COVID-19 Case Analysis Using Cognos

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Phase 3: Development Part 1

Project: COVID-19 Case Analysis

Step-1: Problem Definition

The project involves analyzing COVID-19 cases and deaths data using IBM Cognos. The objective is to compare and contrast the mean values and standard deviations of cases and associated deaths per day and by country in the EU/EEA. This project encompasses defining analysis objectives, collecting COVID-19 data, designing relevant visualizations in IBM Cognos, and deriving insights from the data.

Step 2: Data Collection

For our COVID-19 cases analysis project, we will gather essential data from reputable sources, such as health organizations like the WHO and CDC, government databases, and peer-reviewed research publications. The primary source of our dataset will be from the link provided: [COVID-19 Case Dataset]

We will collect data daily from this dataset and merge it for comprehensive analysis. The dataset contains information related to COVID-19 cases. To ensure we have a complete dataset, we will also access data from the Our World in Data GitHub repository for COVID-19. These daily updates will be compiled and uploaded for our analysis.

To enhance our dataset, we will include data at the country level to provide a more comprehensive view of the pandemic's impact. This data will be consolidated into a single file, making it easier to work with and analyze. Additionally, we will merge this data file with a location-specific dataset to incorporate information about the sources of COVID-19 cases and their geographic origins. To further enrich our analysis, a second file containing information about the manufacturers of COVID-19 testing and diagnostic equipment will be included.

By following this data collection process, we aim to have a robust and comprehensive dataset for our COVID-19 cases analysis project.

```
#import all relevant libraries

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

from sklearn.metrics import accuracy_score, precision_score, recall_score, f1_score, confusion_matrix, classification_report
```

```
#loading the dataset
data=pd.read_csv(r"C:\Users\Dhanu\OneDrive\Desktop\Covid_19_cases4.csv")
data.head()
```

	dateRep	day	month	year	cases	deaths	countriesAndTerritories
0	31-05-2021	31	5	2021	366	5	Austria
1	30-05-2021	30	5	2021	570	6	Austria
2	29-05-2021	29	5	2021	538	11	Austria
3	28-05-2021	28	5	2021	639	4	Austria
4	27-05-2021	27	5	2021	405	19	Austria

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2730 entries, 0 to 2729
Data columns (total 7 columns):
 #   Column                  Non-Null Count  Dtype 
---  ------                  --------------  ----- 
 0   dateRep                 2730 non-null   object
 1   day                     2730 non-null   int64 
 2   month                   2730 non-null   int64 
 3   year                    2730 non-null   int64 
 4   cases                   2730 non-null   int64 
 5   deaths                  2730 non-null   int64 
 6   countriesAndTerritories  2730 non-null   object
dtypes: int64(5), object(2)
memory usage: 149.4+ KB
```

```
data.describe()
```

	day	month	year	cases	deaths
count	2730.000000	2730.000000	2730.0	2730.000000	2730.000000
mean	16.000000	4.010989	2021.0	3661.010989	65.291941
std	8.765919	0.818813	0.0	6490.510073	113.956634
min	1.000000	3.000000	2021.0	-2001.000000	-3.000000
25%	8.000000	3.000000	2021.0	361.250000	2.000000
50%	16.000000	4.000000	2021.0	926.500000	14.500000
75%	24.000000	5.000000	2021.0	3916.250000	72.000000
max	31.000000	5.000000	2021.0	53843.000000	956.000000

Step 3: Data Preprocessing

• In the context of our COVID-19 cases analysis project, the critical phase of data preprocessing is vital to ensure the data's quality and suitability for analysis.

• This phase encompasses various tasks, including the identification and removal of duplicate records, standardizing inconsistent data formatting, managing missing values, and the conversion of categorical features into numerical representations when necessary.

```
data.dtypes
```

```
dateRep                    object
day                         int64
month                       int64
year                        int64
cases                       int64
deaths                      int64
countriesAndTerritories    object
dtype: object
```

Step 4: Data Exploration

In this phase, we will conduct an exploratory data analysis (EDA) to gain a comprehensive understanding of the dataset, including its distribution, correlations, and trends. EDA is an essential step for delving deeper into the dataset's characteristics. It involves the generation of statistical summaries, data distribution visualizations, and the identification of notable trends and outliers. We will focus on several critical aspects during this exploration, including the geographical distribution of COVID-19 cases, the progression of vaccination rates over time, and the detection of potential irregularities or anomalies in the data. Visualizing the data will be instrumental in uncovering insights related to COVID-19 case distribution and any associated adverse effects.

