

IBM- Naan Mudhalvan Data Analytics with Cognos

Phase 5

Development Part 2

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IBM Naan Muthalvan

Data Analytics with Cognos-Group 2

Project 7: Covid-19 cognos

Introduction:

The COVID-19 pandemic has been an unprecedented global challenge that has impacted every facet of our lives. From public health and healthcare systems to economies and daily routines, the pandemic has forced us to adapt and make data-driven decisions to mitigate its spread and impact. One of the essential tools in this battle against COVID-19 has been data analytics and visualization. IBM Cognos, a powerful business intelligence and data analytics platform, has played a pivotal role in helping organizations and governments understand, track, and respond to the pandemic. In this document, we explore how IBM Cognos has been used in the context of COVID-19 to harness the power of data for informed decision-making.

Abstract:

The COVID-19 pandemic has underscored the significance of data-driven decision-making in addressing global crises. This abstract outlines an exploration of the role of IBM Cognos in the context of COVID-19 data analytics and visualization.

The analysis objectives encompass a wide range of critical aspects, including monitoring the spread of the virus, assessing healthcare system capacity, and tracking vaccination campaigns'

progress. These objectives are achieved through comprehensive data collection methods, leveraging sources like daily case reports, hospitalization data, and vaccination records.

The heart of the analysis lies in the visualization strategy, which harnesses IBM Cognos' capabilities to create dynamic dashboards, reports, and predictive models. These visualizations are instrumental in presenting real-time data and insights to key stakeholders, allowing for informed decision-making and timely responses to the evolving pandemic.

Moreover, the use of IBM Cognos goes beyond data presentation. Code integration plays a crucial role in data cleaning, transformation, and statistical analysis, ensuring the accuracy and relevance of the insights derived from COVID-19 data.

In conclusion, the adoption of IBM Cognos in the context of the COVID-19 pandemic has been pivotal in enabling organizations and governments to make data-driven decisions, allocate resources effectively, and save lives. This

document delves into the methodologies, strategies, and outcomes of utilizing IBM Cognos for COVID-19 data analytics, highlighting its significance in managing public health emergencies.

Objectives :

Start building the product sales analysis using IBM Cognos for visualization. Define the analysis objectives and collect sales data from source shared. Process and clean the collected data to ensure its accuracy and reliability..

I. Analysis Objectives A. Define specific objectives 1. Compare mean values of COVID-19 cases and deaths 2. Analyze standard deviations of COVID-19 cases and deaths B. Specify metrics and parameters for comparison

II. Data Collection A. Obtain the provided data file 1. COVID- 19 cases and deaths per day 2. Data for countries in the EU/EEA B. Validate and preprocess the data

III. Visualization Strategy A. Utilize IBM Cognos for data visualization B. Plan chart types and graphs 1. Line charts for trend analysis 2. Bar charts for comparisons C. Design informative visuals to represent mean values and standard deviations

IV. Insights Generation A. Analyze and compare mean values B. Evaluate standard deviations C. Identify potential insights 1. Variations in case and death trends 2. Outliers or anomalies in specific countries D. Determine the implications of insights for public health and policy decisions

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Step 1: Project Planning and Research

Define Project Scope: Determine the specific focus of your COVID-19 project, whether it's related to tracking, prevention, treatment, or public awareness.

Market Research: Understand existing solutions and identify gaps in the market to create a unique and impactful project.

Legal and Ethical Considerations: Ensure compliance with data protection laws and ethical guidelines, especially when dealing with sensitive health data.

Step 2: Design and Development

Conceptualize the Solution: Create a detailed project plan outlining the features, functionalities, and user experience of your COVID-19 project.

Prototyping: Develop wireframes and prototypes to visualize the project's interface and user interactions. **Development:** Write code, design databases, and develop the frontend and backend components of your project.

Testing: Perform rigorous testing, including unit tests, integration tests, and user acceptance tests, to identify and fix bugs and issues.

Step 3: Implementation and Deployment

Infrastructure Setup: Deploy the necessary servers, databases, and hosting environments to make your project accessible online. **Data Integration:** If your project involves data analysis, integrate relevant datasets securely.

User Training: If applicable, provide training sessions for end-users and administrators to ensure they can use the project effectively.

Deployment: Launch the project to the public or specific user groups, making it accessible through web browsers or mobile applications.

Step 4: Monitoring and Maintenance

Performance Monitoring: Implement tools to monitor the project's performance, including website traffic, user engagement, and system response times.

Security Updates: Regularly update the project with the latest security patches and measures to protect against cyber threats. **User Feedback:** Gather feedback from users to identify areas of improvement and implement necessary changes.

Continuous Development: Stay updated with the latest technologies and trends to enhance your

project continually. **Step 5: Scaling and Optimization**

Scalability: Prepare the project for increased usage by optimizing code, databases, and server configurations to handle a larger user base.

Optimization: Identify bottlenecks and optimize the project for better performance and user experience.

Feature Expansion: Based on user feedback and evolving needs, consider adding new features and functionalities

to the project. **Step 6: Documentation and Knowledge Transfer**

Documentation: Create detailed documentation, including user manuals and technical guides, to assist users and future developers.

Knowledge Transfer: If applicable, transfer knowledge about the project to other team members or stakeholders to ensure continuity.

By following these steps, you can successfully design, develop, implement, and transform your COVID-19 project into a valuable and sustainable solution.

Step 1: Data Collection Find a reliable source for COVID-19 data. Websites like Johns Hopkins University, World Health Organization (WHO), or government health department websites often provide updated datasets.

Step 2: Data Loading and Preprocessing **Loading Data:** Import the COVID-19 dataset into IBM Cognos. This process usually involves uploading a CSV or Excel file.

Data Cleaning: Handle missing values, outliers, and inconsistencies in the dataset.

Data Transformation:

Convert data types if necessary (e.g., dates, numerical values). Normalize or standardize data if you plan to use algorithms sensitive to the scale of the variables.

Step 3: Data Analysis and

Visualization Descriptive

Statistics:

Calculate basic statistics like mean, median, and standard deviation.

Exploratory Data Analysis (EDA):

Use histograms, box plots, or scatter plots to understand the distribution of variables.

Advanced Analytics:

Perform more complex analyses like regression, clustering, or time series forecasting if your dataset allows.

Visualizations:

Create visualizations like bar charts, line graphs, heat maps, and geographical maps to represent the COVID-19 data.

Dashboard Creation:

Design interactive dashboards displaying key metrics and trends. Cognos allows you to create dynamic and customizable dashboards.

Step 4: Interpreting

Results Identify

Patterns:

Look for patterns or trends in the data. For example, analyze how infection rates vary over time or across regions.

Data Insights:

Derive meaningful insights from the analyses.

Understand the impact of various factors on the spread of COVID-19.

Step 5: Report Generation and

Sharing Create Reports:

Generate comprehensive reports summarizing your analyses, insights, and visualizations. Sharing:

Share your reports and dashboards with stakeholders.

Cognos allows you to export reports in various formats (PDF, Excel) or share them online.

Remember, the specific steps and features can vary based on the version of IBM Cognos you are using.

Consult Cognos documentation or online tutorials for detailed instructions related to your version. If you have specific questions or encounter challenges during any of these steps, feel free to ask for assistance!

Data source

Dataset is collected from the kaggle.com named “ daily-website-visitors.csv” which has a data about the Days, Day of week, Date, page Loads, Unique visits, First-time visits, Returning Visits.

