DOCUMENTATION

COVID-19 DASHBOARD

Data Science (UCS538)

Submitted to

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Submitted By

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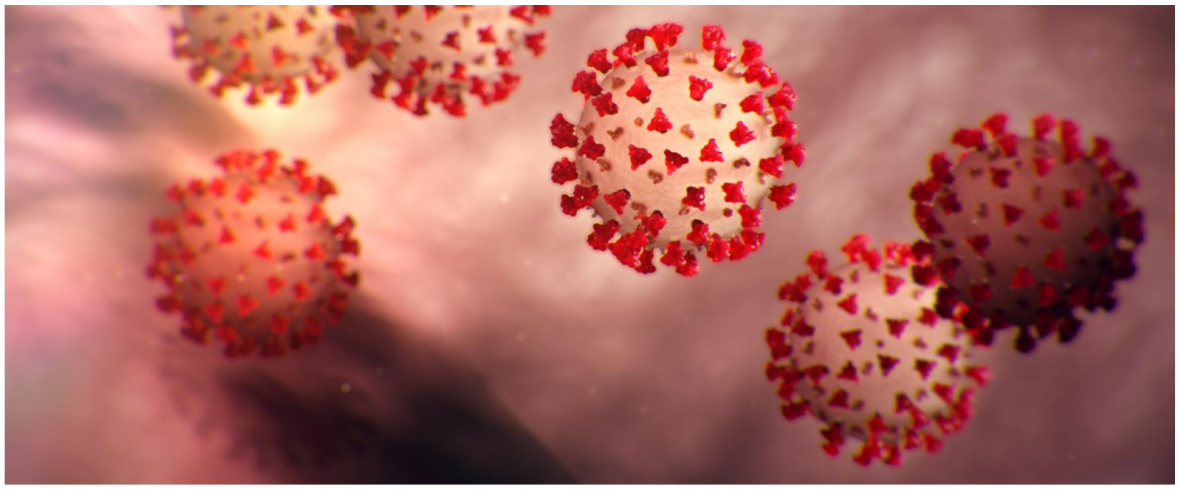
Screenshot of the Dashboard:

- **First on the screen:**



Confirmed cases: 265009819 Deaths: 5245261 Recovered cases: 0

- **Widgets(slider) showing confirmed, recovered and death cases highlighted, along with option of changing value of n:**

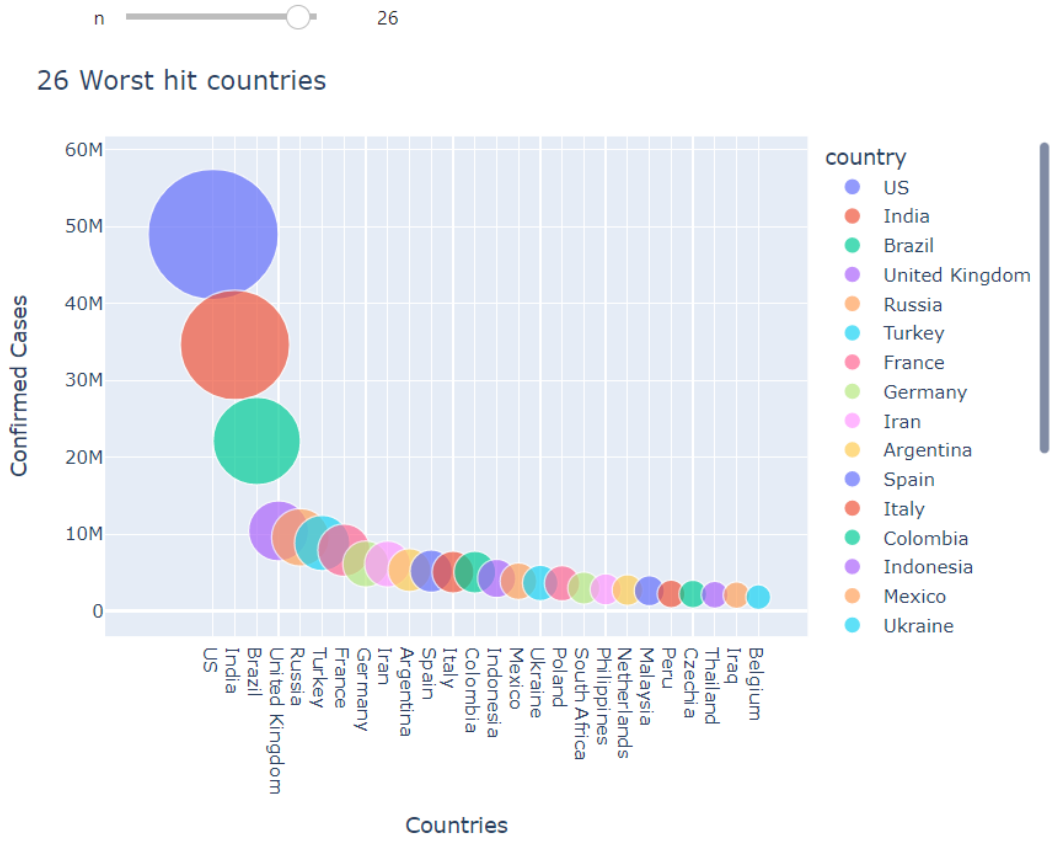
COVID-19 Confirmed/Death/Recovered cases by countries

