



COVID-19 Vaccines Analysis

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Course Name-Applied data science



Phase-IV

Phase 4: Development Part 2

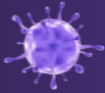


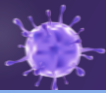


In this part you will continue building your project.

Continue conducting the Covid-19 vaccines analysis by:

- ☐ **Performing exploratory data analysis**
- ☐ **Statistical analysis**
- ☐ **Visualization.**





Performing exploratory data analysis

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localhost:8888/notebooks/Documents/Covid%2019%20vaccines%20analysis/Untitled.ipynb

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JupyterLab Python 3 (ipykernel)

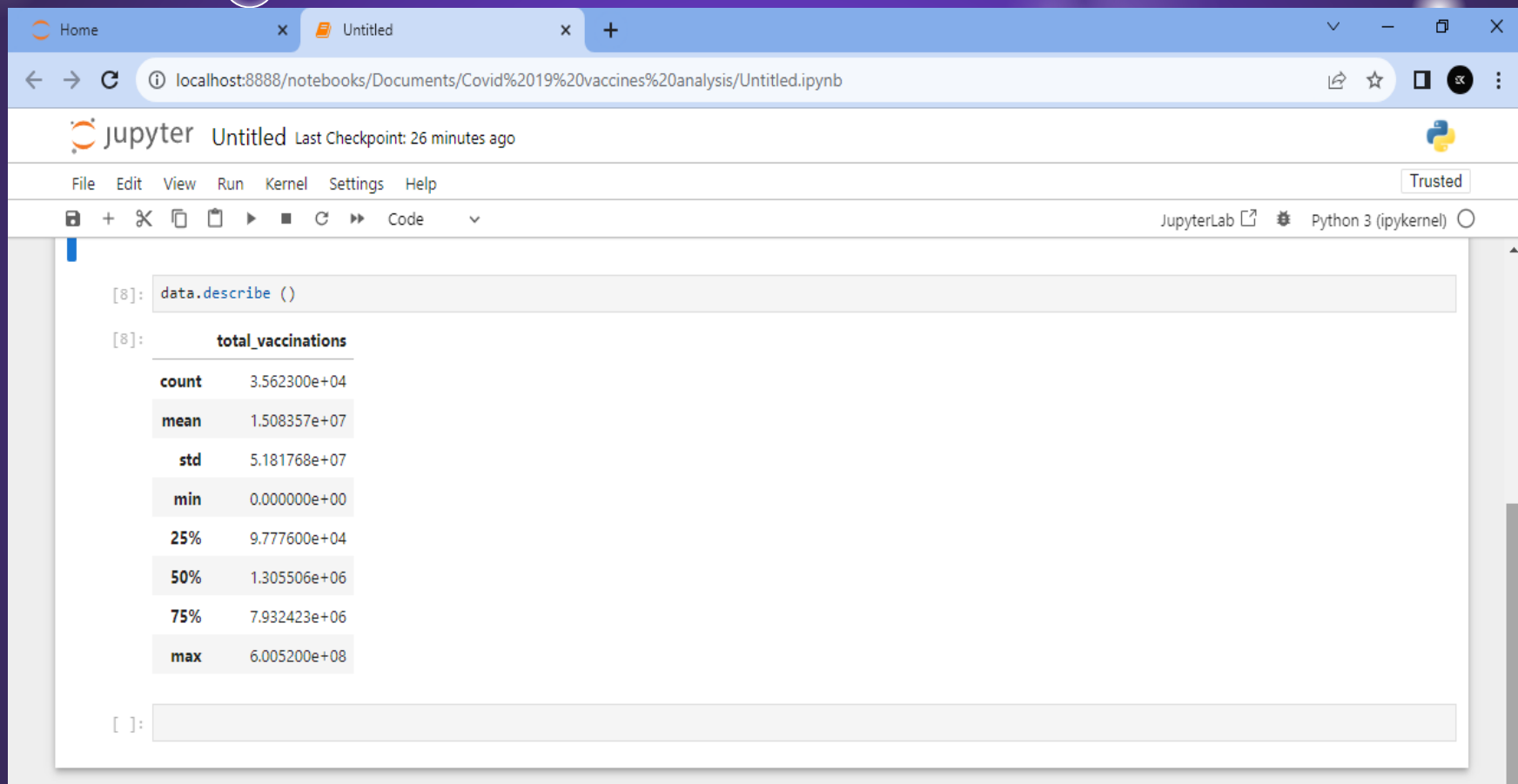
```
[7]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

data=pd.read_csv("country_vaccinations_by_manufacturer.csv")
data.head()
```

