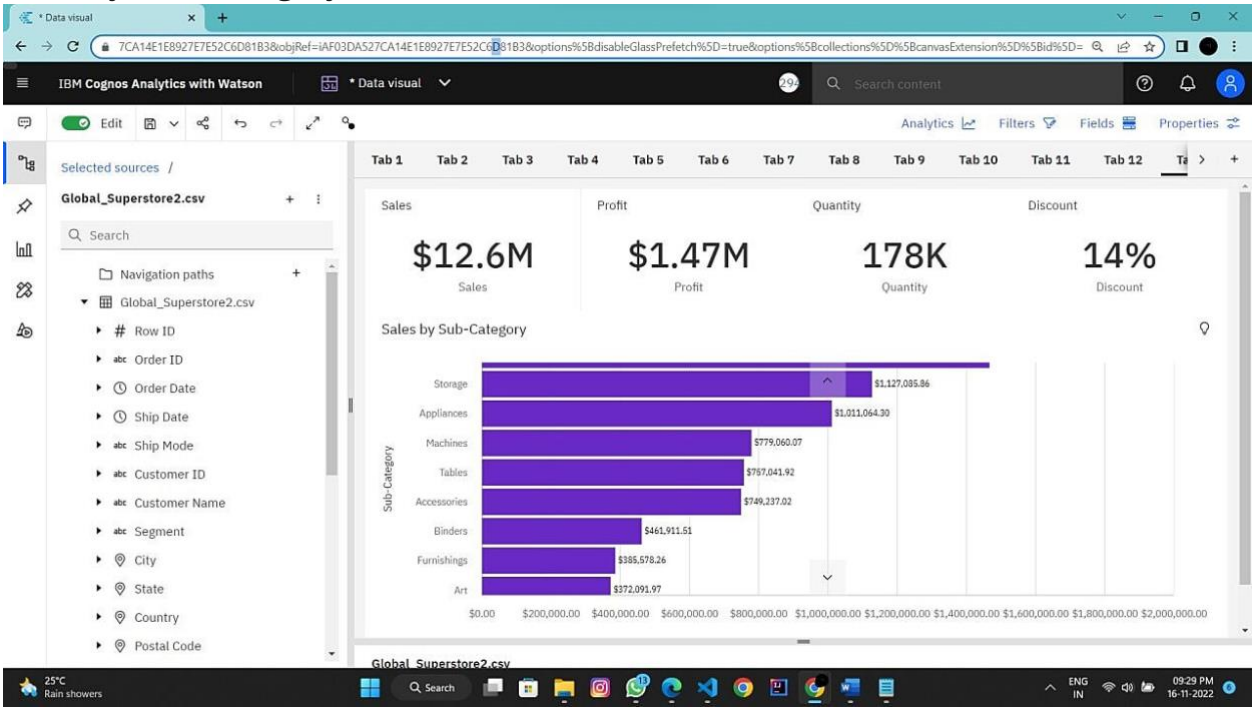
Show the Min, Max, and Avg Sales by Sub-Category using the Box plot



