**Data Analytics With Cognos**

**Phase 2 Submission**

**Data Extraction:**

Data extraction in a product sales analysis project with Cognos involves the process of collecting, retrieving, and transforming data from various sources to be used for analysis within IBM Cognos, a popular business intelligence (BI) and performance management software. Here's how data extraction fits into a product sales analysis project:

1. ***Data Sources:***

In a sales analysis project, data is often scattered across multiple sources, including databases, spreadsheets, online platforms, and more. These sources contain valuable information about sales transactions, customer data, product information, and more.

1. ***Data Extraction*:**

Data extraction is the process of pulling data from these diverse sources. It typically involves using ETL (Extract, Transform, Load) tools or processes to extract data in a structured format that can be used for analysis. This ensures that the data is in a usable state for reporting and analysis.

1. ***Data Transformation:***

After extracting data, it often needs to be transformed to meet the specific requirements of the analysis. This may include cleaning, aggregating, and converting data into a common format to facilitate meaningful insights.

1. ***Data Loading:***

Once the data is extracted and transformed, it is loaded into the Cognos environment. This may involve loading data into a data warehouse, a data mart, or directly into Cognos for analysis.

1. ***Report Creation:***

With data now available in Cognos, you can create reports, dashboards, and visualizations to analyze product sales. These reports can provide insights into sales trends, customer behaviors, product performance, and more.

1. ***Data Analysis:***

Cognos provides various tools for data analysis and exploration, allowing you to analyze product sales data, identify patterns, and make data-driven decisions.

Data extraction is a crucial step in the product sales analysis process as it ensures that the necessary data is available for analysis and reporting in Cognos. It streamlines the data preparation process, allowing users to focus on deriving insights and making informed business decisions based on the sales data.

***An effective way to extract data for this project:***

***1. Identify Data Sources:***

- Start by identifying all the data sources relevant to your product sales analysis. This may include databases, spreadsheets, web services, e-commerce platforms, and more.

***2. Data Inventory:***

- Create an inventory of the data sources, noting what kind of data they contain, where they are located, and how they are structured.

***3. Define Data Requirements:***

- Clearly define the specific data requirements for your analysis. What data points do you need to perform product sales analysis effectively? This might include sales transaction data, product details, customer information, pricing, and more.

***4. ETL (Extract, Transform, Load):***

- Depending on the data sources and their formats, use ETL tools to extract data. ETL tools can automate data extraction, transformation, and loading. Popular ETL tools like Apache Nifi, Talend, and IBM DataStage can be beneficial.

***5. Data Cleansing and Transformation:***

- Ensure that the extracted data is clean and in the appropriate format for analysis. This may involve cleaning up inconsistencies, handling missing data, and transforming data as needed.

***6. Data Integration:***

- Integrate data from multiple sources into a unified data repository. This might involve loading the data into a data warehouse, data mart, or a central repository that can be accessed by Cognos.

***7. Prepare Metadata:***

- Create metadata that describes the data you've extracted. This metadata is essential for Cognos to understand the data structure and relationships.

***8. Connection to Cognos:***

- Use Cognos Connection to set up connections to your data sources, whether they are databases, flat files, or web services.

***9. Create Data Models:***

- In Cognos Framework Manager, create data models that define how the data is structured and related. This is an essential step to make data accessible for reporting.

***10. Data Security:***

- Implement appropriate data security measures to ensure that only authorized users have access to sensitive data.

***11.Report and Dashboard Development:***

- With data in Cognos, design and create reports, dashboards, and visualizations to perform the actual product sales analysis.

***12.Testing and Validation:***

- Thoroughly test the data extraction, transformation, and analysis processes to ensure data accuracy and reliability.

***13. Automation:***

- Consider automating the data extraction and transformation processes to ensure that your analyses are always based on up-to-date data.

***14.Documentation:***

- Document the entire data extraction and analysis process, as well as data sources and definitions, to facilitate future maintenance and understanding of your solution.

By following this structured approach, you can effectively extract and prepare the data you need for your product sales analysis using Cognos, ensuring that you have accurate and reliable data for your reporting and decision-making processes.

Common platforms and data sources that will help us extract datasets:

***1. Relational Databases:***

- Microsoft SQL Server

- Oracle Database

- MySQL

- PostgreSQL

***2. Data Warehouses***:

- Amazon Redshift: A cloud-based data warehousing solution provided by AWS.

- Google BigQuery:A serverless, highly scalable data warehouse.

- Snowflake: A cloud-native data warehousing platform.

***3. E-commerce Platforms:***

- Shopify:If you run an online store, you can access sales data from Shopify's admin interface or API.

