DATA ANALYTICS EXTERNSHIP

BICYCLE SALES ANALYTICS USING IBM COGNOS

PROJECT REPORT

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1. INTRODUCTION

OVERVIEW :

Adventure Works is a sample database created for use in demos and training on each version of Microsoft SQL Server.The name Adventure Works refers to a fictitious large, multinational bicycle manufacturing company.

"The company manufactures and sells metal and composite bicycles to North American, European and Asian commercial markets. While its base operation is located in Washington with 290 employees, several regional sales teams are located throughout their market base. In 2000, Adventure Works Cycles bought a small manufacturing plant, in Mexico. This manufactures several critical subcomponents for the Adventure Works Cycles product line.

In 2001, they became the sole manufacturer and distributor of the touring bicycle product group. Coming off a successful fiscal year, Adventure Works Cycles is looking to broaden its market share by targeting their sales to their best customers, extending their product availability through an external Web site, and reducing their cost of sales through lower production costs" . Goal of this problem statement is to find and provide various Sales Analytics for the improvement of the Organization.

PURPOSE :

- Know Fundamental concepts and can work on Cognos Analytics
- Able to Analyze the given problem using Forecasting, Trend Lines
- Build Scatter and Density Plots, Correlation Matrix.
- Gain a broad understanding of plotting different graphs
- Able to create meaningful dashboards

2. LITERATURE SURVEY

EXISTING PROBLEM :

• If we are finding unusual patterns within our data analysis or our statistical significance is not strong enough, we might not have enough data to make valid conclusions.

• Without doing data analysis, we won't get the opportunity to evaluate the data before making actionable plans.

• Data is meaningless without context and without context, we cannot turn data into information.

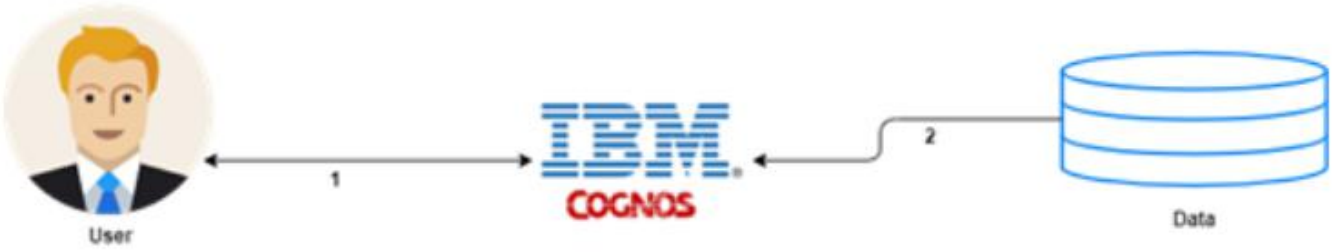
• Information is useless without being able to apply to something.

PROPOSED SOLUTION :

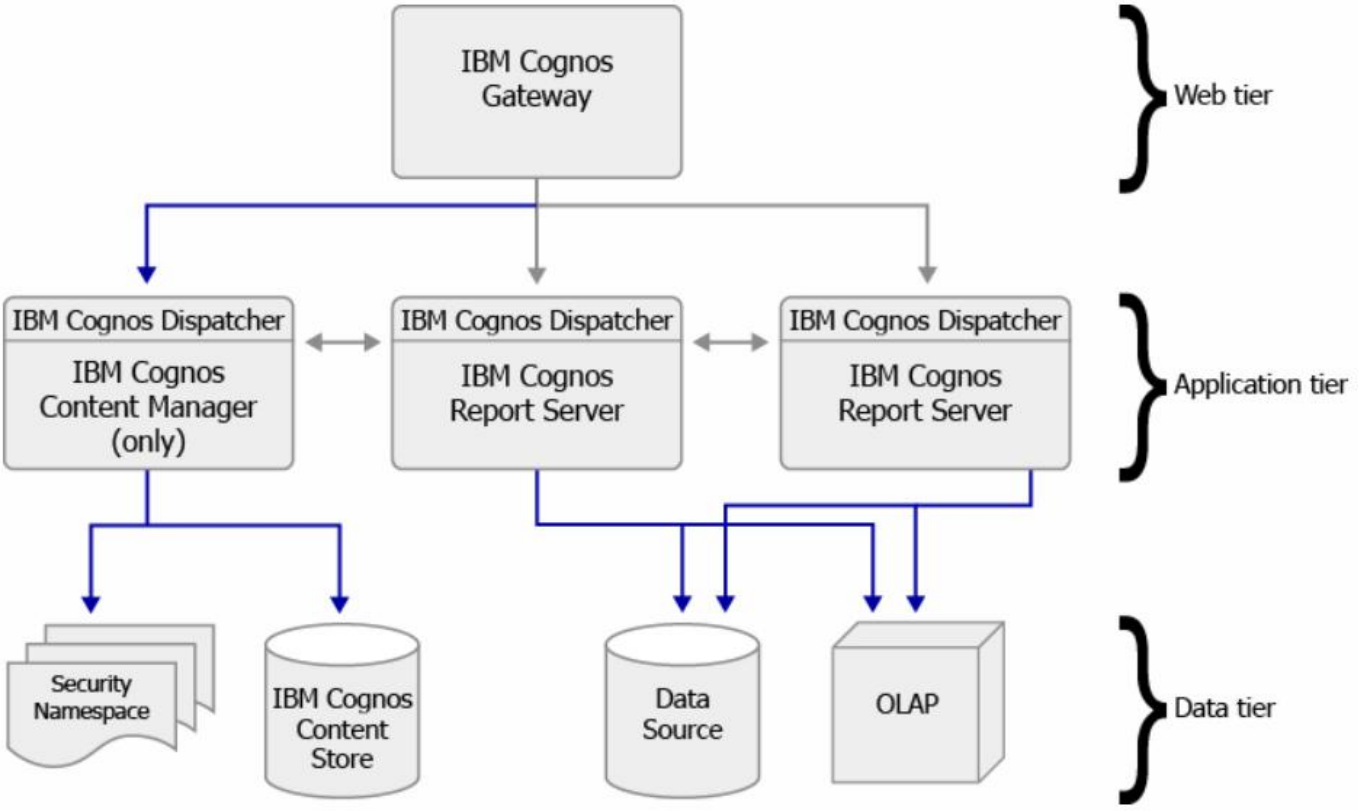
- To create various data visualizations using IBM Cognos.
- To make a dashboard using IBM Cognos.
- Making dashboards can revolutionize both our success and enjoyment in running our business.