Dataset link

<https://www.kaggle.com/datasets/chakradharmattapalli/covid-19-cases>

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	dateRep	day	month	year	cases	deaths	countriesAndTerritories															
2	#####	31	5	2021	366	5	Austria															
3	#####	30	5	2021	570	6	Austria															
4	#####	29	5	2021	538	11	Austria															
5	#####	28	5	2021	639	4	Austria															
6	#####	27	5	2021	405	19	Austria															
7	#####	26	5	2021	287	8	Austria															
8	#####	25	5	2021	342	3	Austria															
9	#####	24	5	2021	520	3	Austria															
10	#####	23	5	2021	626	8	Austria															
11	#####	22	5	2021	671	12	Austria															
12	#####	21	5	2021	608	8	Austria															
13	#####	20	5	2021	866	13	Austria															
14	#####	19	5	2021	630	11	Austria															
15	#####	18	5	2021	391	15	Austria															
16	#####	17	5	2021	676	6	Austria															
17	#####	16	5	2021	684	12	Austria															
18	#####	15	5	2021	721	14	Austria															
19	#####	14	5	2021	1100	11	Austria															
20	#####	13	5	2021	1179	14	Austria															
21	#####	12	5	2021	968	19	Austria															
22	#####	11	5	2021	670	16	Austria															
23	#####	10	5	2021	1009	11	Austria															
24	#####	9	5	2021	1251	14	Austria															
25	#####	8	5	2021	1383	23	Austria															
26	#####	7	5	2021	1220	8	Austria															

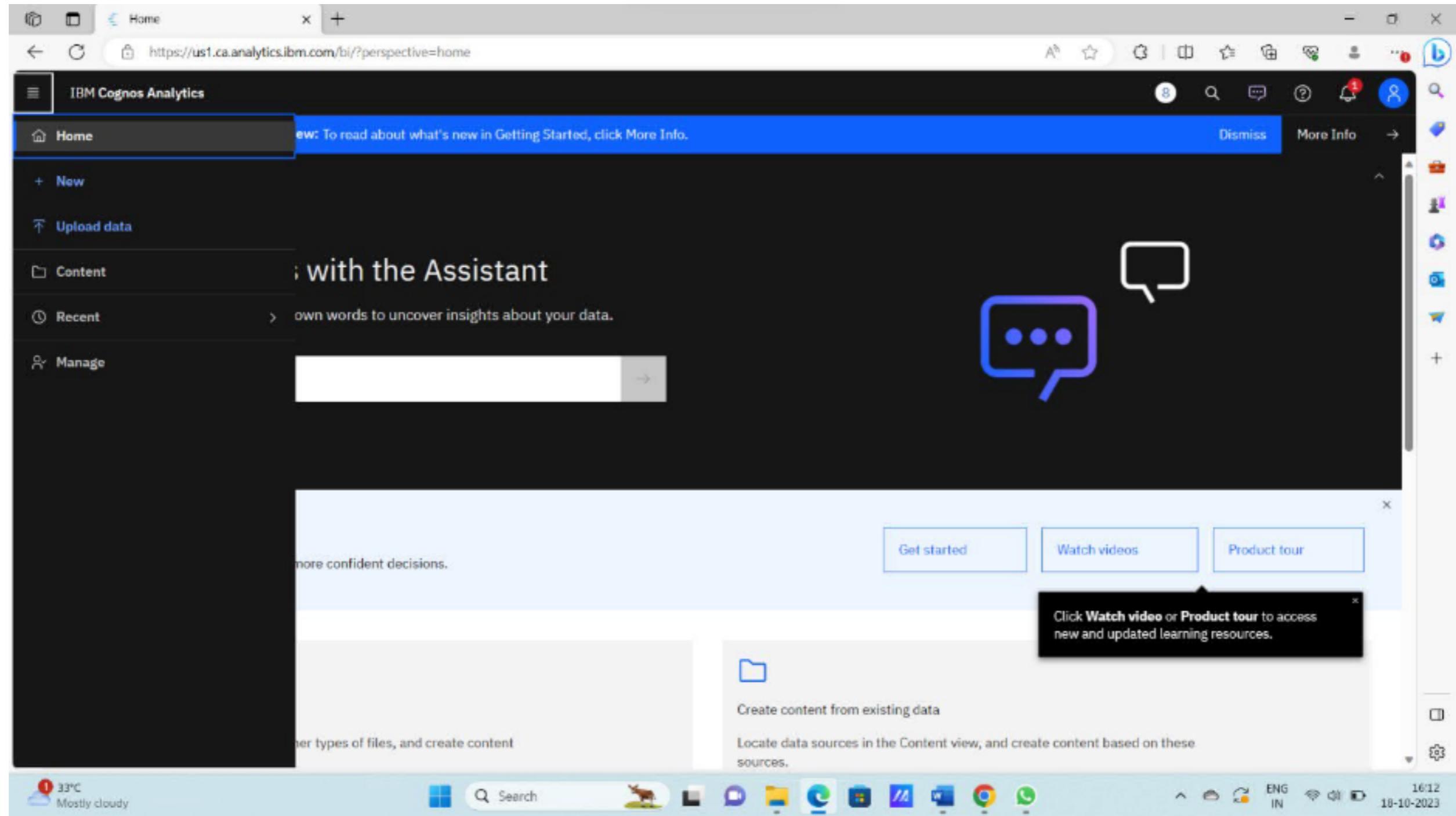
Data Loading

Steps Involved in data loading on IBM cognos.