- WooCommerce: For WordPress-based e-commerce sites, WooCommerce provides sales data through plugins and APIs.

- Magento:Magento offers data export options for analysis.

***4. Business Software and ERPs:***

- If you use enterprise resource planning (ERP) systems like SAP, Oracle E-Business Suite, or Microsoft Dynamics, you can access sales data through these systems.

***5. Web Services and APIs:***

- Many businesses collect sales data through web services and APIs provided by payment processors, CRM systems, or analytics tools. For example, you can use APIs provided by PayPal, Stripe, Salesforce, or Google Analytics.

***6. Spreadsheets:***

- If your data is currently stored in Excel or Google Sheets, you can extract the data from these files for analysis.

***7. Point of Sale (POS) Systems:***

- Many businesses use POS systems to manage sales transactions. These systems may offer reporting features or data export options.

***8. Flat Files***:

- Sales data may be stored in CSV, Excel, or other flat file formats. These files can be imported into Cognos for analysis.

***9. Cloud Storage Services:***

- Data stored in cloud storage services like Amazon S3, Google Cloud Storage, or Azure Blob Storage can be accessed for analysis.

***10. Custom Data Sources:***

- Depending on your business, you may have custom applications or data sources. You can build data extraction processes tailored to your specific needs.

***11.Third-Party Data Providers:***

- In some cases, businesses purchase data from third-party providers for market research and analysis.

***12. Legacy Systems:***

- If you have data stored in legacy systems, you might need to extract it using legacy data connectors or migration tools.

***13. Web Scraping:***

- For competitive analysis or data from websites, you can use web scraping tools to extract relevant information.

It's essential to understand where our sales data resides and how it's structured to plan an effective data extraction strategy. The choice of platforms will depend on the systems and sources your business uses. Using ETL tools, APIs, or manual extraction methods, you can collect data from these sources and prepare it for analysis in Cognos.

***SOME IMPORTANT KAGGLE DATA SETS:***

**Amazon Products Sales Dataset 2023:**

[***https://www.kaggle.com/datasets/lokeshparab/amazon-products-dataset/download?datasetVersionNumber=2***](https://www.kaggle.com/datasets/lokeshparab/amazon-products-dataset/download?datasetVersionNumber=2)

## E-commerce Business Transaction:

[***https://www.kaggle.com/datasets/gabrielramos87/an-online-shop-business/download?datasetVersionNumber=7***](https://www.kaggle.com/datasets/gabrielramos87/an-online-shop-business/download?datasetVersionNumber=7)

# **Sales Product Rate prediction and Analysis:**

[***https://www.kaggle.com/datasets/racksonsit/sales-product-rate-prediction-and-analysis/download?datasetVersionNumber=1***](https://www.kaggle.com/datasets/racksonsit/sales-product-rate-prediction-and-analysis/download?datasetVersionNumber=1)

# **Flipkart Products Review Dataset:**

[***https://www.kaggle.com/datasets/mansithummar67/flipkart-product-review-dataset/download?datasetVersionNumber=5***](https://www.kaggle.com/datasets/mansithummar67/flipkart-product-review-dataset/download?datasetVersionNumber=5)

These include Sales data, Historical data, Customer data , Product data.

**Cognos Analytics in Action**

"Cognos Analytics in Action" refers to the practical application and utilization of IBM Cognos Analytics software for real-world business scenarios. IBM Cognos Analytics is a business intelligence and data analytics platform that enables organizations to collect, analyze, and visualize data to make informed business decision.

1. **Data Analysis**:

Using Cognos Analytics to analyze data to gain insights into business performance, customer behavior, market trends, and other critical aspects of the business.

1. **Reporting**:

Creating and generating reports, dashboards, and visualizations to present data in a meaningful and understandable way to business stakeholders.

3. **Interactive Dashboards**: Building interactive dashboards that allow users to explore data and drill down into details, helping them answer specific questions and identify areas for improvement.

1. **Data Exploration**:

Conducting ad-hoc data exploration to discover hidden patterns, correlations, and anomalies in the data.

5**. Decision Support:**

Providing decision-makers with the necessary information and insights to make informed and data-driven decisions.

1. **Predictive Analytics:**

Using Cognos Analytics to perform predictive modeling and forecasting to anticipate future trends and outcomes.

1. **Data Collaboration:**

Collaborating and sharing data insights with team members and stakeholders within the organization.

**9.Data Integration:**

Integrating data from various sources, including databases, spreadsheets, and web services, to create a unified view of the business.