3. THEORETICAL ANALYSIS

BLOCK DIAGRAM :



Architecture of IBM Cognos



A Detailed Block diagram of IBM

SOFTWARE DESIGNING :

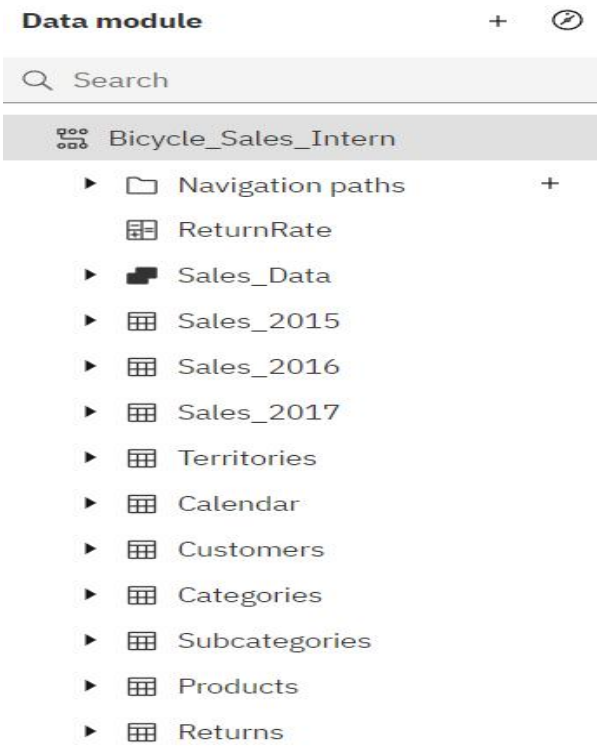
IBM Cognos Analytics with Watson

4. EXPERIMENTAL INVESTIGATION

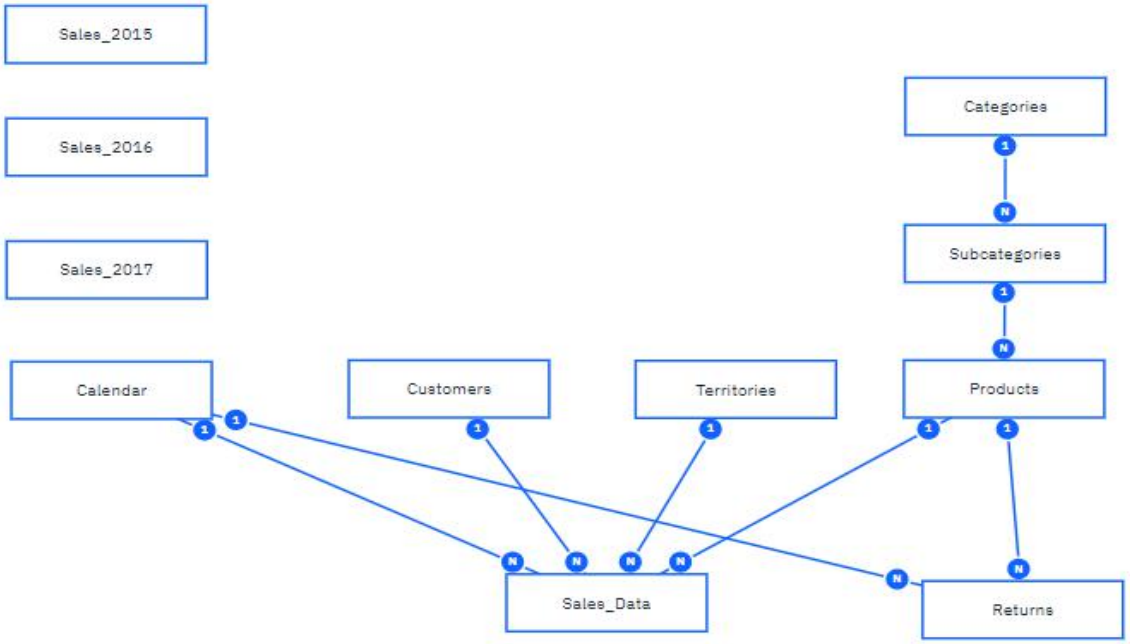
- IBM Cloud Account and Login to Cognos Analytics
- Working with the Dataset
  - Understanding the Dataset.
  - Loading the Dataset.