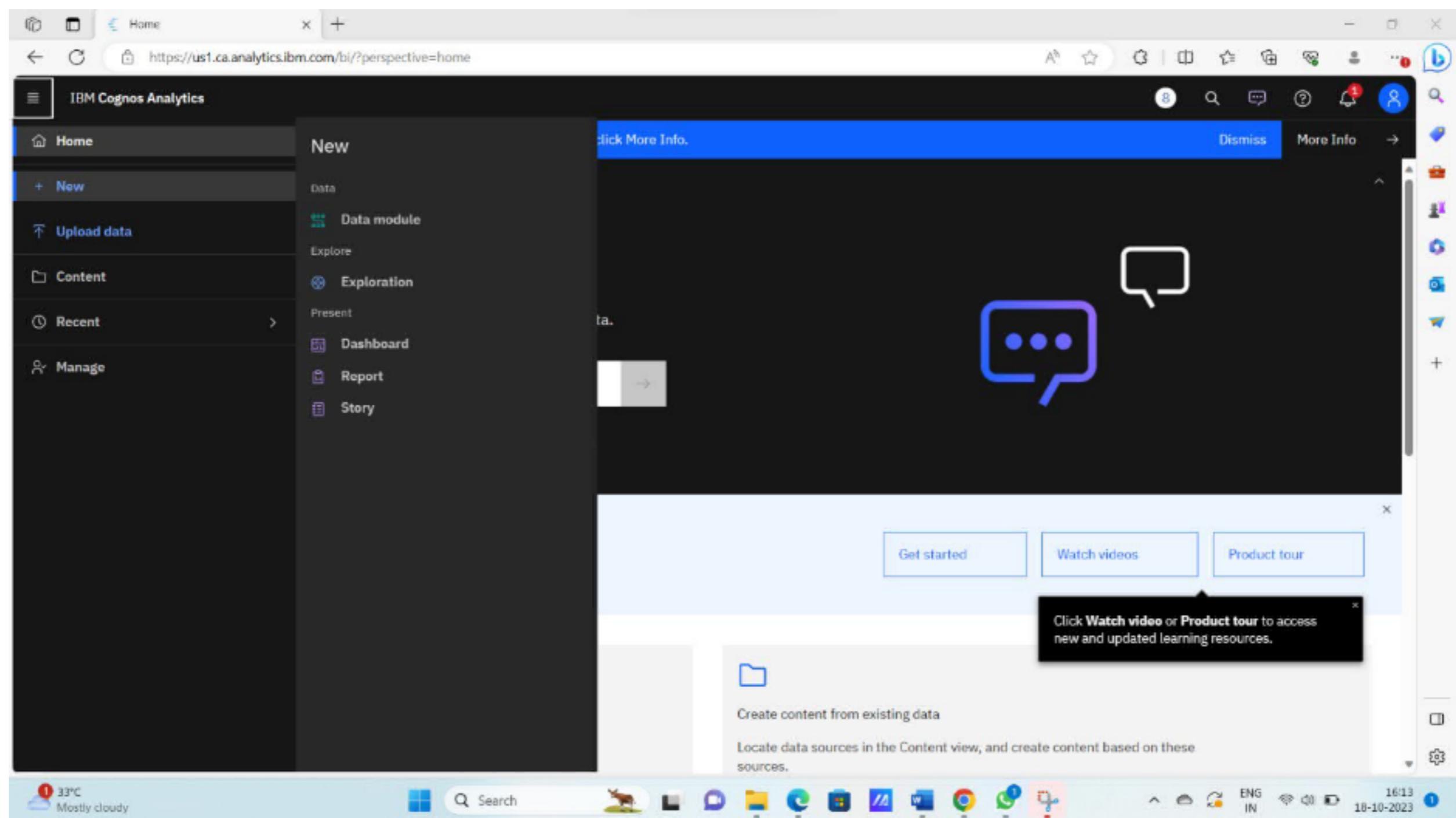
1. Login to your IBM cognos

2. Click more menu from the left side

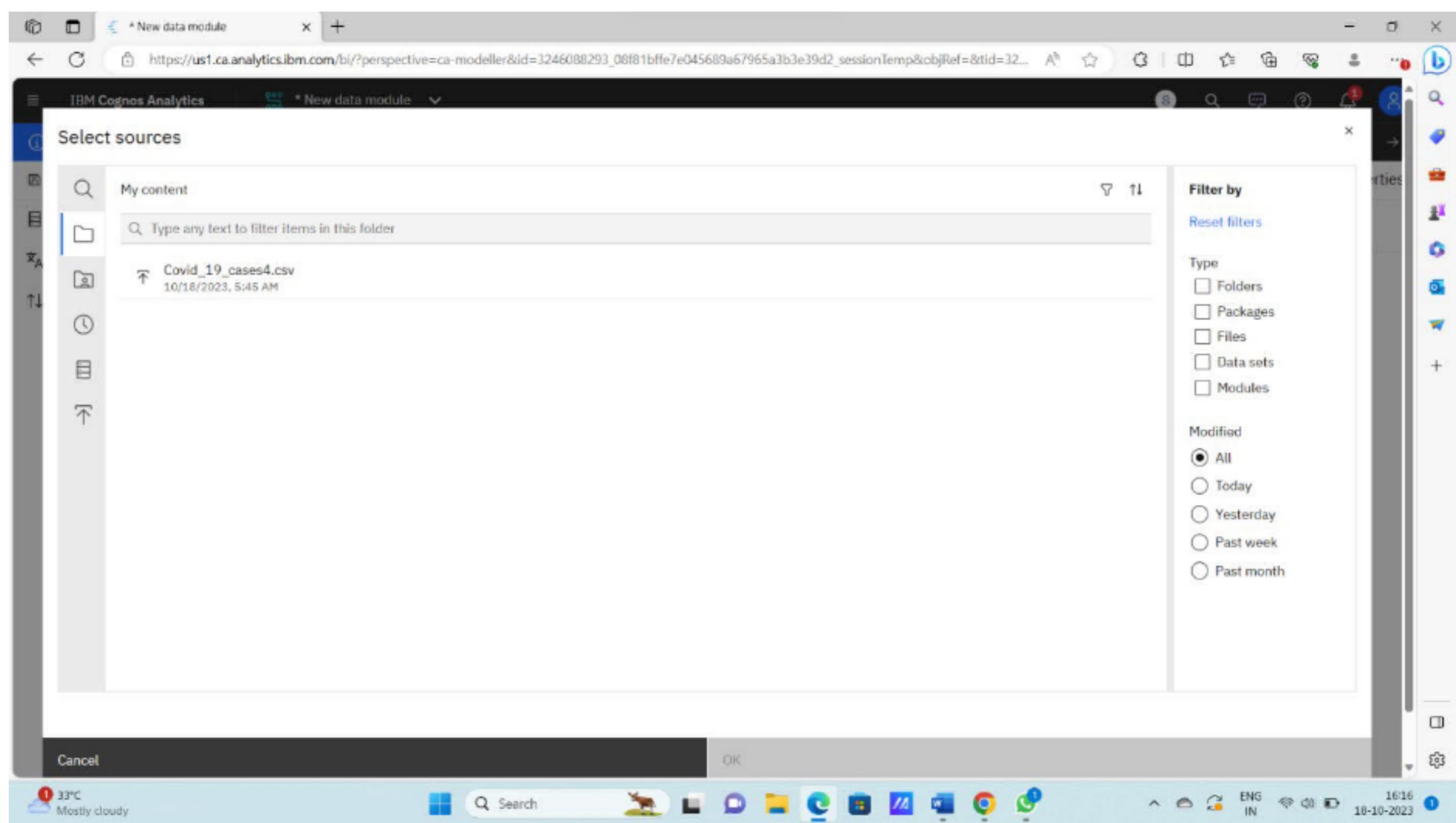
3. Select new tab



4. Click Data module tab



5.Upload the dataset for your project and select the Corresponding file



6. preview the data

The screenshot shows the IBM Cognos Analytics interface. A new data module titled "New data module" is selected. Inside, there is a folder named "Navigation paths" which contains a CSV file named "Covid_19_cases4.csv". The CSV file has columns: Row Id, dateRep, day, month, year, cases, and deaths. A preview data section is visible, featuring a circular icon with a calendar and a checkmark, and the text "Preview data: To preview data, select a table, a column in a table, or a folder that contains columns." The system tray at the bottom shows weather information (33°C, Mostly cloudy), system icons, and the date/time (18-10-2023, 16:16).

7. Explore the data

The screenshot shows the same IBM Cognos Analytics interface. The "Covid_19_cases4.csv" table is now expanded, showing its data in a grid format. The columns are Row Id, dateRep, day, month, year, cases, and deaths. The data consists of 12 rows, each representing a specific date and its corresponding COVID-19 case and death counts. The system tray at the bottom shows weather information (33°C, Mostly cloudy), system icons, and the date/time (18-10-2023, 16:17).

Row Id	dateRep	day	month	year	cases	deaths
1	2021-05-31	31	5	2021	366	5
2	2021-05-30	30	5	2021	570	6
3	2021-05-29	29	5	2021	538	11
4	2021-05-28	28	5	2021	639	4
5	2021-05-27	27	5	2021	405	19
6	2021-05-26	26	5	2021	287	8
7	2021-05-25	25	5	2021	342	3
8	2021-05-24	24	5	2021	520	3
9	2021-05-23	23	5	2021	626	8
10	2021-05-22	22	5	2021	671	12
11	2021-05-21	21	5	2021	603	8
12	2021-05-20	20	5	2021	866	13

8. save the data module

	dateRep	day	month	year	cases	deaths
2021-05-31	31	5	2021	366	5	
2021-	Clean - month		x	21	570	6
2021-	NULL values			21	538	11
2021-	<input type="checkbox"/> Replace this value with NULL	8		21	639	4
2021-	<input type="checkbox"/> Replace NULL values with	8		21	405	19
2021-	Cancel	Clean		21	287	8
2021-				21	342	3
2021-				21	520	3
2021-				21	626	8
2021-05-22	22	5	2021	671	12	
2021-05-21	21	5	2021	603	8	
2021-05-20	20	5	2021	866	13	
2021-05-19	19	5	2021	630	11	
2021-05-18	18	5	2021	209	16	

Data Preprocessing and Cleaning

In this phase the following steps will taken

- Handling missing data
- Data Transformation
- Data Type Conversion
- Removing Duplicates
- Dealing Outliers

Once you saved the data module. Click the corresponding dataset on IBM cognos and Preview the module