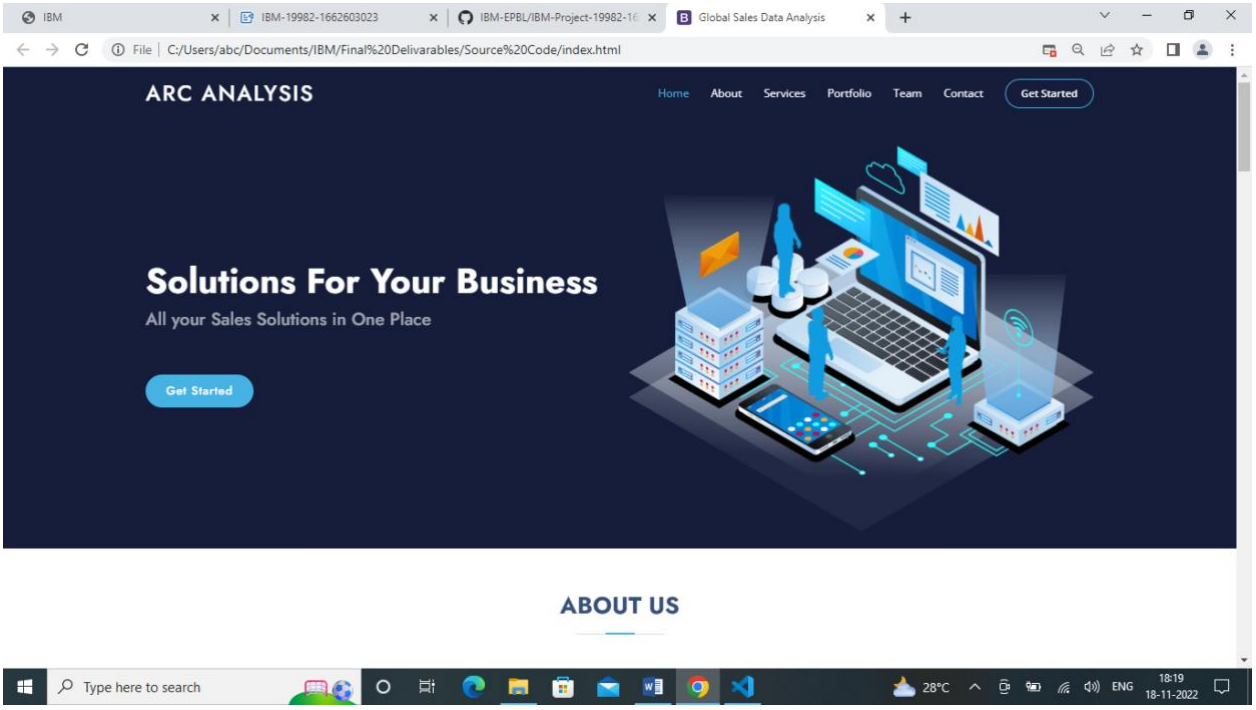
Country Colored by Region sized by Sales