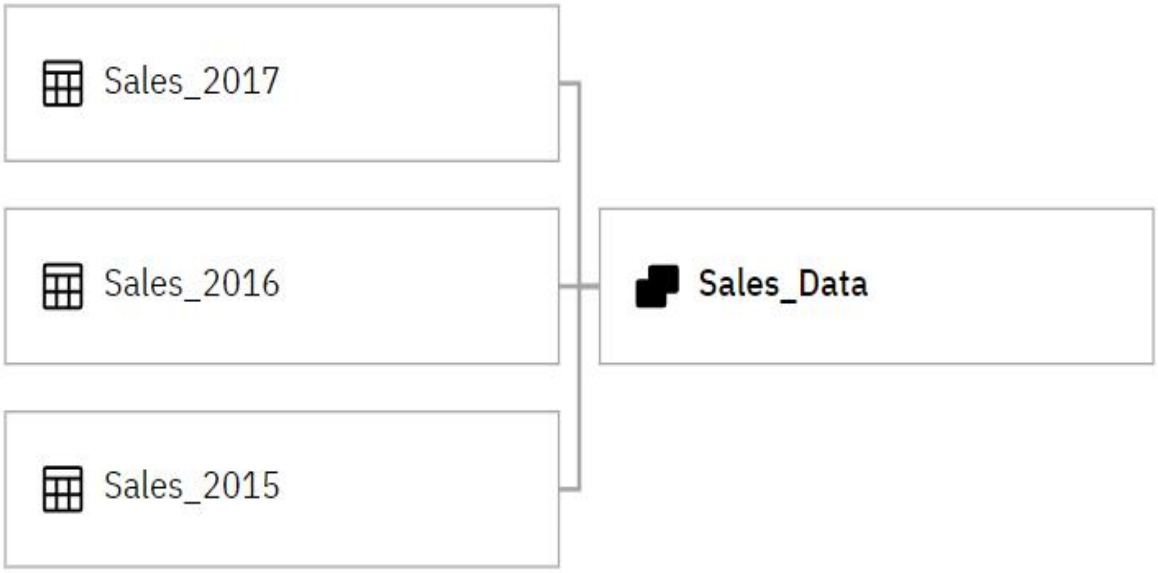
Data Visualization Charts

1. Build the Data Model using various Source Files and renaming the data sets according to the user's requirements.



2. Establish Relationships among the Data Set. Data preparation that involves union and joints of the data sets.





3. Data preparation calculations.

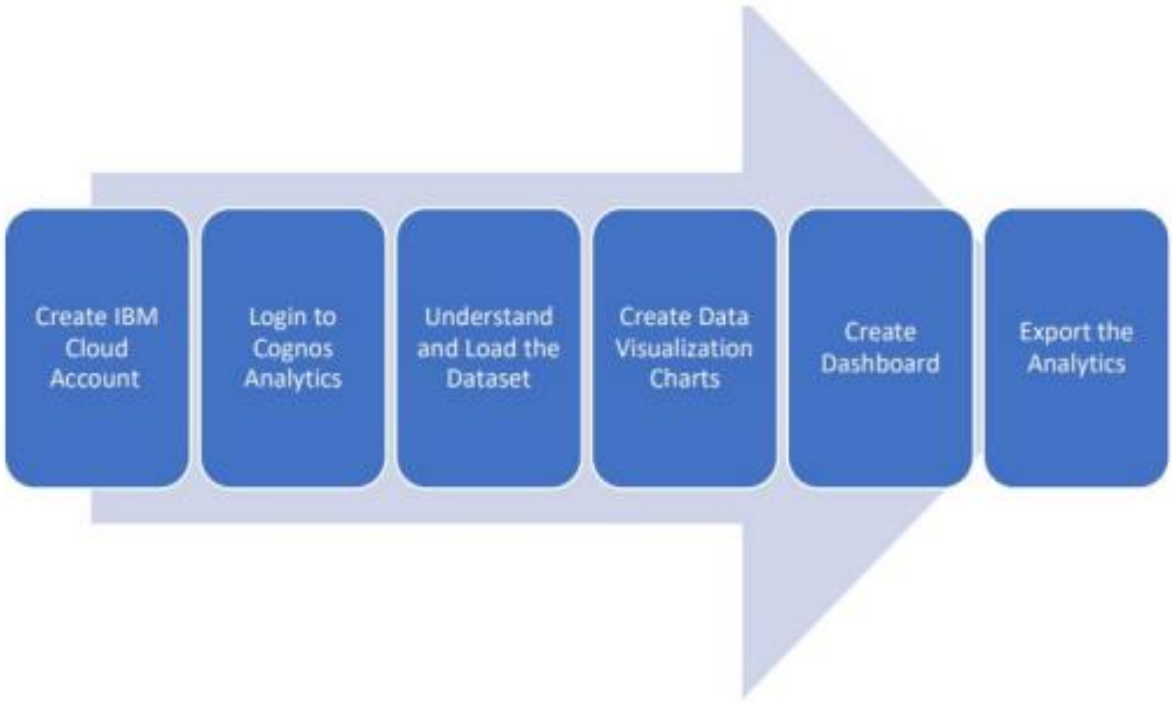
- Year = Year(Date)
- Month = Month(Date)
- Day = Day(Date)
- Format Year, Month, Day under
  - Usage - Attribute
  - Aggregate - Count distinct
  - Data type - Integer
  - Representation - Time & year/month/day

