NAAN MUDHULVAN PHASE-3

DEVELOPMENT PART -1

Project name: COVID Vaccines Analysis

DATA ANALYTICS OF COVID VACCINES ANALYSIS

Introduction

The COVID-19 pandemic has had a profound impact on global health and society. Vaccination campaigns are one of the most significant strategies to control the spread of the virus and mitigate its effects. This project aims to utilize virtualization technology to analyze and visualize data related to COVID-19 vaccines, offering insights into their development, distribution, and effectiveness. This virtualization shows that the vaccination done records through which has contains various people from various places.

Dataset and Its Detailed Explanation:

The dataset "COVID-19 World Vaccination Progress" provides information about the vaccination progress worldwide. It includes data on vaccination campaigns, vaccine types, and the number of people vaccinated. The dataset is available on Kaggle at COVID-19 World Vaccination Progress.

Dataset link:
https://www.kaggle.com/datasets/gpreda/covid-world-vaccination-progress

Load the Dataset:

Here we are loading the dataset in python by importing pandas.

```
import pandas as pd
df =
pd.read_csv('path/to/country_vaccin
ations.csv')
print(df.head())
```

Preprocessing of given dataset and program implementation:

Data preprocessing is crucial for preparing the dataset for analysis. This step involves handling missing values, encoding categorical variables, scaling numerical features, etc. Here's a general example using Python and pandas.

```
df.fillna(df.mean(), inplace=True)
df = pd.get_dummies(df, columns=['categorical_column'])
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
df[['numerical_feature1', 'numerical_feature2']] = scaler.fit_transform(df[['numerical_feature1',
'numerical_feature2']])
```

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	country	iso_code	date	total_vacc	people_va	people_fu	daily_vacc	daily_vacc	total_vacc	people_va	people_fu	daily_vacc	vaccines	source_na	source_website			
2	Afghanist	AFG	22-02-2021	0	0				0	0			Johnson&	World He	https://covid19.who.int/			
3	Afghanist	AFG	23-02-2021					1367				34	Johnson&	World He	https://covid19.who.int/			
4	Afghanist	AFG	24-02-2021					1367				34	Johnson&	World He	https://covid19.who.int/			
5	Afghanist	AFG	25-02-2021					1367				34	Johnson&	World He	https://covid19.who.int/			
6	Afghanist	AFG	26-02-2021					1367				34	Johnson&	World He	https://covid19.who.int/			
7	Afghanist	AFG	27-02-2021					1367				34	Johnson&	World He	https://covid19.who.int/			
8	Afghanist	AFG	28-02-2021	8200	8200			1367	0.02	0.02		34	Johnson&	World He	https://covid19.who.int/			
9	Afghanist	AFG	01-03-2021					1580				40	Johnson&	World He	https://covid19.who.int/			
10	Afghanist	AFG	02-03-2021					1794				45	Johnson&	World He	https://covid19.who.int/			
11	Afghanist	AFG	03-03-2021					2008				50	Johnson&	World He	https://covid19.who.int/			
12	Afghanist	AFG	04-03-2021					2221				56	Johnson&	World He	https://covid19.who.int/			
13	Afghanist	AFG	05-03-2021					2435				61	Johnson&	World He	https://covid19.who.int/			
14	Afghanist	AFG	06-03-2021					2649				66	Johnson&	World He	https://covid19.who.int/			
15	Afghanist	AFG	07-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
16	Afghanist	AFG	08-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
17	Afghanist	AFG	09-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
18	Afghanist	AFG	10-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
19	Afghanist	AFG	11-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
20	Afghanist	AFG	12-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
21	Afghanist	AFG	13-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
22	Afghanist	AFG	14-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
23	Afghanist	AFG	15-03-2021					2862				72	Johnson&	World He	https://covid19.who.int/			
24	Afghanist	AFG	16-03-2021	54000	54000			2862	0.14	0.14		72	Johnson&	World He	https://covid19.who.int/			
25	Afghanist	AFG	17-03-2021					2882				72	Johnson&	World He	https://covid19.who.int/			

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```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
data = pd.read_csv("C:\Users\student\Documents\country_vaccinations.csv")
data.head()
```

```
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                     NaN              1367.0
2                      NaN                     NaN              1367.0
3                      NaN                     NaN              1367.0
4                      NaN                     NaN              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  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/
```

Data.describe ()

```
       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
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

pd.to_datetime(data.date)
data.country.value_counts()
```

```
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
```

```
data.vaccines.value_counts()
```

```
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
EpiVacCorona, Oxford/AstraZeneca, QazVac, Sinopharm/Beijing, Sputnik V,
ZF2001     190
Name: count, Length: 84, dtype: int64
```

```
df = data[["vaccines", "country"]]
df.head()
```

```
                                              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
```