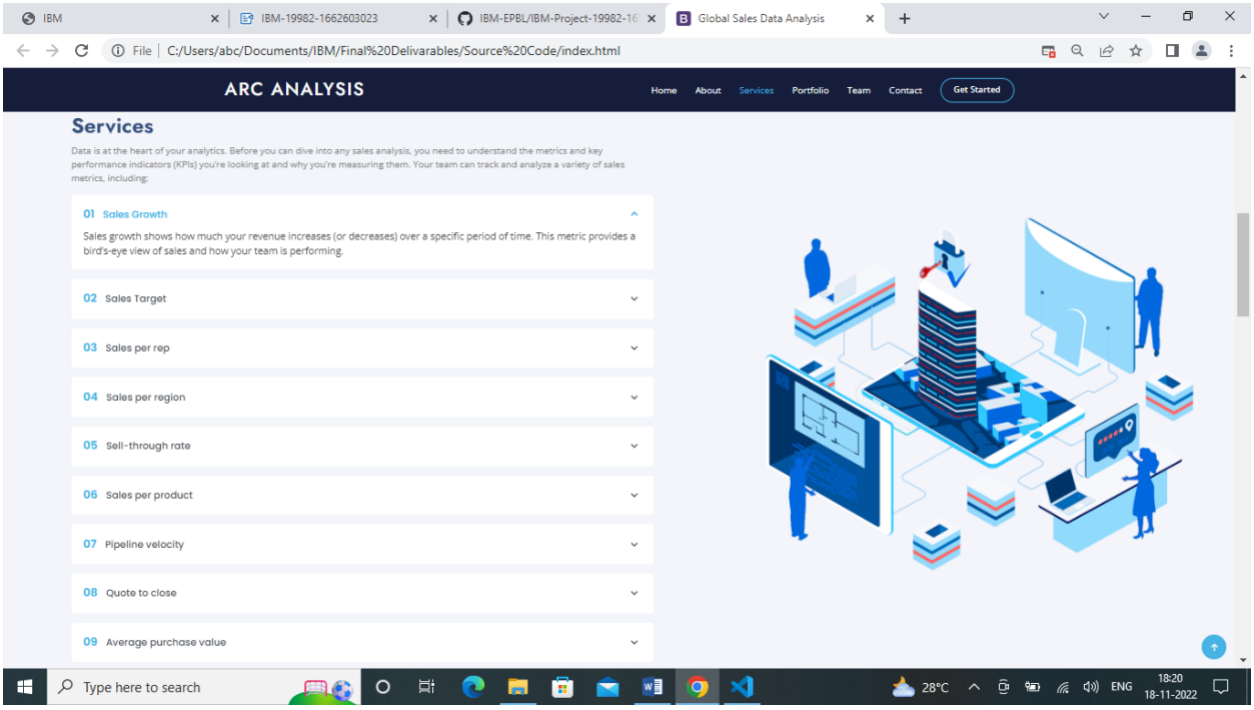


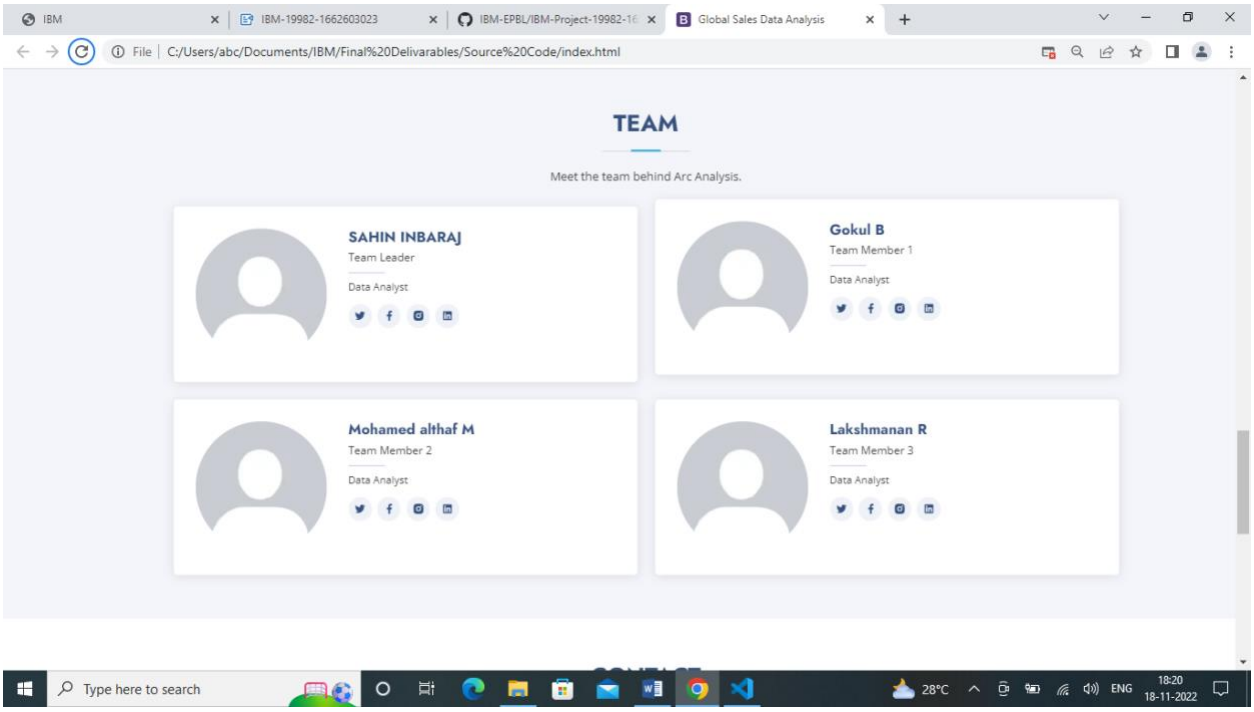
Sales by Sub-Category

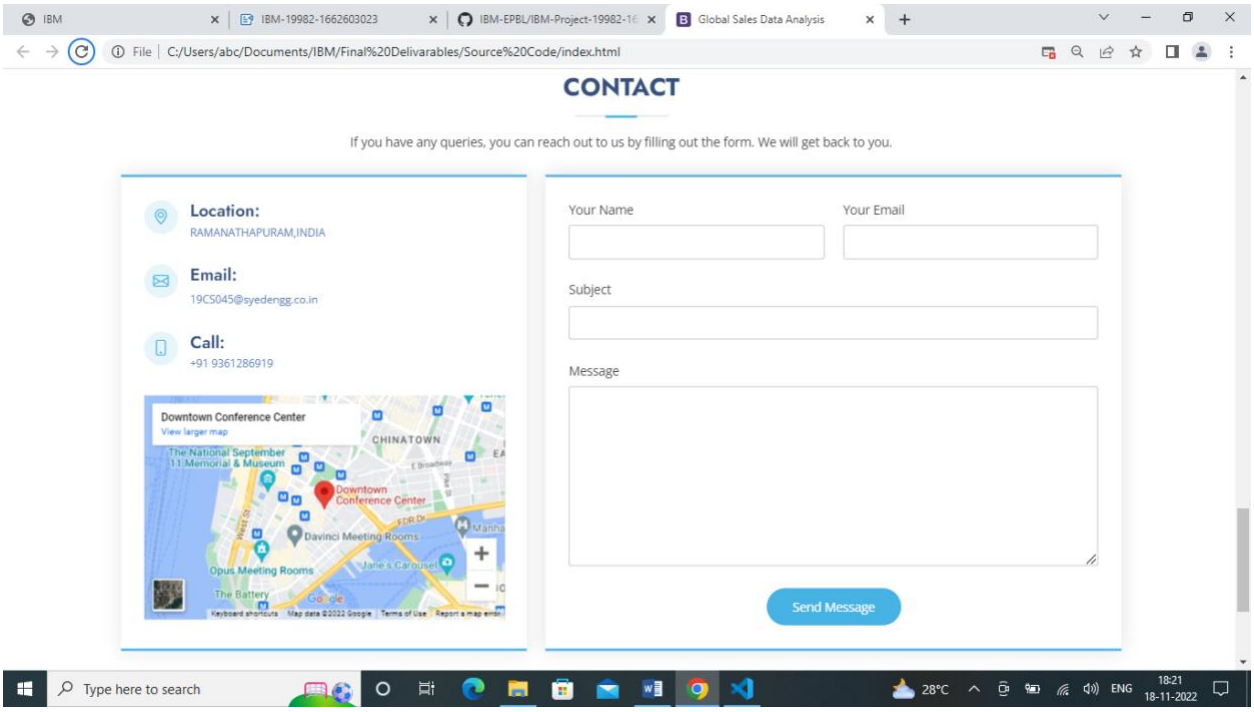


WebPage


IBM
IBM-19982-1662603023
IBM-EPBL/IBM-Project-19982-16
Global Sales Data Analysis
File | C:/Users/abc/Documents/IBM/Final%20Delivarables/Source%20Code/index.html
ARC ANALYSIS
Home
About
Services
Portfolio
Team
Contact
Get Started
Solutions For Your Business
All your Sales Solutions in One Place
Get Started
ABOUT US
Type here to search
28°C
ENG
18:19
18-11-2022