Right Click the row where you want to clean the data

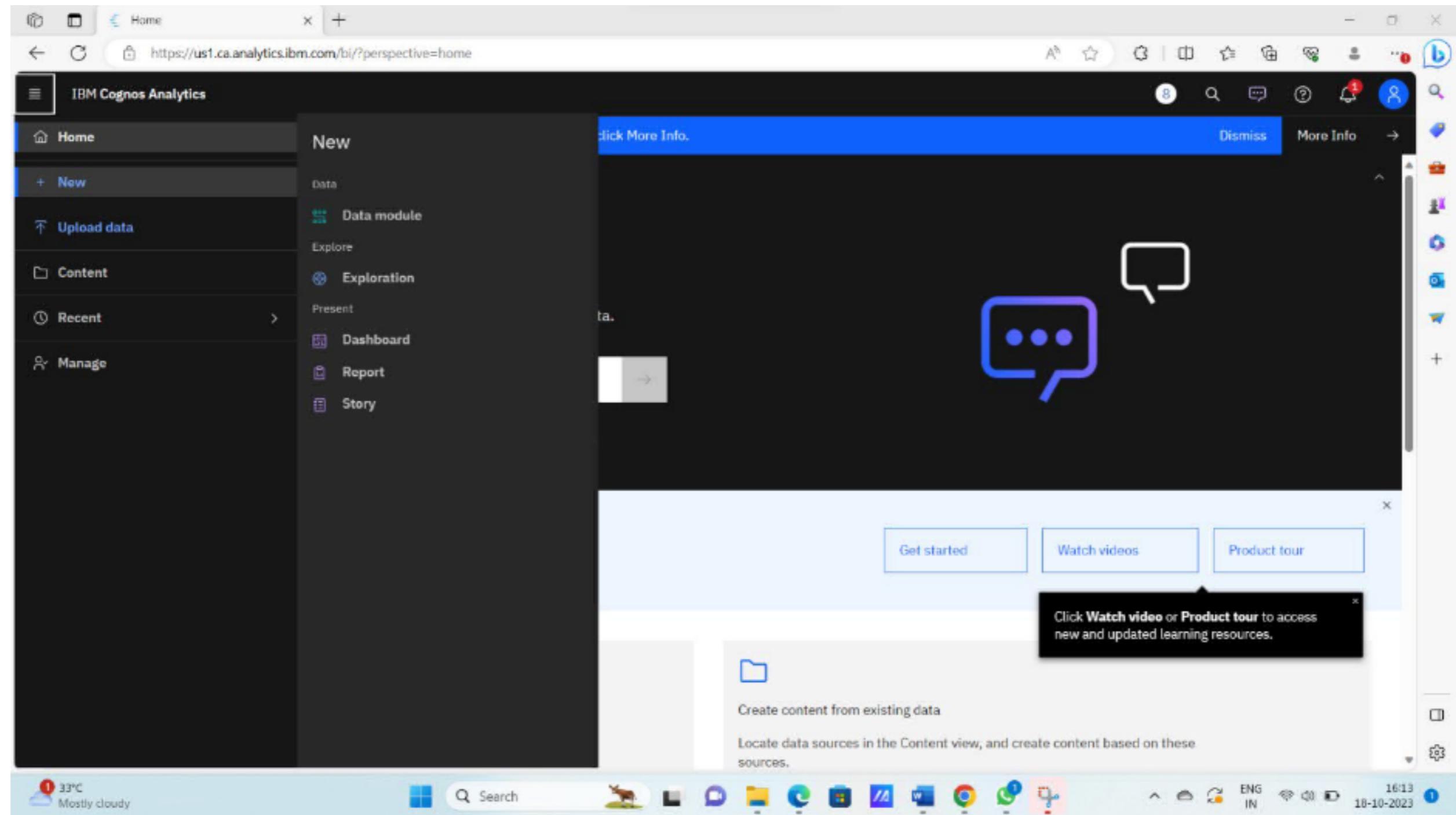
It provides the UI to Clean the data and makes the task easy one, Now Updating and Replacing the Null values are simple

data module will be updated by doing the above process after the completion of process start creating the dashboard for Visualization