Members - Enabled

- Create navigation path for Year, Month and Day.
- Return rate = Return quantity / Order quantity
- Revenue = Order quantity * Product price

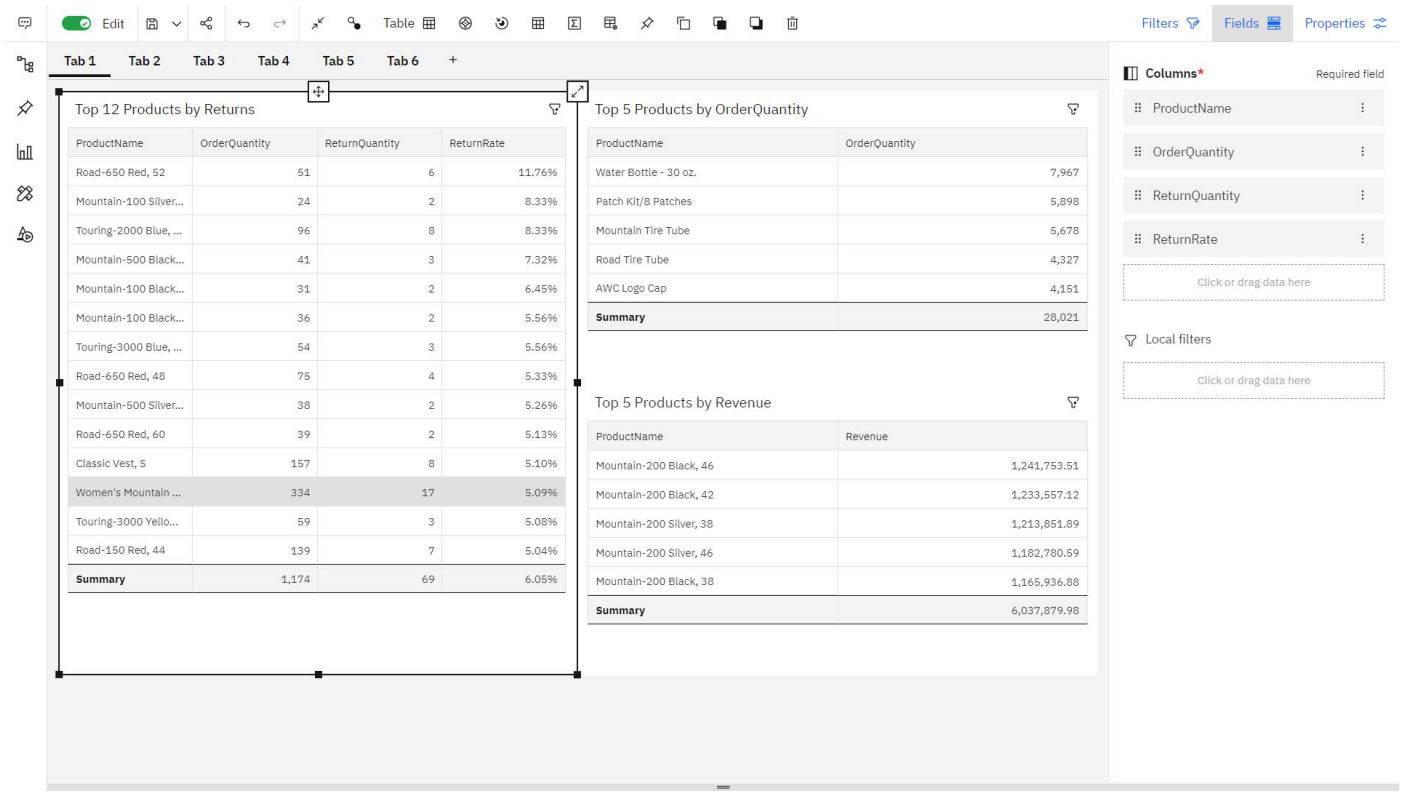
4. Build Visualizations.
   - Text Table to show case Order Quantity, Return Quantity and Return Rate
     - Top 3 Products by Order Quantity
     - Top 3 Products by Revenue
     - Top 3 Return Products
   - Tree map showing the Revenue by Education Level
   - Donut chart showing Revenue by Month
   - Map showing the Top 3 Revenue by Country
   - Multi-Row card showing Revenue, Order Quantity, Return Quantity, Return Rate, No of Products and No. of Customers
   - Monthly Revenue Forecast Chart With the filters of Region, Year and Month.