IBM
IBM-19982-1662603023
IBM-EPBL/IBM-Project-19982-16
Global Sales Data Analysis
File | C:/Users/abc/Documents/IBM/Final%20Delivarables/Source%20Code/index.html
ARC ANALYSIS
Home
About
Services
Portfolio
Team
Contact
Get Started
Services
Data is at the heart of your analytics. Before you can dive into any sales analysis, you need to understand the metrics and key performance indicators (KPIs) you're looking at and why you're measuring them. Your team can track and analyze a variety of sales metrics, including:
01 Sales Growth
Sales growth shows how much your revenue increases (or decreases) over a specific period of time. This metric provides a bird's-eye view of sales and how your team is performing.
02 Sales Target
03 Sales per rep
04 Sales per region
05 Sell-through rate
06 Sales per product
07 Pipeline velocity
08 Quote to close
09 Average purchase value
Type here to search
28°C
ENG
18:20
18-11-2022


IBM
IBM-19982-1662603023
IBM-EPBL/IBM-Project-19982-16
Global Sales Data Analysis
File | C:/Users/abc/Documents/IBM/Final%20Delivarables/Source%20Code/index.html
TEAM
Meet the team behind Arc Analysis.
SAHIN INBARAJ
Team Leader
Data Analyst
Gokul B
Team Member 1
Data Analyst
Mohamed althaf M
Team Member 2
Data Analyst
Lakshmanan R
Team Member 3
Data Analyst
Type here to search
28°C
ENG
18:20
18-11-2022


IBM
IBM-19982-1662603023
IBM-EPBL/IBM-Project-19982-16
Global Sales Data Analysis
File | C:/Users/abc/Documents/IBM/Final%20Delivarables/Source%20Code/index.html
CONTACT
If you have any queries, you can reach out to us by filling out the form. We will get back to you.
Location:
RAMANATHAPURAM,INDIA
Email:
19CS045@syedengg.co.in
Call:
+91 9361286919
Downtown Conference Center
View larger map
CHINATOWN
The National September 11 Memorial & Museum
Davinci Meeting Rooms
Opus Meeting Rooms
The Battery
Your Name
Your Email
Subject
Message
Send Message
Type here to search
28°C
ENG
18:21
18-11-2022

8 RESULT

Performance Metrics

This dashboard is created to understand a few things like, Customer Analysis and Product Analysis of the Global Super Store. This can be achieved by hearing out to the consumers and collecting their user preference data So that purchasing power will increase and beneficiary for both retailers and consumers.

9 ADVANTAGES & DISADVANTAGES

ADVANTAGES

1. purchasing power will increase and beneficiary for both retailers and consumers.
2. IBM Cognos analytics helps in building the dashboard and creating the exploration.

DISADVANTAGES

3. A little bit confusing to choose the type of exploration

10 FUTURE SCOPE

Sales analytics refers to the use of technology to collect and use sales data to derive actionable insights. It is used to identify, optimize, and forecast sales. It uses different metrics and KPIs to plan an efficient sales model that generates higher revenue for the business

This dashboard is a responsive dashboard, so as we update the csv file uploaded in the IBM Cognos dashboard updates automatically so that this dashboard can be utilized in future also.

This dashboard is also having forecast exploration which enables to predict future sale

11 CONCLUSION

By implementing this analytics solution, the company brought their competitive and sales data reporting in-house, cut costs and increased the accuracy of their reporting and analysis. As the company moves forward with this new solution, their sales reporting costs will most likely be reduced by 50 to 70%. They are now able to analyze raw data themselves, respond more quickly to changes in market trends and perform root cause analysis to determine those shifts in the market. By securing quicker access to their data with the new solution, the company was also able to reduce the risk associated with delayed responses to changes in their markets.

With the new solution, the company can now process sales reports faster than the outsourced solution, reducing turnaround time between 50% to 60%. The reporting needs of the company have been streamlined, consolidating over 10 reports into the centralized dashboard solution. The company's competitive analysis group is also able to more quickly respond to internal data requests given they have the ability to pull the information themselves. With this quicker response, the company is better able to react to changes in the market and predict opportunities for its sales force. The business also experienced an increase in the overall understanding of their sales data throughout the organization. The company now has great flexibility in the presentation of their sales and competitive data, while also being able to integrate sales data with other key data points for the organization