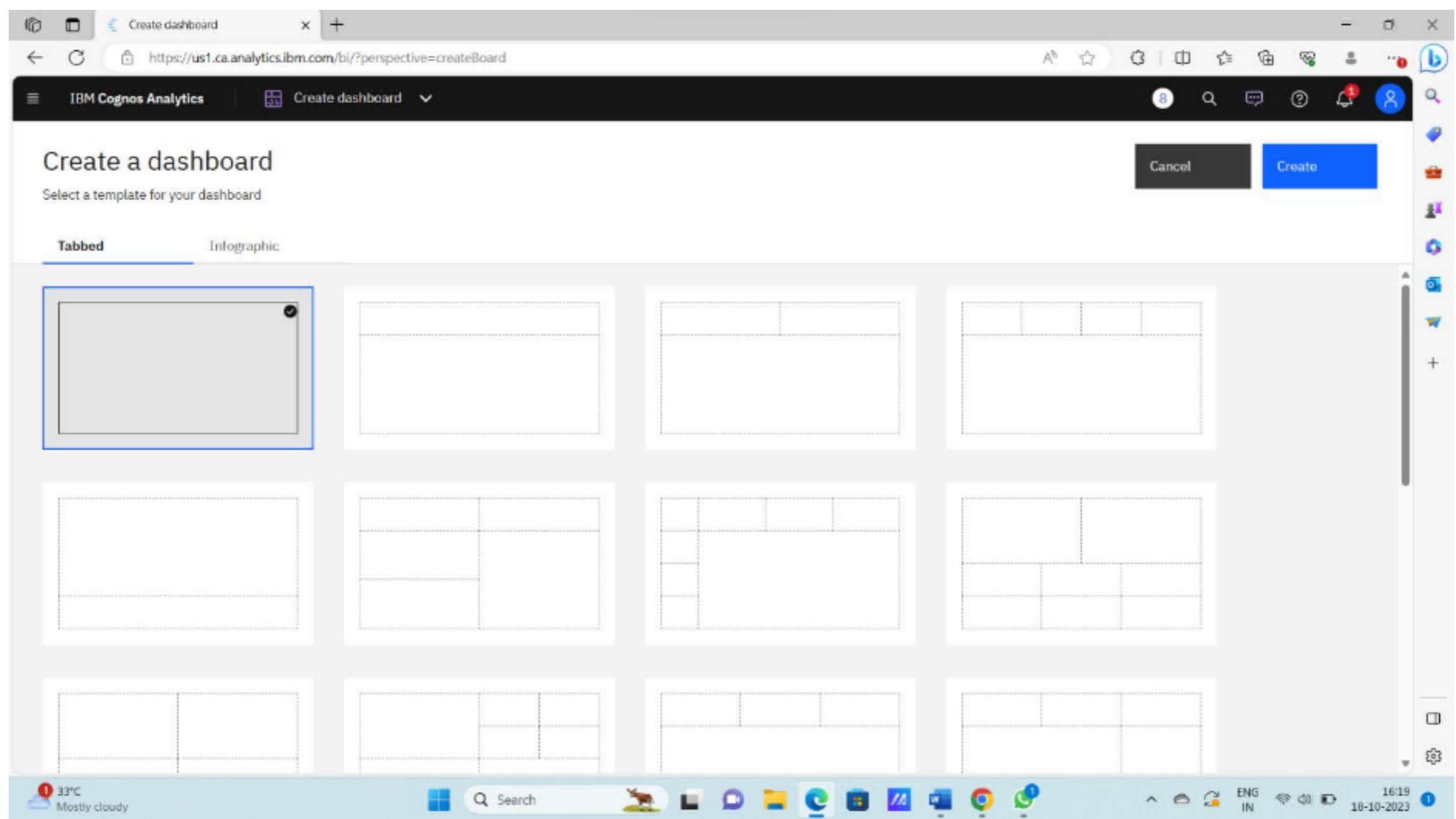
Dashboard Creation

Dashboard creation are helpful to visualizing the data

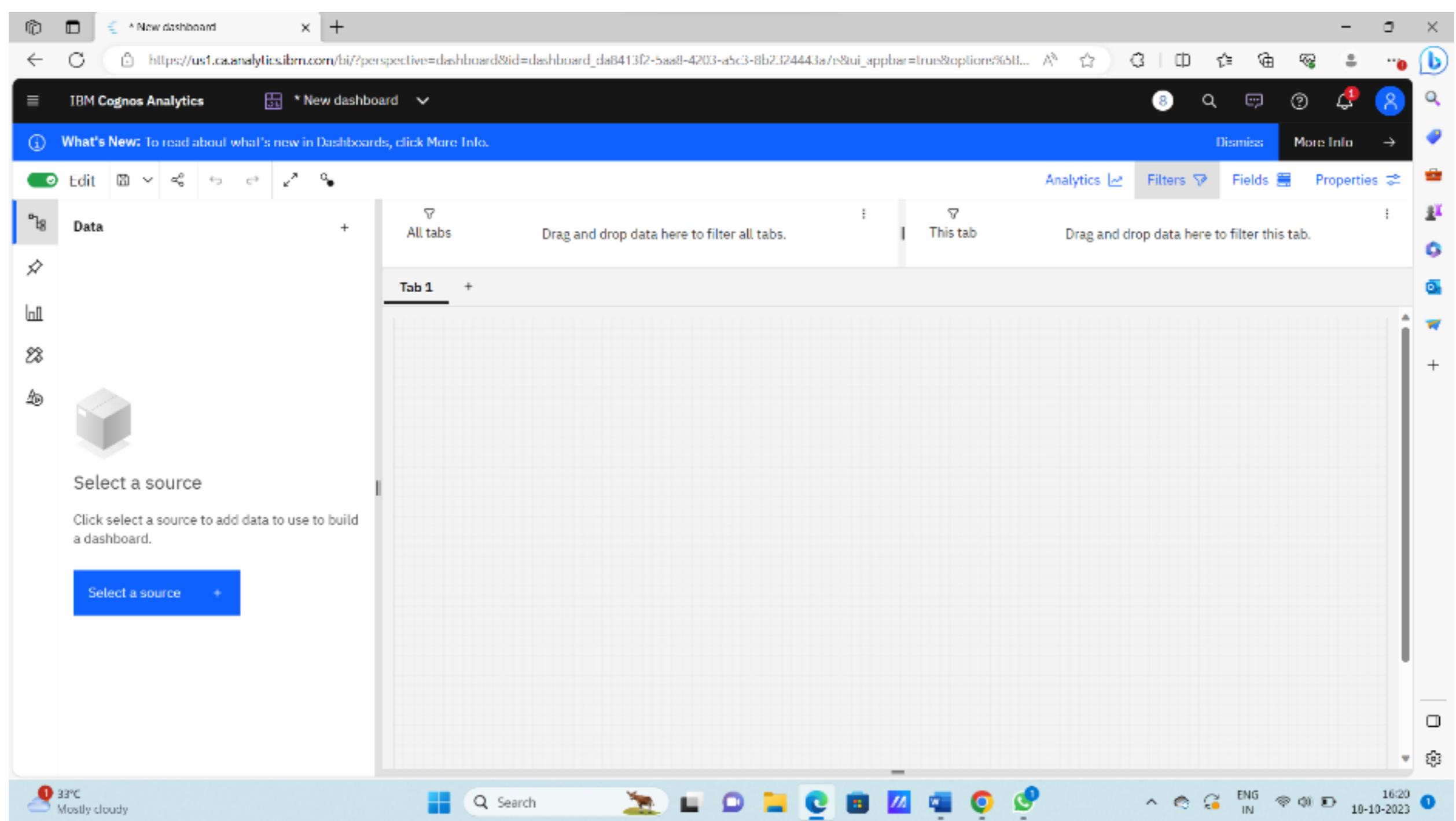
- 1.Goto Home menu**
- 2.Select the new tab**
- 3.Click dashboard**



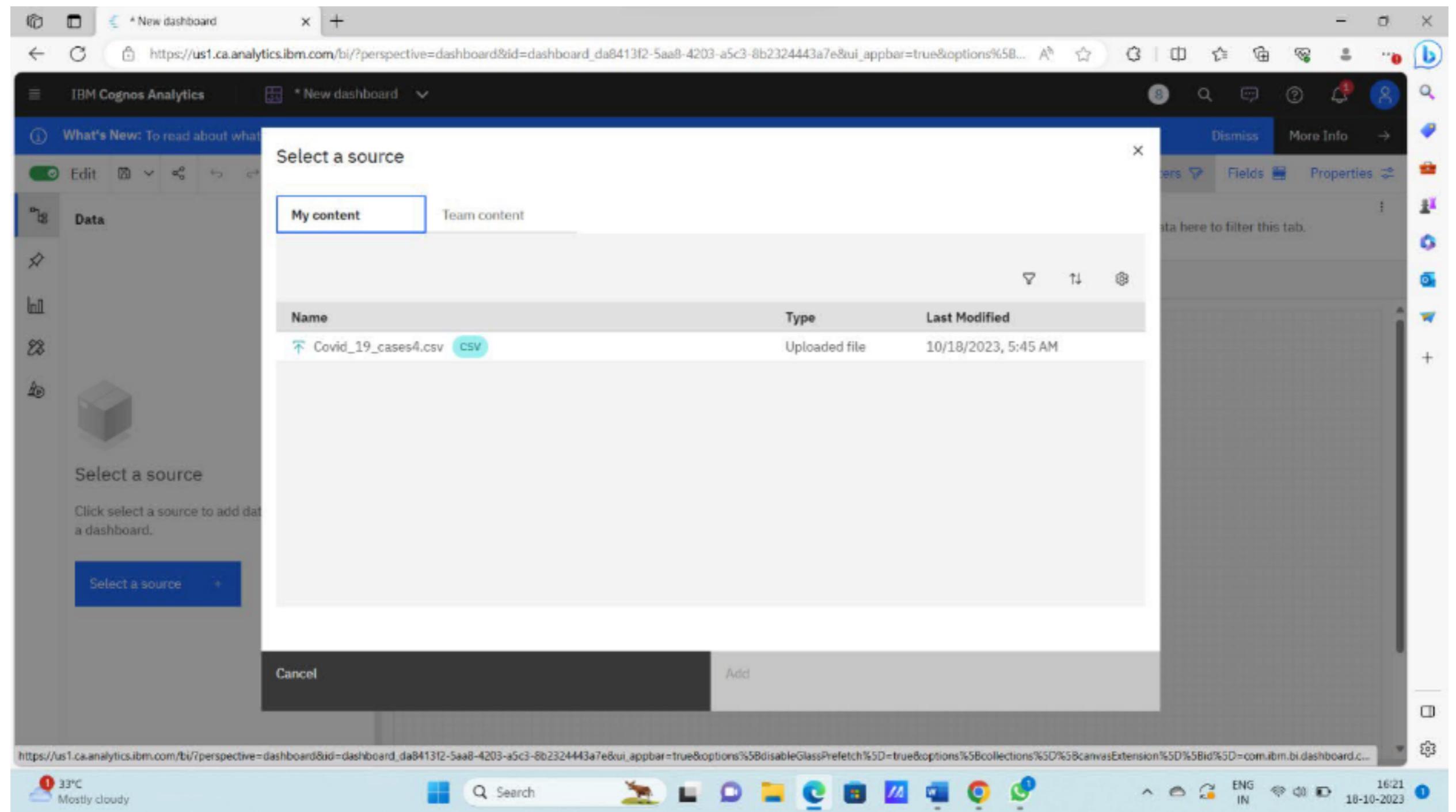
- 4. Choose the template for your project and click**