```
data.isnull().sum()
```

```
dateRep                    0
day                        0
month                      0
year                       0
cases                      0
deaths                     0
countriesAndTerritories    0
dtype: int64
```

```
#convert the date to datetime
data['dateRep'] = pd.to_datetime(data['dateRep'])
data.dtypes
```

```
dateRep                    datetime64[ns]
day                                 int64
month                               int64
year                                int64
cases                               int64
deaths                              int64
countriesAndTerritories            object
dtype: object
```

```
# Calculate mean and median total vaccinations
mean_deaths = data['deaths'].mean()
median_deaths = data['deaths'].median()

# Calculate the correlation between total vaccinations and people fully vaccinated
correlation = data['deaths'].corr(data['cases'])

# Display the results
print(f"Mean deaths: {mean_deaths:.2f}")
print(f"Median deaths: {median_deaths:.2f}")
print(f"Correlation (deaths vs. cases): {correlation:.2f}")
```

```
Mean deaths: 65.29
Median deaths: 14.50
Correlation (deaths vs. cases): 0.77
```

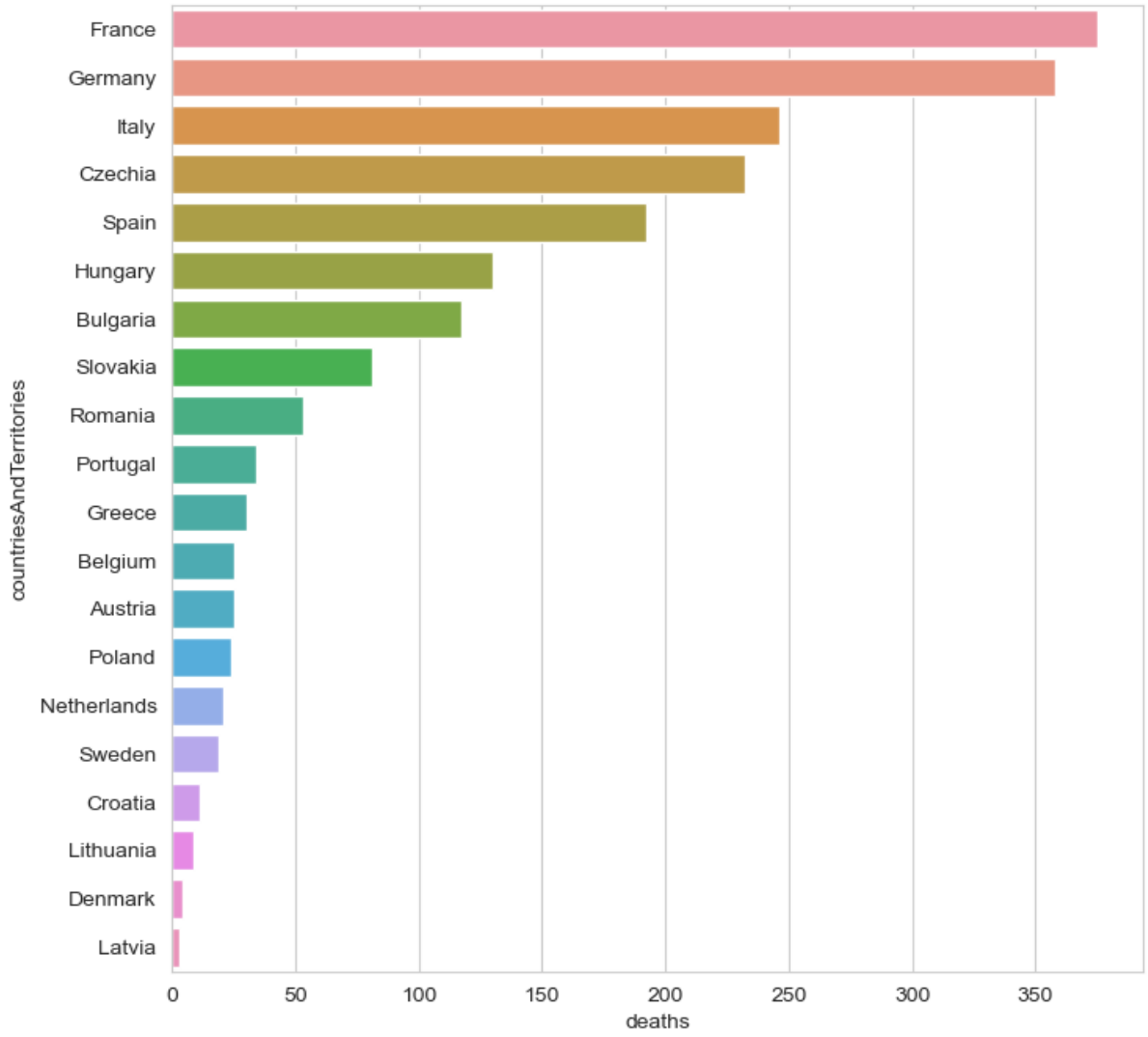
```
#EDA

data.countriesAndTerritories.value_counts()
```

```
Austria           91
Belgium           91
Spain             91
Slovenia          91
Slovakia          91
Romania           91
Portugal          91
Poland            91
Norway            91
Netherlands       91
Malta             91
Luxembourg        91
Lithuania         91
Liechtenstein     91
Latvia            91
Italy             91
Ireland           91
Iceland           91
Hungary           91
Greece            91
Germany           91
France            91
Finland           91
Estonia           91
Denmark           91
Czechia           91
Cyprus            91
Croatia           91
Bulgaria          91
Sweden            91
Name: countriesAndTerritories, dtype: int64
```