Enter number of countries you want the data for:

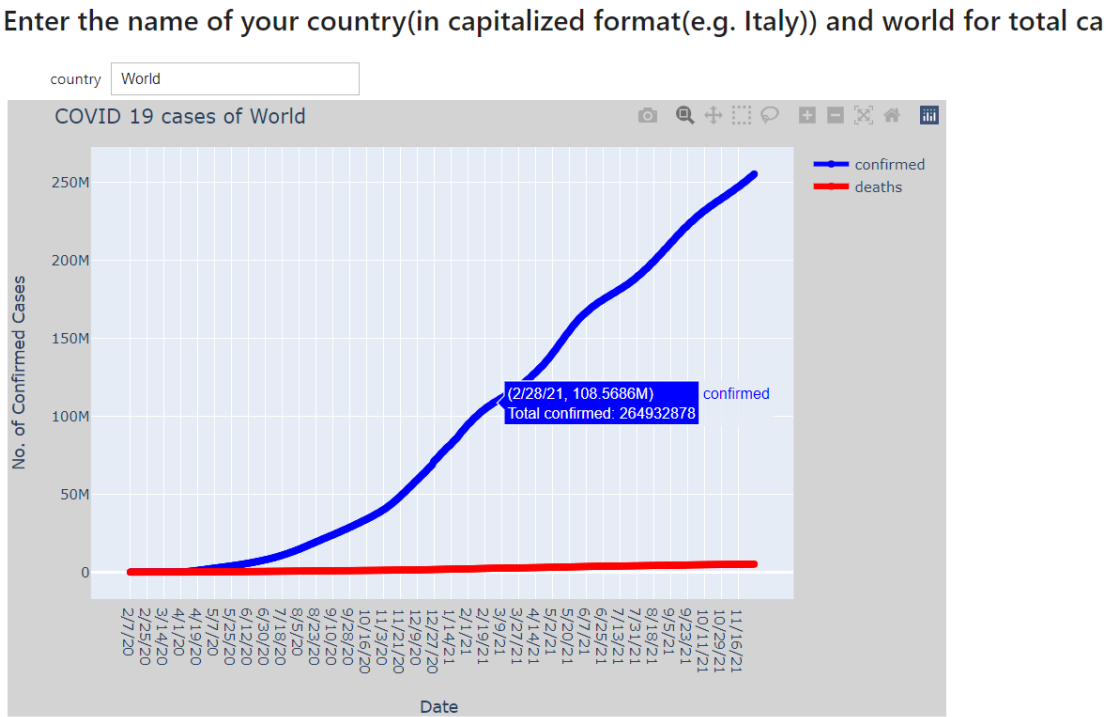
n 10

	country	last_update	lat	long_	confirmed	deaths	recovered	active	incident_rate	people_tested	people_hospitalized	mortality_rate	uid	iso3	cases_28_days	deaths_28_days
182	US	2021-12-04 09:21:21	40.000000	-100.000000	48990135	787695	nan	nan	14869.544329	nan	nan	1.607865	840	USA	2533586	32679
79	India	2021-12-04 09:21:21	20.593684	78.962880	34624360	470530	nan	nan	2509.003622	nan	nan	1.358957	356	IND	279677	10265
23	Brazil	2021-12-04 09:21:21	-14.235000	-51.925300	22129409	615400	nan	nan	10410.928928	nan	nan	2.780915	76	BRA	266951	6340
186	United Kingdom	2021-12-04 09:21:21	55.000000	-3.000000	10438381	145874	nan	nan	15376.337367	nan	nan	1.397477	826	GBR	1151763	3855
144	Russia	2021-12-04 09:21:21	61.524000	105.318800	9598283	274648	nan	nan	6577.118934	nan	nan	2.861428	643	RUS	992586	33520