5. Now Dashboard is created



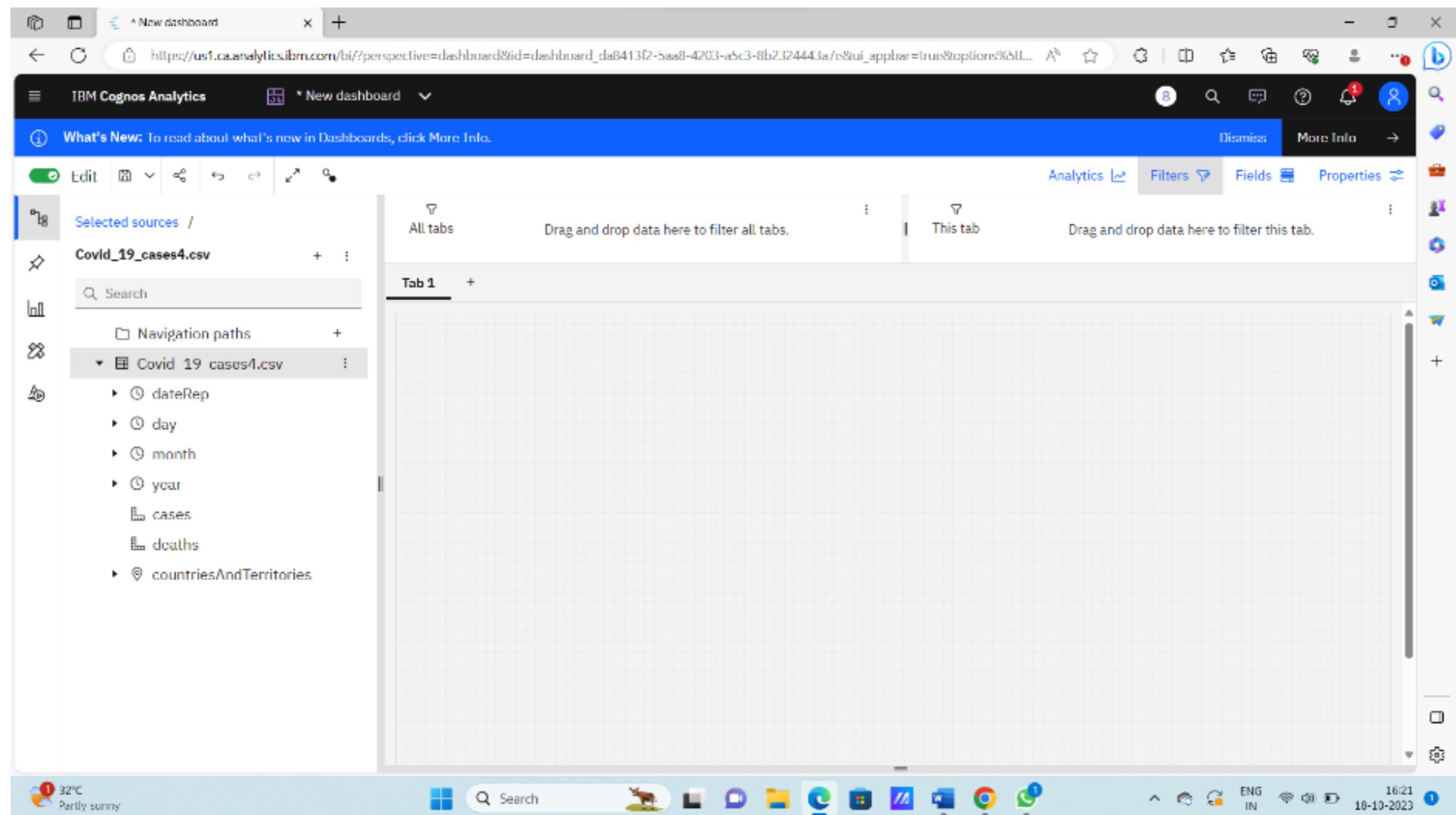
6. Select the data source



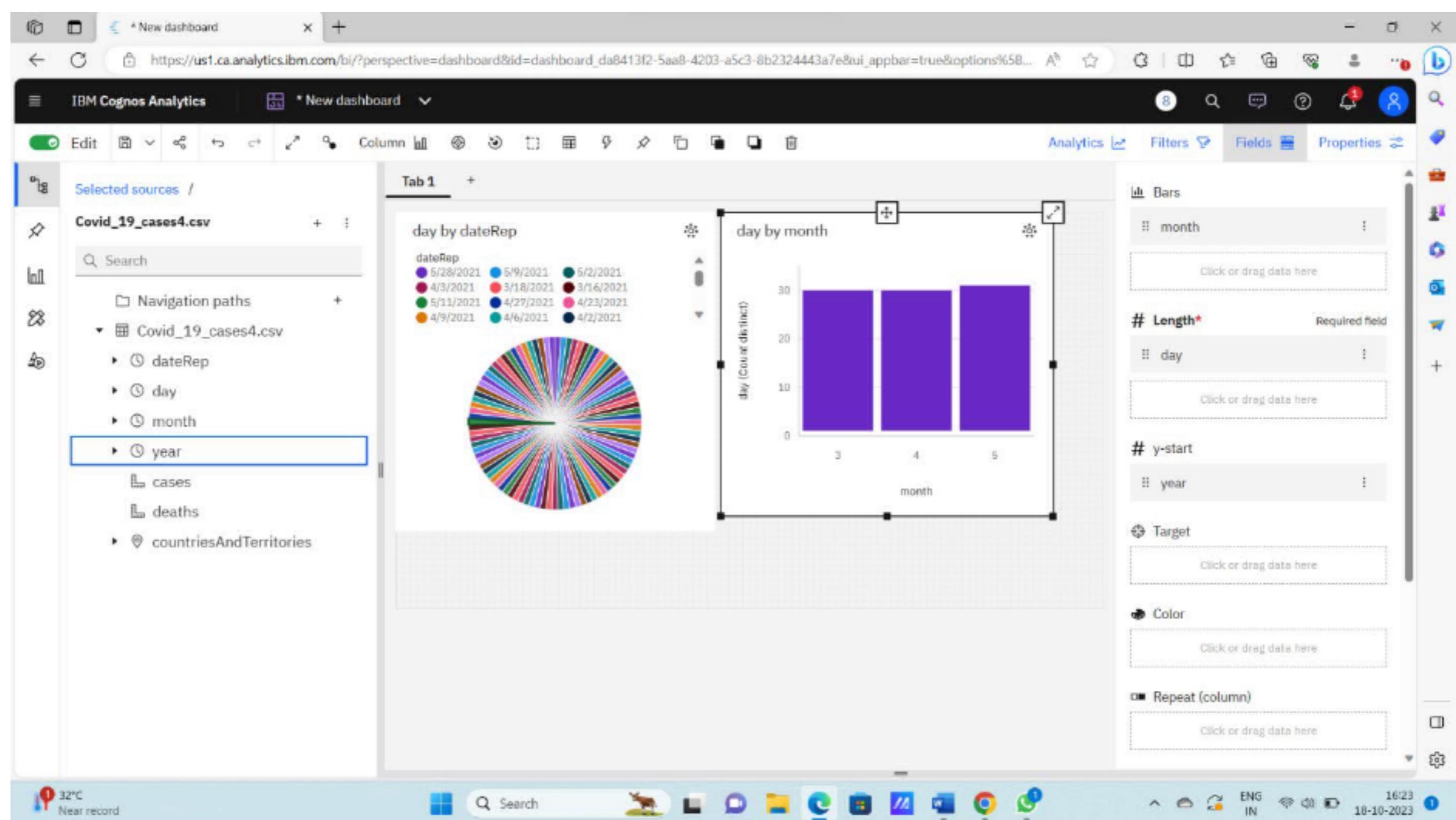
Visualization : After creating the dashboard, the next step is to visualize the data

In IBM Cognos

1. Goes to the Corresponding Dashboard
2. select the visualizations tab in the left side of title bar



3. Choose the system as you want and put the data source for the required columns



In the above screen shot displays the Pie chart and model compares the " day" and " month" .

X-axis = day

Y-axis = month

After performing these activities a comprehensive document will be created to demonstrate the ability to Communicate and share finding.