```
data["deaths"]= data.groupby("countriesAndTerritories").deaths.tail(1)
#countriesAndTerritories with deaths
data.groupby("countriesAndTerritories")["deaths"].mean().sort_values(ascending= False).head(20)
```

```
countriesAndTerritories
France          375.0
Germany         358.0
Italy           246.0
Czechia         232.0
Spain           192.0
Hungary         130.0
Bulgaria        117.0
Slovakia         81.0
Romania          53.0
Portugal         34.0
Greece           30.0
Belgium          25.0
Austria          25.0
Poland           24.0
Netherlands      21.0
Sweden           19.0
Croatia          11.0
Lithuania         9.0
Denmark           4.0
Latvia            3.0
Name: deaths, dtype: float64
```

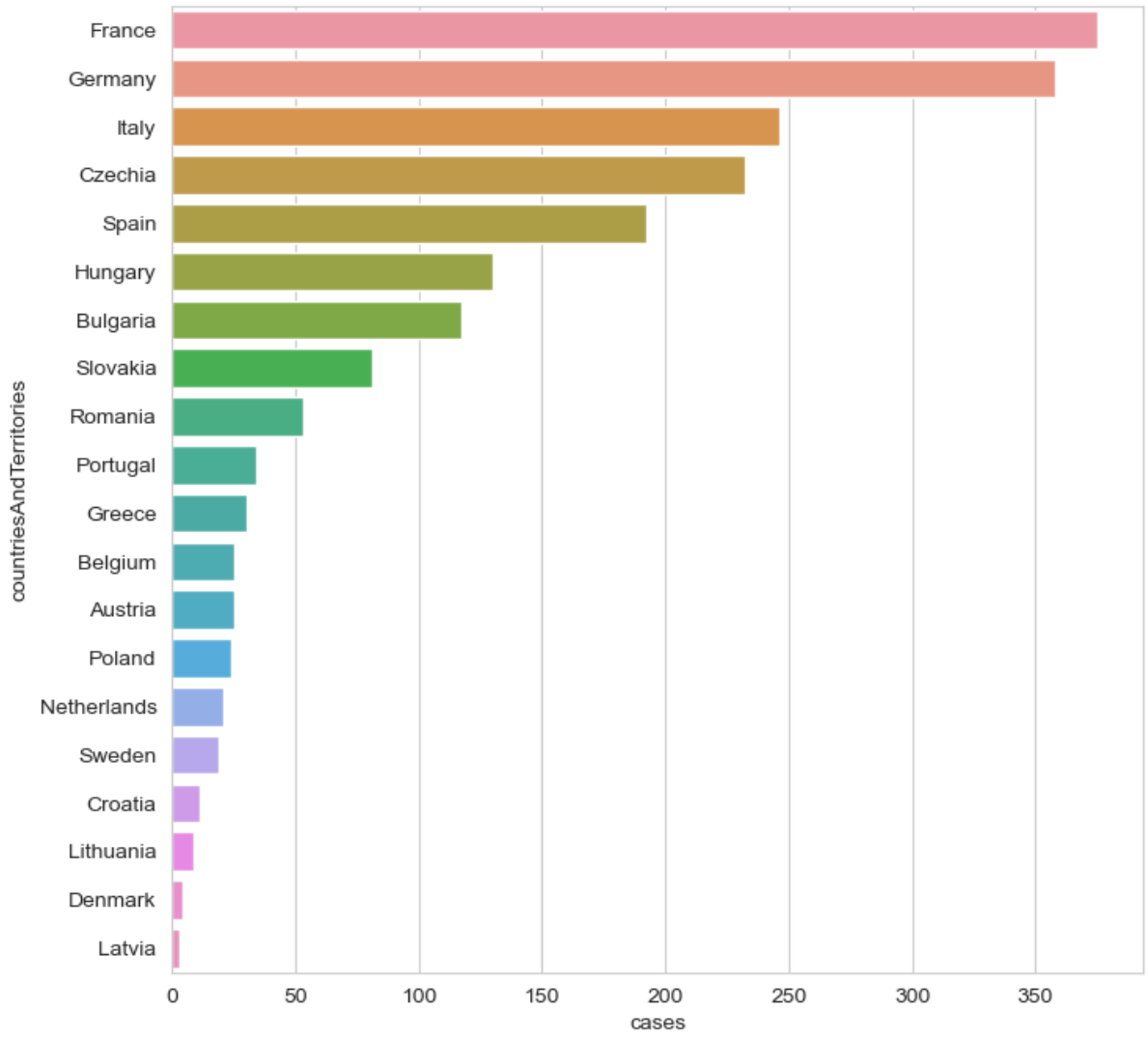
```
#barplot visualization of countriesAndTerritories with deaths
x= data.groupby("countriesAndTerritories")["deaths"].mean().sort_values(ascending= False).head(20)
sns.set_style("whitegrid")
plt.figure(figsize= (8,8))
ax= sns.barplot(x.values,x.index)
ax.set_xlabel("deaths")
plt.show()
```



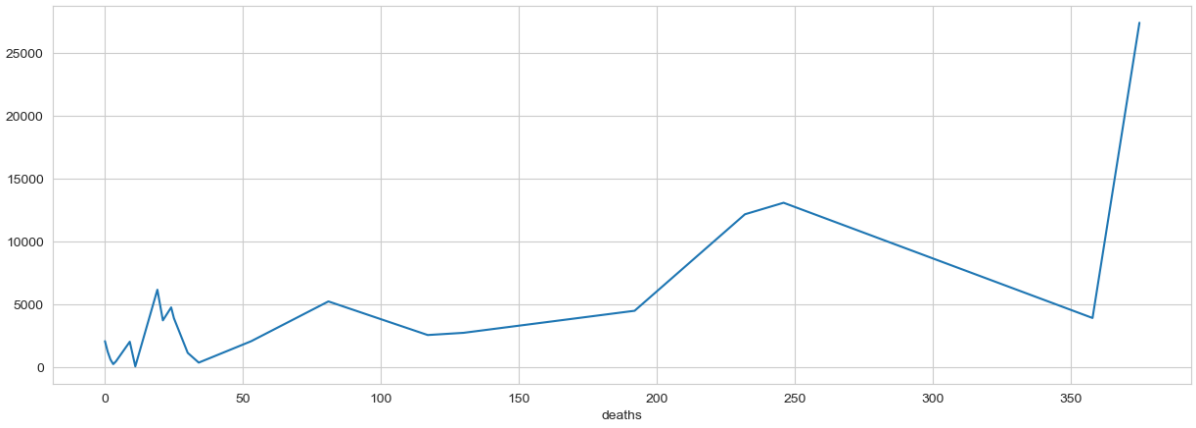