[7]:

	location	date	vaccine	total_vaccinations
0	Argentina	2020-12-29	Moderna	2
1	Argentina	2020-12-29	Oxford/AstraZeneca	3
2	Argentina	2020-12-29	Sinopharm/Beijing	1
3	Argentina	2020-12-29	Sputnik V	20481
4	Argentina	2020-12-30	Moderna	2

Data describe



The screenshot shows a JupyterLab web interface in a browser. The address bar shows the URL `localhost:8888/notebooks/Documents/Covid%2019%20vaccines%20analysis/Untitled.ipynb`. The JupyterLab header includes the Jupyter logo, the text "jupyter Untitled", and "Last Checkpoint: 26 minutes ago". Below the header is a menu bar with "File", "Edit", "View", "Run", "Kernel", "Settings", and "Help". A toolbar contains icons for saving, opening, and running code. On the right, it says "JupyterLab" and "Python 3 (ipykernel)".

The main area contains a code cell with the following code:

```
[8]: data.describe ()
```

The output of the code is a summary statistics table for the 'total_vaccinations' variable:

	total_vaccinations
count	3.562300e+04
mean	1.508357e+07
std	5.181768e+07
min	0.000000e+00
25%	9.777600e+04
50%	1.305506e+06
75%	7.932423e+06
max	6.005200e+08

Below the output table is an empty code cell with the prompt `[]:`.



2	Argentina	2020-12-29	Sinopharm/Beijing	1
3	Argentina	2020-12-29	Sputnik V	20481
4	Argentina	2020-12-30	Moderna	2

```
[16]: df=data["location"]  
df.head()
```

```
[16]: 0    Argentina  
1    Argentina  
2    Argentina  
3    Argentina  
4    Argentina  
Name: location, dtype: object
```

```
[ ]:
```

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JupyterLab Python 3 (ipykernel)

1	Argentina	2020-12-29	Oxford/AstraZeneca	3
2	Argentina	2020-12-29	Sinopharm/Beijing	1
3	Argentina	2020-12-29	Sputnik V	20481
4	Argentina	2020-12-30	Moderna	2

```
[20]: df=data["date"]
df.head()
```

```
[20]: 0    2020-12-29
1    2020-12-29
2    2020-12-29
3    2020-12-29
4    2020-12-30
Name: date, dtype: object
```

[]: |

Click to add a cell.



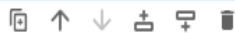
```
[20]: df=data["date"]
      df.head()
```

```
[20]: 0    2020-12-29
      1    2020-12-29
      2    2020-12-29
      3    2020-12-29
      4    2020-12-30
      Name: date, dtype: object
```

```
[21]: df=data["vaccine"]
      df.head()
```

```
[21]: 0    Moderna
      1  Oxford/AstraZeneca
      2  Sinopharm/Beijing
      3    Sputnik V
      4    Moderna
      Name: vaccine, dtype: object
```

```
[ ]:
```



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Code

▼

JupyterLab Python 3 (ipykernel)

[20]:

df=data["date"]
df.head()

[20]:

0 2020-12-29
1 2020-12-29
2 2020-12-29
3 2020-12-29
4 2020-12-30
Name: date, dtype: object

[28]:

df=data[["vaccine","total_vaccinations"]]
df.head()

[28]:

	vaccine	total_vaccinations
0	Moderna	2
1	Oxford/AstraZeneca	3
2	Sinopharm/Beijing	1
3	Sputnik V	20481
4	Moderna	2

[]:



Sinopharm Beijing

3 Sputnik V 20481

4 Moderna 2

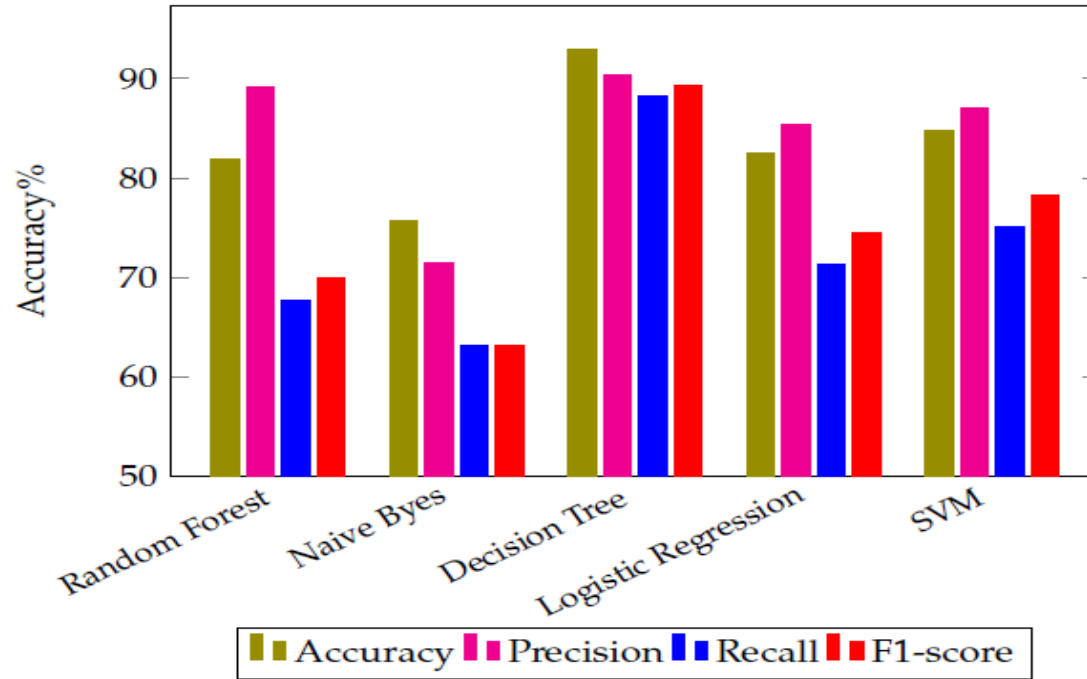
```
[29]: df=data[["location","date"]]  
df.head()
```

```
[29]:
```

	location	date
0	Argentina	2020-12-29
1	Argentina	2020-12-29
2	Argentina	2020-12-29
3	Argentina	2020-12-29
4	Argentina	2020-12-30