181	Turkey	2021-12-04 09:21:21	38.963700	35.243300	8863356	77417	nan	nan	10509.193800	nan	nan	0.873450	792	TUR	684485	5693
62	France	2021-12-04 09:21:21	46.227600	2.213700	7927361	120440	nan	nan	12149.241493	nan	nan	1.519295	250	FRA	626058	1610
66	Germany	2021-12-04 09:21:21	51.165691	10.451526	6134494	102951	nan	nan	7377.177215	nan	nan	1.678231	276	DEU	1378605	6459
81	Iran	2021-12-04 09:21:21	32.427908	53.688046	6129199	130066	nan	nan	7297.277666	nan	nan	2.122072	364	IRN	155742	3013
6	Argentina	2021-12-04 09:21:21	-38.416100	-63.616700	5337692	116639	nan	nan	11810.156511	nan	nan	2.185195	32	ARG	42432	556

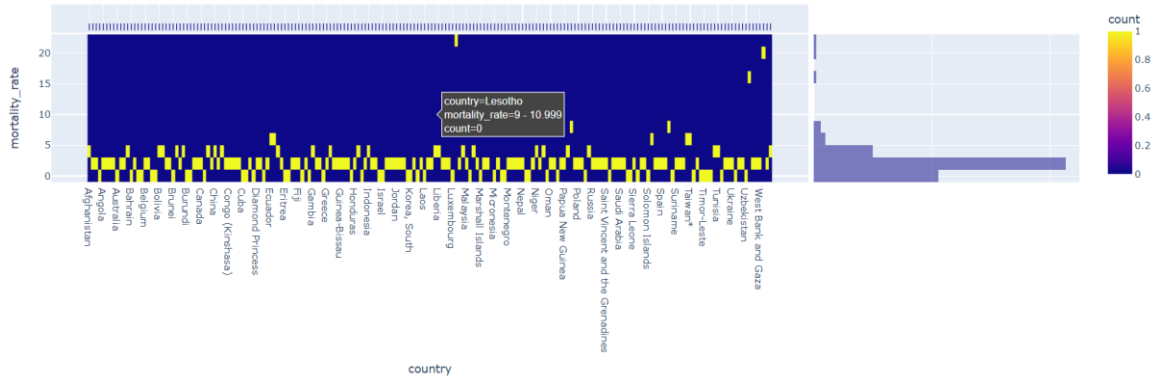
- Scatter plot with slider to show more/less confirmed cases in each country:



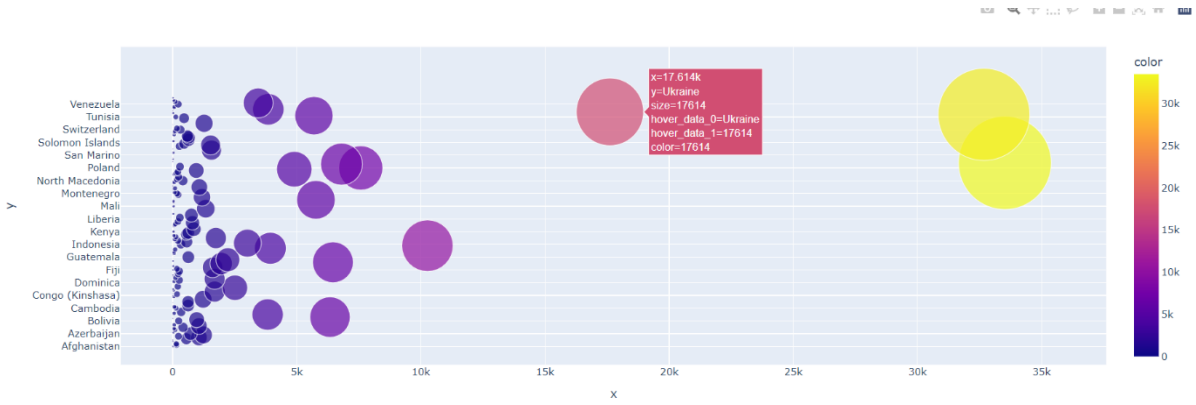
- **Plot showing no of confirmed cases on a particular death where country name can be specified:**