5. FLOW CHART

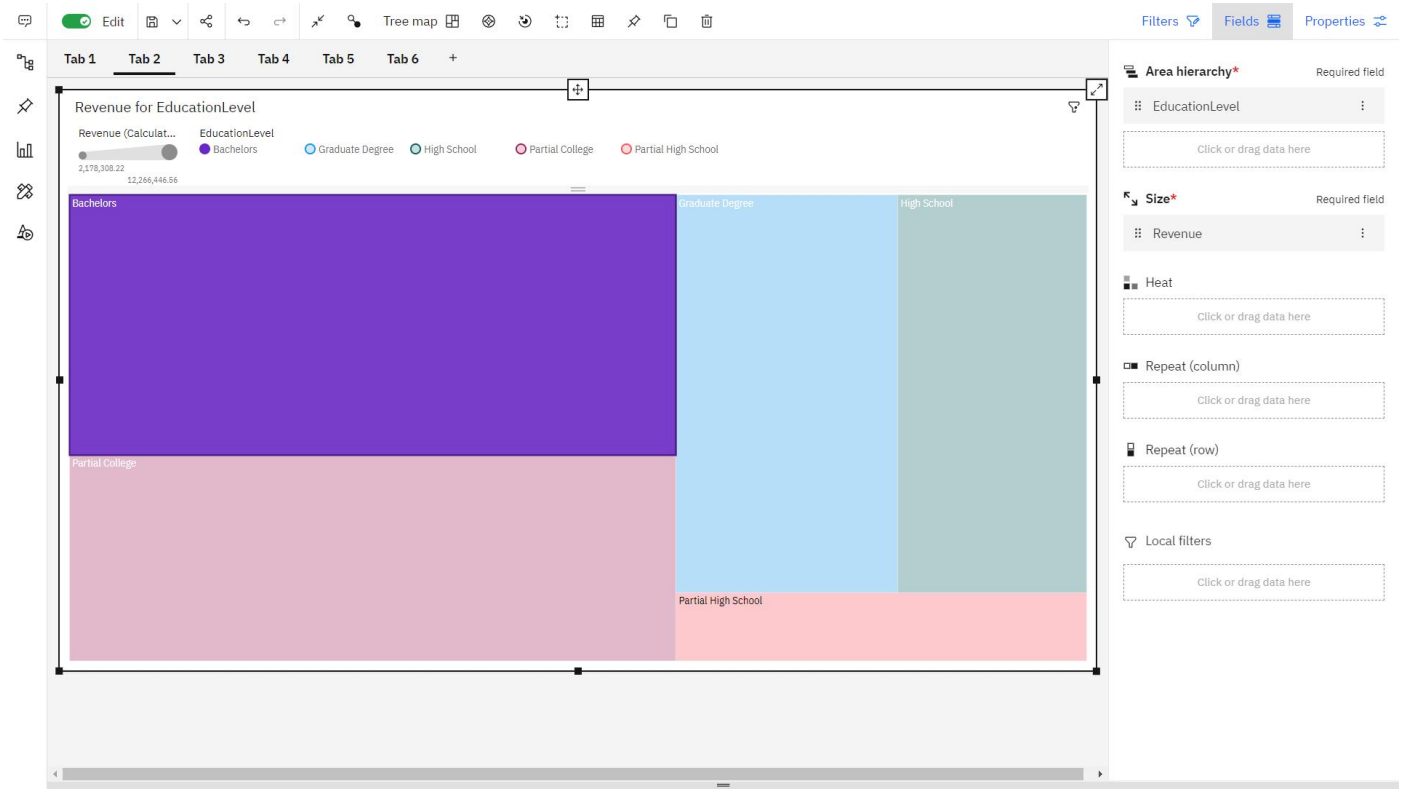


6. RESULT

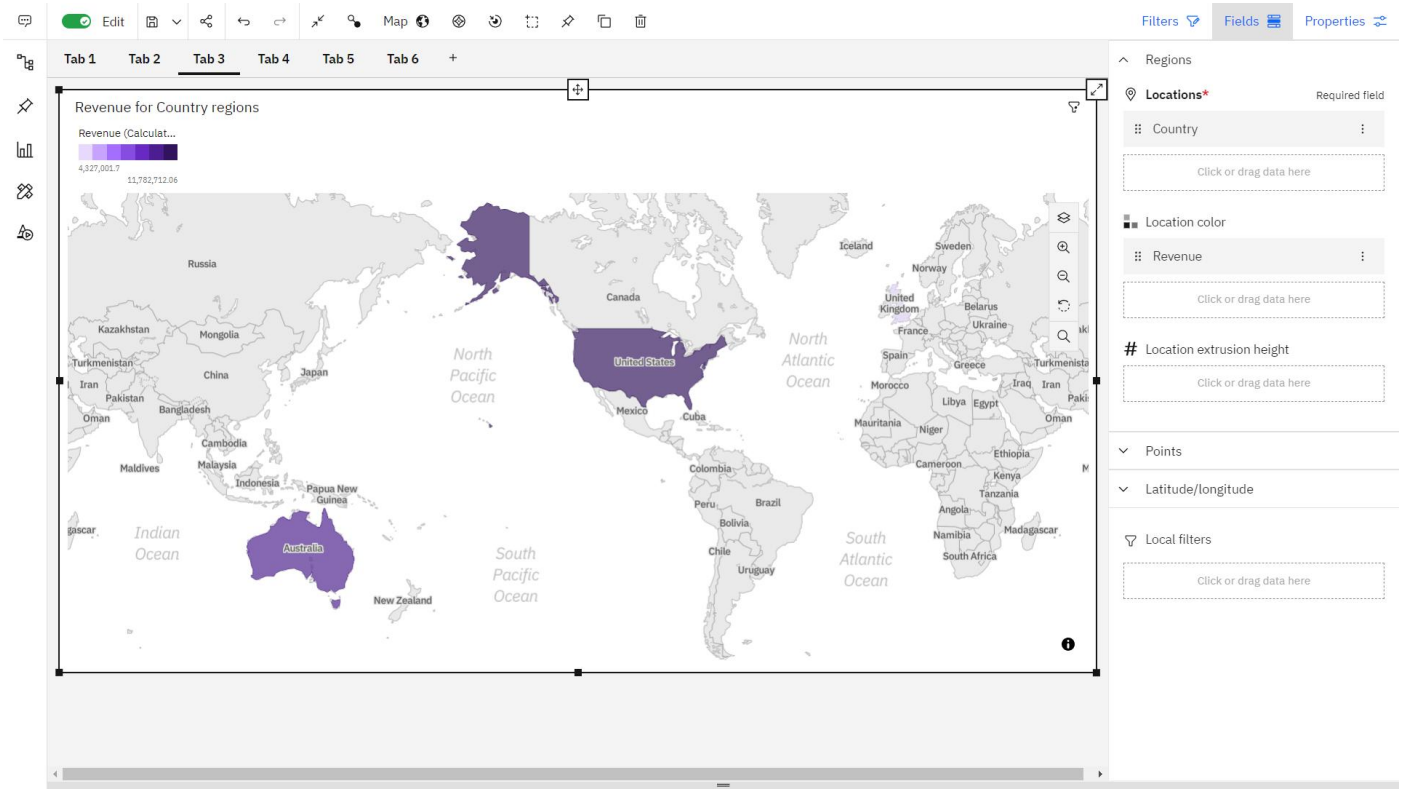
i. Product Wise Order Quantity, Return Quantity And Return Rate