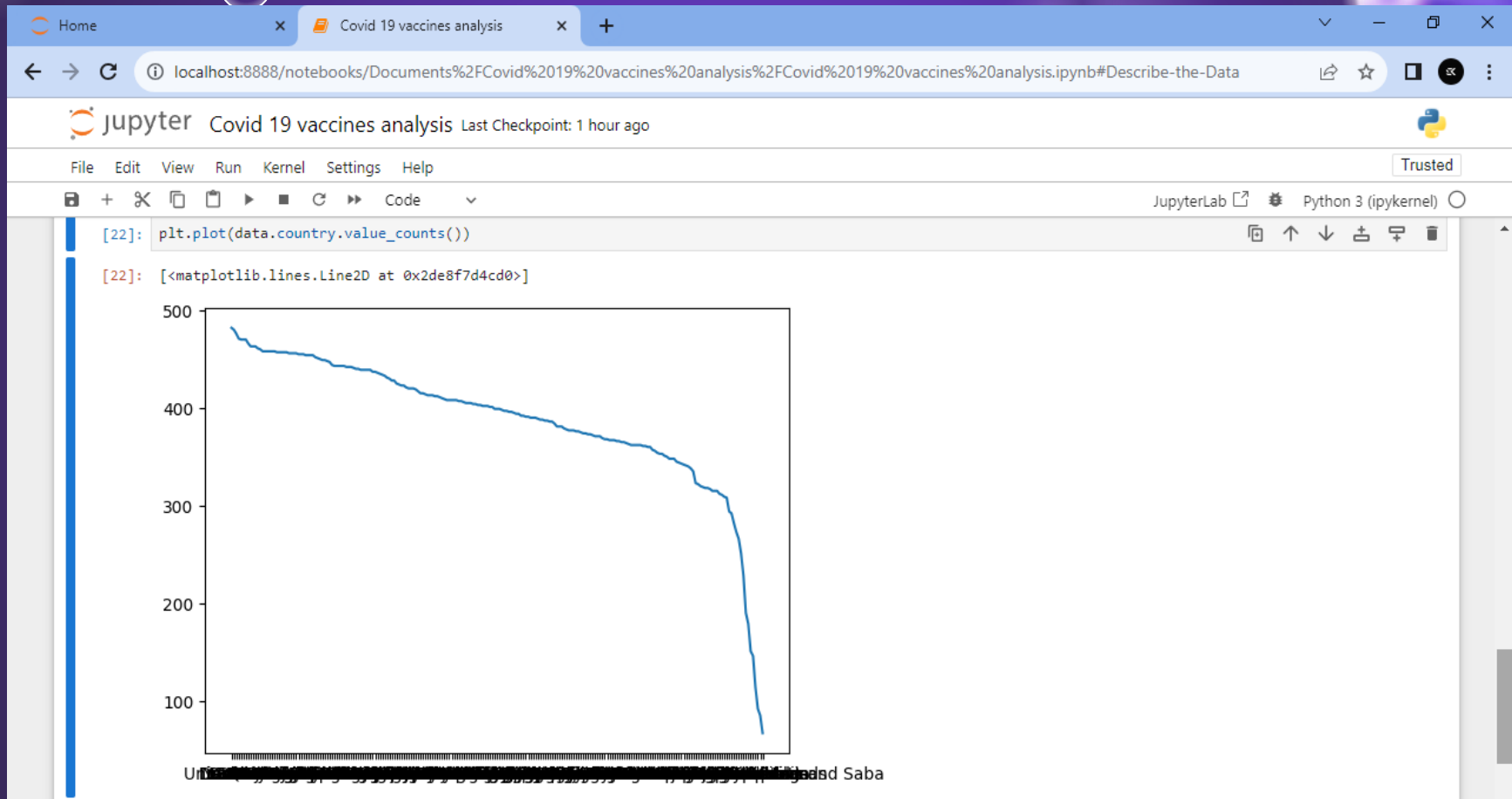
```
[ ]:
```

Statistical analysis



Bar chart
Statistical analysis

Line graph for statistical analysis



Pie chart for statistical analysis

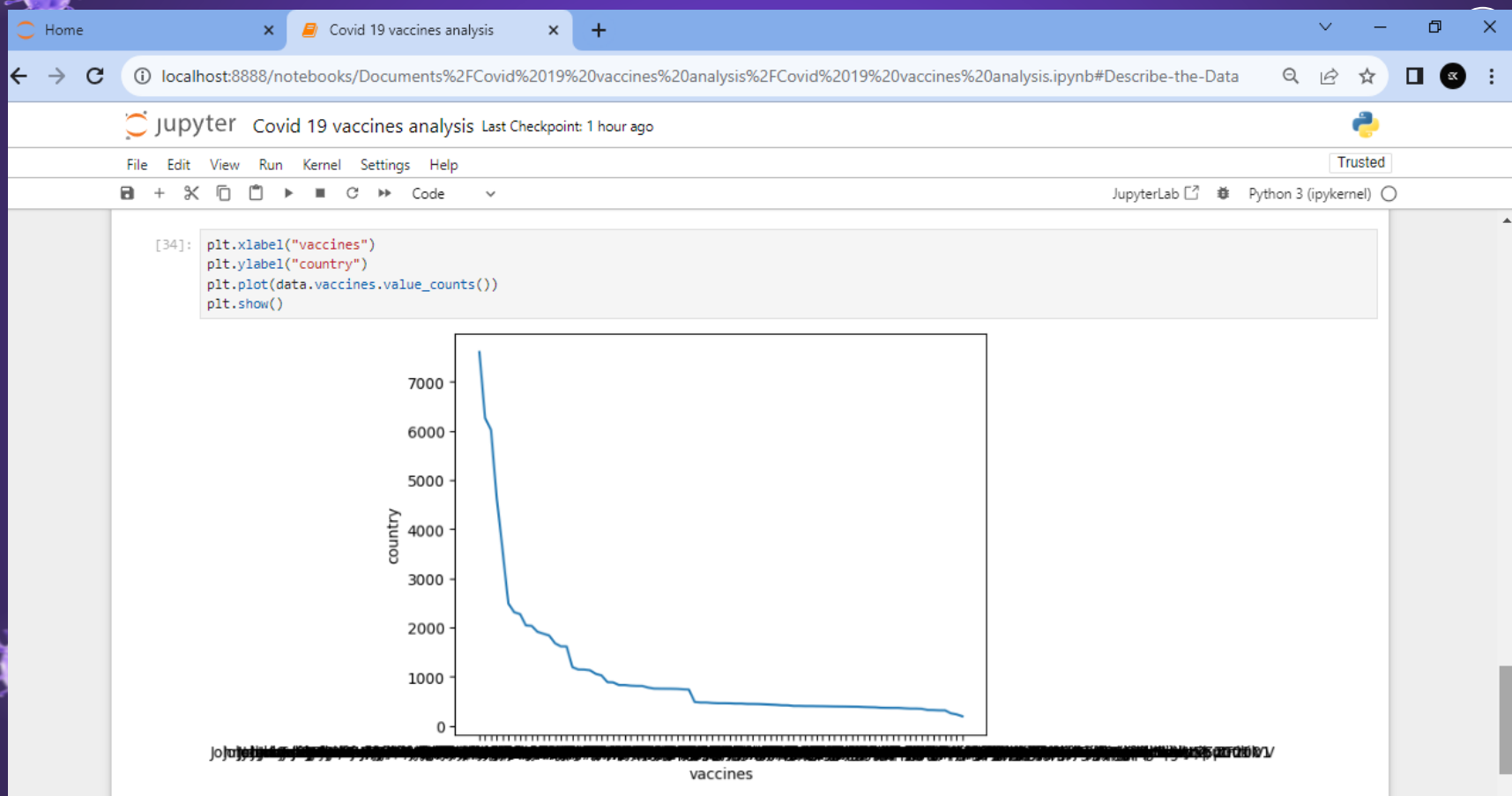


total_vaccinations



- Argentina 29-12-2020 Moderna
- Argentina 29-12-2020 Oxford/AstraZeneca
- Argentina 29-12-2020 Sinopharm/Beijing
- Argentina 29-12-2020 Sputnik V
- Argentina 30-12-2020 Moderna
- Argentina 30-12-2020 Oxford/AstraZeneca
- Argentina 30-12-2020 Sinopharm/Beijing
- Argentina 30-12-2020 Sputnik V
- Argentina 01-01-2021 Moderna
- Argentina 01-01-2021 Oxford/AstraZeneca
- Argentina 01-01-2021 Sinopharm/Beijing
- Argentina 01-01-2021 Sputnik V
- Argentina 02-01-2021 Moderna
- Argentina 02-01-2021 Oxford/AstraZeneca
- Argentina 02-01-2021 Sinopharm/Beijing
- Argentina 02-01-2021 Sputnik V
- Argentina 03-01-2021 Moderna
- Argentina 03-01-2021 Oxford/AstraZeneca
- Argentina 03-01-2021 Sinopharm/Beijing
- Argentina 03-01-2021 Sputnik V
- Argentina 04-01-2021 Moderna
- Argentina 04-01-2021 Oxford/AstraZeneca