"Cognos Analytics in Action" showcases the practical use of the Cognos Analytics platform to solve business problems, enhance decision-making processes, and drive organizational performance by leveraging data and analytics capabilities. It's about taking the capabilities of Cognos Analytics and applying them to real business scenarios to achieve tangible results.

Cognos Analytics is a business intelligence and data analytics platform developed by IBM. It plays a crucial role in product sales analysis by providing powerful tools and capabilities for data exploration, reporting, and data visualization. Here's what Cognos Analytics means in the context of product sales analysis:

**Data Preparation:**

With Cognos, you can cleanse, transform, and enrich your sales data to ensure it is accurate and ready for analysis. This includes handling missing data, formatting, and ensuring data consistency.

**Data Modeling**:

Cognos Framework Manager enables you to create data models that define how data is structured and related. This is essential for building reports and dashboards based on your sales data.

**Report Creation:**

Cognos Analytics provides a robust report authoring environment where you can design and create reports. These reports can present sales performance metrics, trends, and insights in a visually appealing and understandable format.

5. \*\*Dashboard Development:\*\* You can build interactive and informative dashboards using Cognos Dashboards. These dashboards can include key performance indicators (KPIs), charts, graphs, and other visual elements to monitor sales performance in real-time.

**Ad Hoc Analysis:**

Cognos Analytics offers self-service capabilities, allowing business users to perform ad hoc analysis and create custom reports without depending on IT or data experts.

**Advanced Analytics:**

You can apply advanced analytics techniques within Cognos to gain deeper insights into product sales. This includes predictive analytics, forecasting, and statistical analysis.

**Collaboration and Sharing:**

Cognos facilitates collaboration by enabling users to share reports, dashboards, and analysis results with colleagues. This promotes data-driven decision-making across the organization.

**Mobile Accessibility:**

Cognos Analytics provides mobile support, allowing users to access sales data and reports on smartphones and tablets for on-the-go decision-making.

S**ecurity and Access Control:**

Cognos offers robust security features to control who can access, modify, and share sales data and reports, ensuring data privacy and compliance.

**Data Governance:**

It supports data governance by providing tools for metadata management, data lineage, and audit trails.

**Sales Trends and Patterns:**

Cognos Analytics allows users to create charts and graphs to visualize sales trends over time. For example, you can create line charts to track monthly sales, identify seasonal variations, and detect patterns.

**Product Performance Analysis:**

Users can filter and drill down into the data to analyze the performance of individual products. This can include identifying top-selling products, products with declining sales, and products with the highest profit margins.

**Geographic Analysis:**

Cognos Analytics provides geospatial capabilities, enabling users to analyze sales data by region. This is helpful for identifying which products perform best in specific geographical areas.

**Customer Segmentation:**

Using customer data, you can segment your customer base and analyze which products are popular among different customer groups. This can inform marketing strategies and product recommendations.

**Inventory Management:**

Cognos Analytics can be used to analyze product sales data in relation to inventory levels. This helps in optimizing stock levels, reducing carrying costs, and avoiding stockouts.

**Promotion Analysis**:

You can use Cognos Analytics to evaluate the effectiveness of sales promotions and marketing campaigns. By analyzing sales data before, during, and after promotions, you can determine their impact on product sales.

**Forecasting:**

The platform offers predictive analytics capabilities, which can be applied to forecast future sales for each product. This helps in planning inventory, production, and staffing.

**Profitability Analysis:**

Users can calculate and visualize the profitability of each product by considering not only revenue but also associated costs, including production, marketing, and distribution costs.

**Comparative Analysis:**

Cognos Analytics enables you to compare the sales performance of different products, product categories, or time periods. This can highlight areas where improvements are needed or where investment is warranted.

Cognos Analytics is a comprehensive platform that empowers organizations to leverage their sales data for deeper insights and informed decision-making. It helps in transforming raw sales data into meaningful reports and dashboards, making it a valuable asset in product sales analysis.

**Cognos Analytics Tools that will be useful to this Project:**

IBM Cognos Framework Manager

IBM Cognos Analytics Explorer

IBM Cognos Data Module

And many more

**Team members:**

**Dhivyadharshini S B –** [**dhivyadharshu07@gmail.com**](mailto:dhivyadharshu07@gmail.com)

**Dharini A –** [**dhariniathithakumar@gmail.com**](mailto:dhariniathithakumar@gmail.com)

**Dileep-** [**dilleep18@gmail.com**](mailto:dilleep18@gmail.com)

**Dhavasri –** [**indradhavasri212@gmail.com**](mailto:indradhavasri212@gmail.com)