7.Code:

```
covid-19

October 27, 2023

[5]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
data=pd.read_csv("C:\\\\Users\\\\harsh\\\\OneDrive\\\\Desktop\\\\country_vaccinations.csv")
data.head()

[5]:
   country iso_code      date  total_vaccinations  people_vaccinated \
0  Afghanistan     AFG  2021-02-22                  0.0                  0.0
1  Afghanistan     AFG  2021-02-23                  NaN                  NaN
2  Afghanistan     AFG  2021-02-24                  NaN                  NaN
3  Afghanistan     AFG  2021-02-25                  NaN                  NaN
4  Afghanistan     AFG  2021-02-26                  NaN                  NaN

   people_fully_vaccinated  daily_vaccinations_raw  daily_vaccinations \
0                      NaN                      NaN                  NaN
1                      NaN                      1367.0                1367.0
2                      NaN                      1367.0                1367.0
3                      NaN                      1367.0                1367.0
4                      NaN                      1367.0                1367.0

   total_vaccinations_per_hundred  people_vaccinated_per_hundred \
0                           0.0                           0.0
1                           NaN                           NaN
2                           NaN                           NaN
3                           NaN                           NaN
4                           NaN                           NaN

   people_fully_vaccinated_per_hundred  daily_vaccinations_per_million \
0                               NaN                           NaN
1                               NaN                          34.0
2                               NaN                          34.0
3                               NaN                          34.0
4                               NaN                          34.0

   vaccines \
0
1
2
3
4
```

```

0 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi-
1 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi-
2 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi-
3 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi-
4 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi-

           source_name          source_website
0 World Health Organization https://covid19.who.int/
1 World Health Organization https://covid19.who.int/
2 World Health Organization https://covid19.who.int/
3 World Health Organization https://covid19.who.int/
4 World Health Organization https://covid19.who.int/

[6]: data.describe()

[6]:
   total_vaccinations  people_vaccinated  people_fully_vaccinated \
count        4.360700e+04      4.129400e+04      3.880200e+04
mean         4.592964e+07      1.770508e+07      1.413830e+07
std          2.246004e+08      7.078731e+07      5.713920e+07
min          0.000000e+00      0.000000e+00      1.000000e+00
25%         5.264100e+05      3.494642e+05      2.439622e+05
50%         3.590096e+06      2.187310e+06      1.722140e+06
75%         1.701230e+07      9.152520e+06      7.559870e+06
max         3.263129e+09      1.275541e+09      1.240777e+09

   daily_vaccinations_raw  daily_vaccinations \
count        3.536200e+04      8.621300e+04
mean         2.705996e+05      1.313055e+05
std          1.212427e+06      7.682388e+05
min          0.000000e+00      0.000000e+00
25%         4.668000e+03      9.000000e+02
50%         2.530900e+04      7.343000e+03
75%         1.234925e+05      4.409800e+04
max         2.474100e+07      2.242429e+07

   total_vaccinations_per_hundred  people_vaccinated_per_hundred \
count            43607.000000      41294.000000
mean           80.188543      40.927317
std            67.913577      29.290759
min            0.000000      0.000000
25%          16.050000      11.370000
50%          67.520000      41.435000
75%         132.735000      67.910000
max         345.370000      124.760000

   people_fully_vaccinated_per_hundred  daily_vaccinations_per_million
count            38802.000000      86213.000000

```

```
EpiVacCorona, Oxford/AstraZeneca, QazVac, Sinopharm/Beijing, Sputnik V, ZF2001  
190
```

```
Name: count, Length: 84, dtype: int64
```

```
[9]: df = data[['vaccines', 'country']]  
df.head()
```

```
[9]:
```

	vaccines	country
0	Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...	Afghanistan
1	Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...	Afghanistan
2	Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...	Afghanistan
3	Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...	Afghanistan
4	Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...	Afghanistan

```
[12]: dict_ = {}  
for i in df.vaccines.unique():  
    dict_[i] = [df["country"][j] for j in df[df["vaccines"]==i].index]  
  
vaccines = {}  
for key, value in dict_.items():  
    vaccines[key] = set(value)  
for i, j in vaccines.items():  
    print(f"({i}):>>({j})")
```

```
Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech,  
Sinopharm/Beijing:>>{'Cameroon', 'Afghanistan', 'Namibia', 'Trinidad and  
Tobago', 'Belize'}  
Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V:>>{'Oman', 'Albania',  
'Bosnia and Herzegovina', 'Azerbaijan'}  
Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik V:>>{'Algeria',  
'Zimbabwe'}  
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech:>>{'Japan', 'Scotland', 'England',  
'Sweden', 'Andorra', 'Fiji', 'Australia', 'Finland', 'Jersey', 'Isle of Man',  
'Sint Maarten (Dutch part)', 'United Kingdom', 'Northern Ireland', 'Wales',  
'Guernsey'}  
Oxford/AstraZeneca:>>{'Mali', 'Samoa', 'Democratic Republic of Congo',  
'Vanuatu', 'Pitcairn', 'Papua New Guinea', 'Montserrat', 'Falkland Islands',  
'Angola', 'Kiribati', 'Sao Tome and Principe', 'Tuvalu', 'Togo', 'Nigeria',  
'Tonga', 'Liberia', 'Nauru', 'Saint Vincent and the Grenadines', 'Solomon  
Islands', 'Saint Helena'}  
Oxford/AstraZeneca, Pfizer/BioNTech:>>{'Anguilla', 'Cayman Islands', 'Costa  
Rica', 'New Zealand', 'Kosovo', 'Bermuda', 'Saudi Arabia', 'Gibraltar', 'Saint  
Kitts and Nevis', 'Panama', 'Saint Lucia'}  
Oxford/AstraZeneca, Pfizer/BioNTech, Sputnik V:>>{'Antigua and Barbuda'}  
CanSino, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing,  
Sputnik V:>>{'Argentina'}  
Moderna, Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik V:>>{'Armenia'}
```

```
mean           35.523243          3257.049157
std            28.376252          3934.312440
min           0.000000          0.000000
25%           7.020000          636.000000
50%           31.750000         2050.000000
75%           62.080000         4682.000000
max          122.370000        117497.000000
```

```
[7]: pd.to_datetime(data.date)
data.country.value_counts()
```

```
[7]: country
Norway           482
Latvia           480
Denmark          476
United States    471
Russia           470
-
Bonaire Sint Eustatius and Saba 146
Tokelau          114
Saint Helena     92
Pitcairn         85
Falkland Islands 67
Name: count, Length: 223, dtype: int64
```

```
[8]: data.vaccines.value_counts()
```

```
[8]: vaccines
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech
7608
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech
6263
Oxford/AstraZeneca
6022
Oxford/AstraZeneca, Pfizer/BioNTech
4629
Johnson&Johnson, Moderna, Novavax, Oxford/AstraZeneca, Pfizer/BioNTech
3564
-
Johnson&Johnson, Oxford/AstraZeneca, Sinovac
312
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V
311
Johnson&Johnson, Moderna
251
Johnson&Johnson, Pfizer/BioNTech, Sinopharm/Beijing
228
```

Pfizer/BioNTech:>>{'Monaco', 'Tokelau', 'Turks and Caicos Islands', 'Aruba', 'Niue', 'New Caledonia', 'Cook Islands'}

Johnson&Johnson, Moderna, Novavax, Oxford/AstraZeneca,

Pfizer/BioNTech:>>{'Italy', 'Slovenia', 'Lithuania', 'South Korea', 'Czechia', 'Austria', 'Germany', 'Netherlands'}

Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech:>>{'Eswatini', 'Bahamas', 'Grenada'}

Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,

Sinopharm/Beijing, Sputnik Light, Sputnik V:>>{'Bahrain'}

Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,

Sinopharm/Beijing, Sinovac:>>{'Bangladesh'}

Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing:>>{'Dominica', 'Peru', 'Suriname', 'Barbados', 'Maldives'}