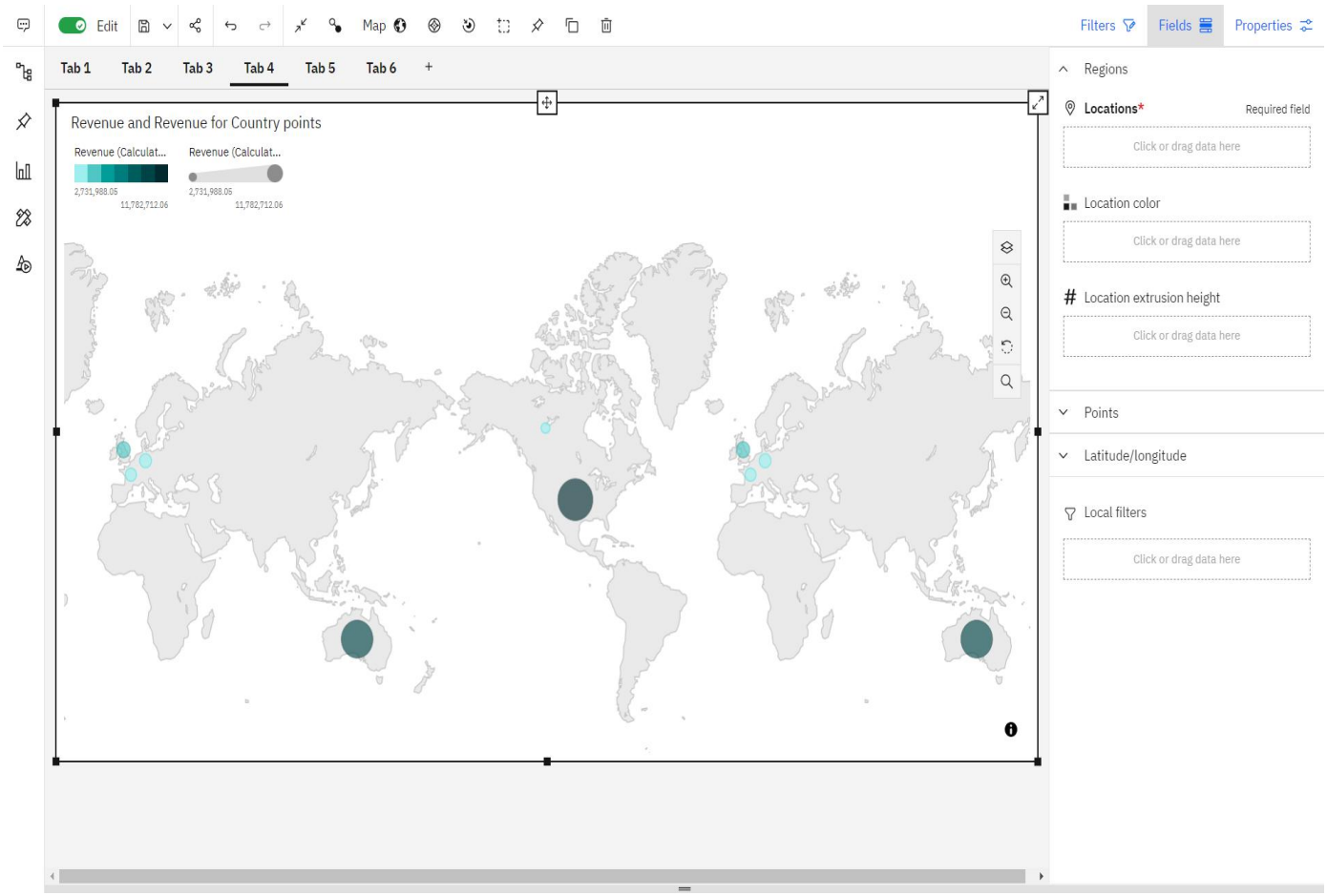


ii. Showing The Revenue By Education Level

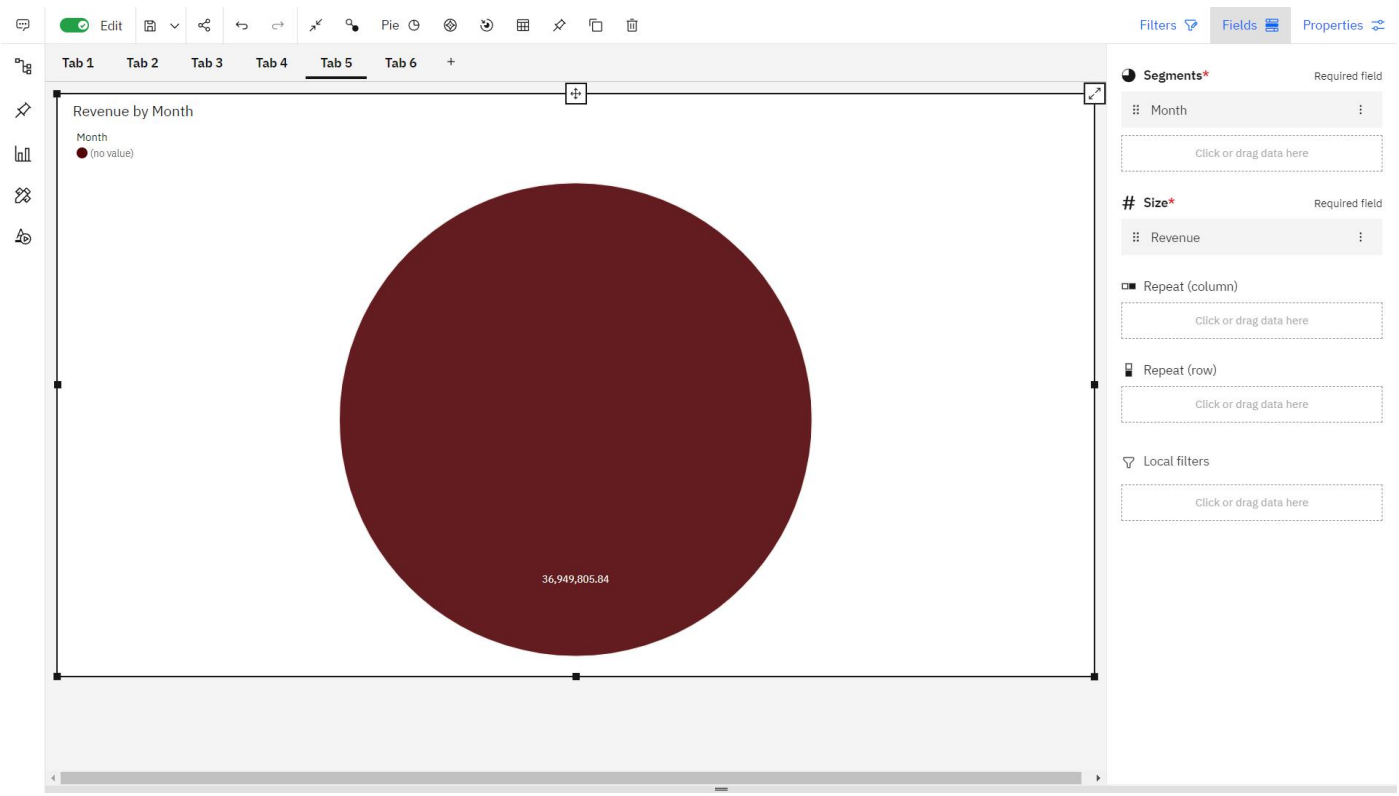


iii. Country Wise Sales Using Geographical Map



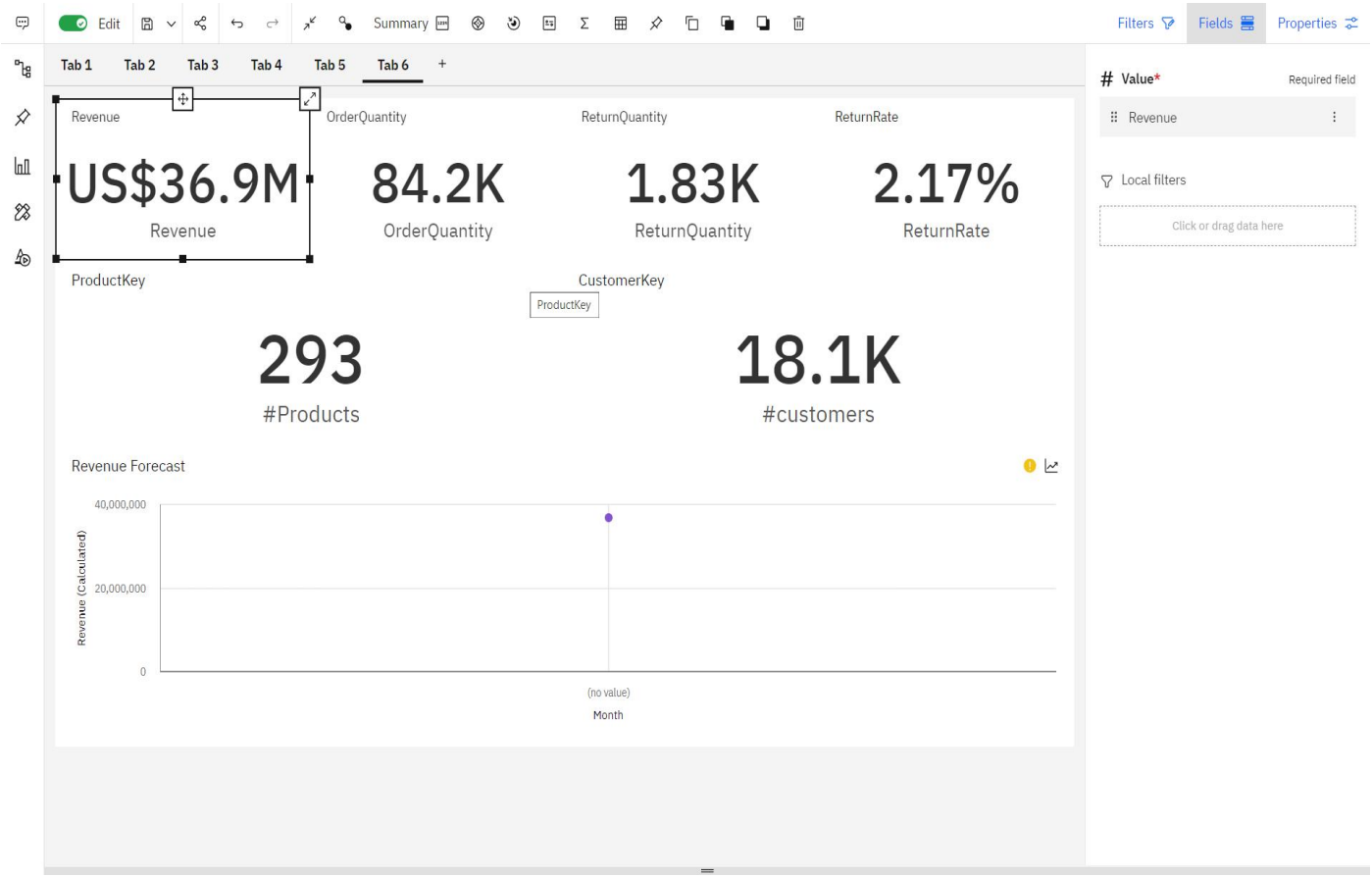


iv. Revenue By Month Using Pie Chart



v. Summary Of Revenue , Orders And Returns &

vi. Monthly Forecast Of Revenue



7. ADVANTAGES AND DISADVANTAGES

Advantages :

• Enhanced Visibility: Dashboards provide greater visibility with information available whenever it is required to ensure businesses are better placed to respond to changing market conditions .

• Timesaving Efficiency: With dashboards, we are no longer wasting valuable time generating reports from multiple systems. Instead, data is drawn from a source and displayed as an easy to interpret visual overview.

• Better Forecasting: With greater insight into the data, future demand can be more accurately predicted using historic information. Businesses can be more effectively planned for demand fluctuations, setting measurable goals and deliverables for greater success.

• Better Decision Making: Whether you're providing reporting and analysis for the entire organization or functional areas of the business, a dashboard allows companies to analyze key data quickly and meticulously. Visualized interactivity serves to deliver overwhelming amounts of data in a way that is easy to understand. With the ability to easily identify what the data really means; better decisions can be made relevant to the business.

Disadvantages :