```
#Top countriesAndTerritories with cases
data["cases"]= data.groupby("countriesAndTerritories").cases.tail(1)

data.groupby("countriesAndTerritories")["cases"].mean().sort_values(ascending= False).head(20)
```

```
countriesAndTerritories
France          27422.0
Italy           13106.0
Czechia         12191.0
Sweden           6191.0
Slovakia         5260.0
Poland           4786.0
Spain            4517.0
Germany          3943.0
Netherlands      3753.0
Belgium          2775.0
Hungary          2764.0
Bulgaria         2588.0
Romania          2096.0
Lithuania        2055.0
Greece           1170.0
Austria          1148.0
Estonia          1111.0
Norway            968.0
Ireland           681.0
Denmark           497.0
Name: cases, dtype: float64
```

```
#barplot visualization of countriesAndTerritories with cases

sns.set_style("whitegrid")
plt.figure(figsize= (8,8))
ax= sns.barplot(x.values,x.index)
ax.set_xlabel("cases")
plt.show()
```




```
#daily cases
x= data.groupby("deaths").cases.sum()
plt.figure(figsize= (15,5))
sns.lineplot(x.index,x.values)
plt.show()
```



```
#COMPARING TOP 5 countriesAndTerritories WITH DEATHS
data.groupby("countriesAndTerritories")["deaths"].mean().sort_values(ascending= False).head()
```

```
countriesAndTerritories
France      375.0
Germany     358.0
Italy       246.0
Czechia     232.0
Spain       192.0
Name: deaths, dtype: float64
```

```
#creating dataframe for top 5 vaccinated countries
x= data.loc[(data.countriesAndTerritories== "France") | (data.countriesAndTerritories== "Germany")|
            (data.countriesAndTerritories== "Italy")| (data.countriesAndTerritories== "Czechia")|
            (data.countriesAndTerritories== "Spain")]
```

```
#total deaths comparison
plt.figure(figsize= (10,5))
sns.barplot(x= "cases",y= "deaths" ,data= x,hue= "countriesAndTerritories")
plt.show()
```