- Argentina 04-01-2021 Sinopharm/Beijing
- Argentina 04-01-2021 Sputnik V
- Argentina 05-01-2021 Moderna
- Argentina 05-01-2021 Oxford/AstraZeneca
- Argentina 05-01-2021 Sinopharm/Beijing
- Argentina 05-01-2021 Sputnik V
- Argentina 06-01-2021 Moderna
- Argentina 06-01-2021 Oxford/AstraZeneca
- Argentina 06-01-2021 Sinopharm/Beijing
- Argentina 06-01-2021 Sputnik V
- Argentina 07-01-2021 Moderna
- Argentina 07-01-2021 Oxford/AstraZeneca
- Argentina 07-01-2021 Sinopharm/Beijing
- Argentina 07-01-2021 Sputnik V
- Argentina 08-01-2021 Moderna
- Argentina 08-01-2021 Oxford/AstraZeneca
- Argentina 08-01-2021 Sinopharm/Beijing
- Argentina 08-01-2021 Sputnik V
- Argentina 09-01-2021 Moderna
- Argentina 09-01-2021 Oxford/AstraZeneca
- Argentina 09-01-2021 Sinopharm/Beijing
- Argentina 09-01-2021 Sputnik V
- Argentina 10-01-2021 Moderna
- Argentina 10-01-2021 Oxford/AstraZeneca
- Argentina 10-01-2021 Sinopharm/Beijing
- Argentina 10-01-2021 Sputnik V
- Argentina 11-01-2021 Sinopharm/Beijing
- Argentina 11-01-2021 Sputnik V
- Argentina 12-01-2021 Moderna