Sinopharm/Beijing, Sputnik V:>>{'Belarus', 'Kyrgyzstan'}

Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech:>>{'Estonia', 'Greece', 'Iceland', 'Poland', 'Romania', 'Bulgaria', 'Spain', 'Cyprus', 'Jamaica', 'Luxembourg', 'Croatia', 'Canada', 'France', 'Belgium', 'Portugal', 'Ireland', 'Malta'}

Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac:>>{'Benin', 'Brazil'}

Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing:>>{'Cape Verde', 'Bhutan'}

Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik V:>>{'Morocco', "Cote d'Ivoire", 'Moldova', 'Bolivia'}

Moderna, Pfizer/BioNTech:>>{'Qatar', 'Israel', 'Bonaire Sint Eustatius and Saba', 'Faeroe Islands', 'Norway', 'Curacao'}

Covaxin, Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,

Sinovac:>>{'Botswana'}

Johnson&Johnson, Oxford/AstraZeneca:>>{'Malawi', 'British Virgin Islands', 'South Sudan'}

Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,

Sinopharm/Beijing:>>{'Nepal', 'Brunei', 'Kuwait', 'Kenya'}

Johnson&Johnson, Oxford/AstraZeneca, Sinopharm/Beijing:>>{'Mozambique', 'Zambia', 'Senegal', 'Lesotho', 'Burkina Faso', 'Madagascar', 'Gambia'}

Sinopharm/Beijing:>>{'Burundi', 'Equatorial Guinea', 'Chad'}

Johnson&Johnson, Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac:>>{'Somalia', 'Cambodia'}

Covaxin, Oxford/AstraZeneca:>>{'Central African Republic'}

CanSino, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac:>>{'Chile', 'Ecuador'}

CanSino, Sinopharm/Beijing, Sinopharm/Wuhan, Sinovac, ZF2001:>>{'China'}

Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,

Sinovac:>>{'Ukraine', 'Uganda', 'Colombia'}

Covaxin, Oxford/AstraZeneca, Sinopharm/Beijing:>>{'Comoros', 'Mauritius'}

Moderna, Oxford/AstraZeneca, Sinopharm/Beijing, Sputnik V:>>{'Congo'}

Abdala, Soberana Plus, Soberana02:>>{'Cuba'}

Johnson&Johnson, Moderna, Pfizer/BioNTech:>>{'Liechtenstein', 'Switzerland', 'United States', 'Denmark'}

Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing,

Sinovac, Sputnik V:>>{'Guinea', 'Egypt', 'Djibouti'}
Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac:>>{'Georgia',
'El Salvador', 'Dominican Republic'}
Covaxin, Johnson&Johnson, Oxford/AstraZeneca, Sinopharm/Beijing.
Sinovac:>>{'Ethiopia'}
Johnson&Johnson, Pfizer/BioNTech:>>{'South Africa', 'French Polynesia'}
Pfizer/BioNTech, Sinopharm/Beijing, Sputnik V:>>{'Gabon'}
Oxford/AstraZeneca, Sputnik V:>>{'Ghana'}
Moderna:>>{'Greenland', 'Wallis and Futuna'}
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sputnik V:>>{'Guatemala'}
Oxford/AstraZeneca, Sinopharm/Beijing:>>{'Niger', 'Myanmar', 'Mauritania',
'Sierra Leone', 'Guinea-Bissau'}
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik
V:>>{'Guyana', 'Sri Lanka'}
Johnson&Johnson, Moderna:>>{'Haiti'}
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sputnik
V:>>{'Honduras'}
Pfizer/BioNTech, Sinovac:>>{'Hong Kong'}
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,
Sinopharm/Beijing, Sputnik V:>>{'Hungary', 'Jordan'}
Covaxin, Oxford/AstraZeneca, Sputnik V:>>{'India'}
Johnson&Johnson, Moderna, Novavax, Oxford/AstraZeneca, Pfizer/BioNTech,
Sinopharm/Beijing, Sinovac:>>{'Indonesia'}
COVIRan Barekat, Covaxin, FAKHRAVAC, Oxford/AstraZeneca, Razi Cov Pars,
Sinopharm/Beijing, Soberana02, SpikoGen, Sputnik V:>>{'Iran'}
Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik V:>>{'Lebanon',
'Montenegro', 'Iraq', 'Serbia', 'Mongolia'}
QazVac, Sinopharm/Beijing, Sputnik V:>>{'Kazakhstan'}
Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing,
Sinovac, Sputnik Light, Sputnik V:>>{'Laos'}
Johnson&Johnson, Moderna, Novavax, Pfizer/BioNTech:>>{'Latvia'}
Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac, Sputnik
V:>>{'Libya', 'North Macedonia'}
Pfizer/BioNTech, Sinopharm/Beijing:>>{'Macao'}
CanSino, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing.
Sinovac:>>{'Malaysia'}
CanSino, Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac,
Sputnik V:>>{'Mexico'}
Abdala, Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Soberana02,
Sputnik Light, Sputnik V:>>{'Nicaragua'}
Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac:>>{'Uruguay', 'Northern Cyprus',
'Timor'}
CanSino, Covaxin, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,
Sinopharm/Beijing, Sinovac, Sputnik V:>>{'Pakistan'}
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,
Sinopharm/Beijing, Sinovac, Sputnik Light, Sputnik V:>>{'Philippines',
'Palestine'}
Covaxin, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing.

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Sinovac, Sputnik V:>>{'Paraguay'}
EpiVacCorona, Sputnik V:>>{'Russia'}
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech,
Sinopharm/Beijing, Sinovac, Sputnik V:>>{'Tunisia', 'Rwanda'}
Pfizer/BioNTech, Sputnik V:>>{'San Marino'}
Oxford/AstraZeneca, Sinopharm/Beijing, Sputnik V:>>{'Seychelles'}
Moderna, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac:>>{'Singapore'}
Johnson&Johnson, Moderna, Novavax, Oxford/AstraZeneca, Pfizer/BioNTech, Sputnik
V:>>{'Slovakia'}
Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing,
Sinovac:>>{'Sudan'}
Johnson&Johnson, Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik Light,
Sputnik V:>>{'Syria'}
Medigen, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech:>>{'Taiwan'}
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik
V:>>{'Tajikistan'}
Johnson&Johnson, Pfizer/BioNTech, Sinopharm/Beijing:>>{'Tanzania'}
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing,
Sinovac:>>{'Thailand'}
Pfizer/BioNTech, Sinovac, Turkovac:>>{'Turkey'}
EpiVacCorona, Oxford/AstraZeneca, QazVac, Sinopharm/Beijing, Sputnik V,
ZF2001:>>{'Turkmenistan'}
Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinopharm/Wuhan, Sputnik
V:>>{'United Arab Emirates'}
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik Light, Sputnik V,
ZF2001:>>{'Uzbekistan'}
Abdala, Sinopharm/Beijing, Sinovac, Soberana02, Sputnik Light, Sputnik
V:>>{'Venezuela'}
Abdala, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik
V:>>{'Vietnam'}
Johnson&Johnson, Oxford/AstraZeneca, Sinovac:>>{'Yemen'}
```

```
[17]: import plotly.express as px
import plotly.offline as py

vaccine_map = px.choropleth(data, locations = 'iso_code', color = 'vaccines')
vaccine_map.update_layout(height=300, margin={"r":0, "t":0, "l":0, "b":0})
vaccine_map.show()
```

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[ ]:
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Conclusion :

In conclusion, Cognos Analysis has proven to be an invaluable asset in our ongoing fight against COVID-19. This powerful tool has enabled us to dissect complex data, revealing critical insights into the virus's spread, its impact on diverse demographics, and the effectiveness of containment measures and vaccination efforts. By harnessing the capabilities of Cognos Analysis, we are better equipped to make data-driven decisions, allocate resources efficiently, and navigate the challenges posed by the pandemic with greater precision.

As we continue to leverage this technology, we move closer to a world where

the impact of COVID-19 is minimized, and our communities are better protected.