```
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:>>{'Trinidad and Tobago', 'Afghanistan', 'Namibia', 'Cameroon', 'Belize'}
Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V:>>{'Albania', 'Bosnia and Herzegovina', 'Azerbaijan', 'Oman'}
Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik V:>>{'Zimbabwe', 'Algeria'}
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech:>>{'United Kingdom', 'England', 'Scotland', 'Guernsey', 'Finland', 'Fiji', 'Northern Ireland', 'Sweden', 'Isle of Man', 'Jersey', 'Wales', 'Sint Maarten (Dutch part)', 'Japan', 'Australia', 'Andorra'}
Oxford/AstraZeneca:>>{'Mali', 'Saint Vincent and the Grenadines', 'Angola', 'Nigeria', 'Saint Helena', 'Samoa', 'Liberia', 'Tuvalu', 'Nauru', 'Pitcairn', 'Tonga', 'Vanuatu', 'Togo', 'Kiribati', 'Papua New Guinea', 'Democratic Republic of Congo', 'Solomon Islands', 'Sao Tome and Principe', 'Falkland Islands', 'Montserrat'}
Oxford/AstraZeneca, Pfizer/BioNTech:>>{'New Zealand', 'Bermuda', 'Kosovo', 'Saudi Arabia', 'Cayman Islands', 'Gibraltar', 'Costa Rica', 'Panama', 'Saint Kitts and Nevis', 'Saint Lucia', 'Anguilla'}
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'}
Pfizer/BioNTech:>>{'Niue', 'New Caledonia', 'Cook Islands', 'Tokelau', 'Monaco', 'Turks and Caicos Islands', 'Aruba'}
Johnson&Johnson, Moderna, Novavax, Oxford/AstraZeneca, Pfizer/BioNTech:>>{'Germany', 'Austria', 'Czechia', 'Lithuania', 'Netherlands', 'South Korea', 'Italy', 'Slovenia'}
Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech:>>{'Bahamas', 'Grenada', 'Eswatini'}
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:>>{'Maldives', 'Suriname', 'Peru', 'Barbados', 'Dominica'}
Sinopharm/Beijing, Sputnik V:>>{'Belarus', 'Kyrgyzstan'}
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech:>>{'Ireland', 'Romania', 'Luxembourg', 'Belgium', 'Jamaica', 'Bulgaria', 'Iceland', 'Greece', 'Estonia', 'Poland', 'Spain', 'Croatia', 'Portugal', 'Cyprus', 'Canada', 'Malta', 'France'}
Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac:>>{'Brazil', 'Benin'}
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing:>>{'Bhutan', 'Cape Verde'}
Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik V:>>{'Morocco', 'Bolivia', "Cote d'Ivoire", 'Moldova'}
Moderna, Pfizer/BioNTech:>>{'Israel', 'Norway', 'Curacao', 'Bonaire Sint Eustatius and Saba', 'Qatar', 'Faeroe Islands'}

Covaxin, Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac:>>{'Botswana'}
Johnson&Johnson, Oxford/AstraZeneca:>>{'British Virgin Islands', 'Malawi', 'South Sudan'}
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing:>>{'Kuwait', 'Brunei', 'Nepal', 'Kenya'}
Johnson&Johnson, Oxford/AstraZeneca, Sinopharm/Beijing:>>{'Burkina Faso', 'Mozambique', 'Lesotho', 'Senegal', 'Zambia', 'Gambia', 'Madagascar'}
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:>>{'Ecuador', 'Chile'}
CanSino, Sinopharm/Beijing, Sinopharm/Wuhan, Sinovac, ZF2001:>>{'China'}
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac:>>{'Ukraine', 'Uganda', 'Colombia'}
Covaxin, Oxford/AstraZeneca, Sinopharm/Beijing:>>{'Mauritius', 'Comoros'}
Moderna, Oxford/AstraZeneca, Sinopharm/Beijing, Sputnik V:>>{'Congo'}
Abdala, Soberana Plus, Soberana02:>>{'Cuba'}
Johnson&Johnson, Moderna, Pfizer/BioNTech:>>{'United States', 'Denmark', 'Liechtenstein', 'Switzerland'}
Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac, Sputnik V:>>{'Djibouti', 'Guinea', 'Egypt'}
Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac:>>{'Dominican Republic', 'El Salvador', 'Georgia'}
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', 'Guinea-Bissau', 'Myanmar', 'Mauritania', 'Sierra Leone'}
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:>>{'Jordan', 'Hungary'}
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', 'Mongolia', 'Iraq', 'Serbia', 'Montenegro'}
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:>>{'Palestine', 'Philippines'}
Covaxin, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac, Sputnik V:>>{'Paraguay'}
EpiVacCorona, Sputnik V:>>{'Russia'}
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac, Sputnik V:>>{'Rwanda', 'Tunisia'}
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'}

STEPS:

Convert Date to Datetime:

Convert the 'date' column to the datetime format for easier analysis of temporal trends.

```
df['date'] = pd.to_datetime(df['date'])
```

Handling Missing Values :

Handle missing values by filling them with appropriate values. For simplicity, we'll fill missing numerical values with 0.

```
df.fillna(0, inplace=True)
```

Handle Categorical Data (if any) :

If there are categorical columns that need encoding, handle them appropriately.

```
df = pd.get_dummies(df, columns=['country'])
```

Data Exploration:

Perform exploratory data analysis (EDA) to understand the dataset better, identify trends, and plan further analyses.

```
summary_stats = df.describe()
print(summary_stats)
```

These are basic preprocessing steps. Depending on the specific analysis you plan to conduct, you may need to perform additional data cleaning, feature engineering, or handle missing values more intricately.After preprocessing,the dataset is ready for further analysis and visualization related to COVID-19 Vaccinations.

Performing Different Analyses:

Perform various analyses on the preprocessed dataset based on your project goals. This could involve statistical analysis, exploratory data analysis (EDA), machine learning modeling, visualization, etc.