Line plot for statistical analysis



Visualization



Videos/Machine Learning/ML Project 4 Covid-19 Vaccines Analysis - Jupyter

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```
In [16]: import plotly.express as px
import plotly.offline as py

v_map=px.choropleth(data, locations='iso_code', color='vaccines')
v_map.update_layout(height=500)

v_map.show()
```



- Qazvac, Sinopharm/Hayatvax, Sputnik V
- Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac, Sputnik V
- Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V
- Pfizer/BioNTech, Sinopharm/Beijing
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing
- CanSino, Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac, Sputnik V
- CanSino, Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik V
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sputnik V
- Covaxin, Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik V
- EpiVacCorona, Sputnik V
- Pfizer/BioNTech, Sputnik V
- Moderna, Pfizer/BioNTech, Sinovac
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik V
- EpiVacCorona, Oxford/AstraZeneca, Sinopharm/Beijing, Sputnik V
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinopharm/Wuhan, Sputnik V
- Oxford/AstraZeneca, RBD-Dimer, Sputnik V
- Sinopharm/Beijing, Sinovac, Sputnik V





- Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V
- Sputnik V
- Oxford/AstraZeneca, Pfizer/BioNTech
- Oxford/AstraZeneca
- Oxford/AstraZeneca, Sinopharm/Beijing, Sputnik V
- Oxford/AstraZeneca, Sinovac, Sputnik V
- Pfizer/BioNTech
- Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik V
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing
- Sinopharm/Beijing, Sputnik V
- Oxford/AstraZeneca, Sinopharm/Beijing
- Oxford/AstraZeneca, Sinovac
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech
- Moderna, Pfizer/BioNTech
- Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac
- Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac
- Covaxin, Oxford/AstraZeneca
- Sinopharm/Beijing
- CanSino, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac
- CanSino, Sinopharm/Beijing, Sinopharm/Wuhan, Sinovac
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac
- Covaxin, Oxford/AstraZeneca, Sinopharm/Beijing
- Moderna, Oxford/AstraZeneca, Sinopharm/Beijing, Sputnik V
- Abdala, Soberana02
- Johnson&Johnson, Moderna, Pfizer/BioNTech
- Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik V
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac
- Johnson&Johnson, Pfizer/BioNTech
- Oxford/AstraZeneca, Sputnik V

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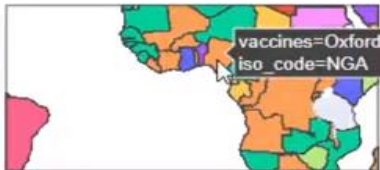
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Run Code

vaccines

- Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V
- Sputnik V
- Oxford/AstraZeneca, Pfizer/BioNTech
- Oxford/AstraZeneca
- Oxford/AstraZeneca, Sinopharm/Beijing, Sputnik V
- Oxford/AstraZeneca, Sinovac, Sputnik V
- Pfizer/BioNTech
- Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik V
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing
- Sinopharm/Beijing, Sputnik V
- Oxford/AstraZeneca, Sinopharm/Beijing
- Oxford/AstraZeneca, Sinovac
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech
- Moderna, Pfizer/BioNTech
- Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac
- Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac
- Covaxin, Oxford/AstraZeneca

vaccines=Oxford/AstraZeneca, Sinopharm/Beijing
iso_code=NGA



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Python 3

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Run Code



- Qazvac, Sinopharm/Hayatvax, Sputnik v
- Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac, Sputnik V
- Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V
- Pfizer/BioNTech, Sinopharm/Beijing
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing
- CanSino, Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinovac, Sputnik V
- CanSino, Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik V
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sputnik V
- Covaxin, Oxford/AstraZeneca, Sinopharm/Beijing, Sinovac, Sputnik V
- EpiVacCorona, Sputnik V
- Pfizer/BioNTech, Sputnik V
- Moderna, Pfizer/BioNTech, Sinovac
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sputnik V
- EpiVacCorona, Oxford/AstraZeneca, Sinopharm/Beijing, Sputnik V
- Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac
- Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing, Sinopharm/Wuhan, Sputnik V
- Oxford/AstraZeneca, RBD-Dimer, Sputnik V
- Sinopharm/Beijing, Sinovac, Sputnik V



Performing exploratory data analysis



Statistical analysis



Visualization



So these all are Covid-19 vaccines is analyzed.