• Flashy or cluttered design, with users attempting to incorporate too much information without understanding constraints or considering their specific needs from the range of different measurable detailed data analysis provides.

• The technology used in the development of dashboards differs from other software solutions already employed in organizations and can be initially difficult to understand.

• The business has no predetermined rules and hierarchies for how dashboard metrics are used. This means each employee can use the metrics in different ways, resulting in a diverse set of data being reported.

8. APPLICATIONS

• If you manage complex campaigns, you usually end up having several analytics solutions for each platform and needing to consult them separately, which hinders the overall view. Instead, the dashboard displays data from different sources, like web analytics solutions, social media metrics. This way, makes it much easier to compare them and see how they develop.

• A good dashboard clearly shows you a number of key metrics so you don't need to be an analytics expert to understand them. If you want to look further into a particular dataset, you always have the option of employing more specific tools.

• If you synchronize your dashboard automatically in the cloud, you can create different users so that your entire team can access the same information from anywhere. It's even possible to project the dashboard onto a screen in your office so that the whole team can see what is going on in real time.

• Having a centralized dashboard will save you a lot of time. Instead of collecting data from different sources and making charts on your own, dashboards do all this work for you. You just need to invest some time at the beginning to set up the metrics and decide how to present them. From that point on, the reports are created automatically.

9. CONCLUSIONS

Using IBM cognos with watson, with the help of diagrams, graphs, and maps we can understand given data. This understanding of data allows us to ask the right questions to reach our desired goals by optimizing methods. With this project, we learned how to upload and prepare data. We also statistical concepts which helped in calculations and plotting of graphs and maps to make a dashboard.

From this project, we have successfully:

- Created multiple analysis charts / graphs
- Used the analyzed chart creation of dashboard
- Saved and visualized the final dashboard in the IBM Cognos Analytics

10. FUTURE SCOPE

Various other visualization can be observed using IBM cognos, some of them includes

- ✓ Bar chart for Sales by year, month, day.
- ✓ Bubble chart for product prices.
- ✓ Radar on Gender and Martial status.
- ✓ Waterfall visualization on Product quantity.
- ✓ Other visualizations such as Box plot, Bullet visualization, Decision tree, Heat map, List, Spiral analysis and etc can be performed on given sources.

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[5] https://eu2.ca.analytics.ibm.com/bi/?perspective=home
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