- **Plot showing mortality_rate vs country where we can hover on the graph and get the required information:**



- **Scatter(Bubble) plot having the facility of hovering and getting the required information along with specified colour legend:**



Some of the Libraries used in the Python code:

- **plotly:**
  The plotly library is an interactive, open-source plotting library that supports over 40 unique chart types covering a wide range of statistical, financial, geographic, scientific, and 3-dimensional use-cases.

- **numpy:**
  numpy is a general-purpose array-processing package. It provides a high-performance multidimensional array object and tools for working with these arrays.

- **pandas:**
  Pandas is an open-source Python package that is most widely used for data science/data analysis and machine learning tasks. It is built on top of another package named numpy, which provides support for multi-dimensional arrays.

- **widgets:**
  Widgets are eventful python objects that have a representation in the browser, often as a control like a slider, textbox, etc.

- **matplotlib:**
  matplotlib is a cross-platform, data visualization and graphical plotting library for Python and its numerical extension NumPy. As such, it offers a viable open-source alternative to MATLAB. Developers can also use matplotlib's APIs (Application Programming Interfaces) to embed plots in GUI applications.

Links of the datasets used in the Python code:

- https://raw.githubusercontent.com/CSSEGISandData/COVID-19/web-data/data/cases_country.csv
- https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_recovered_global.csv
- https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_confirmed_global.csv
- https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_deaths_global.csv

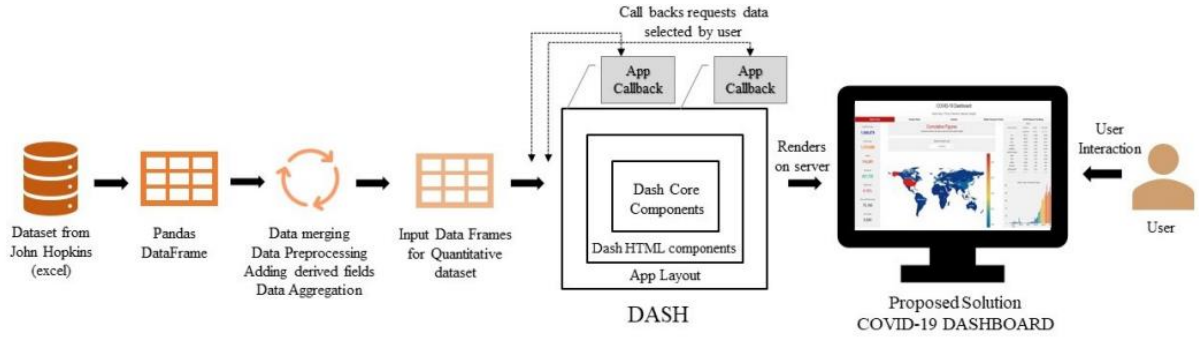
Voila:

- It is an open-source python library that is used to turn the Jupyter notebook into a standalone web application.
- It supports widgets to create interactive dashboards, reports, etc.
- It launches a kernel when it is connected to a notebook and executes all the cells, but it does not stop the kernel there so that the user can interact with the output.
- Voila converts the jupyter notebook into HTML and returns it to the user as a dashboard or report with all the inputs excluded and the outputs included. Voila supports all the python libraries for widgets such as bqplot, plotly etc.

COVID-19 Dashboard Application structure:

- The application was designed to include as much user interactions as possible.
- I chose plotly as visualization platform mainly because of the tabular format of the data, that could be efficiently processed using pandas DataFrame.
- The dashboard was created to allow users to have the maximum interactions as possible.
- A list of customized user actions are: Text Input, Slider, Click Data and Hover Data.
- For each of these interactions the responses are triggered for data, colour scales, axis scales, axis titles, plot titles, hierarchy of sunburst charts etc.

The Dashboard can be deployed on a larger level as well:



The graphs plotted on the Covid-19 Dashboard:

1. Visualising N number of worst hit countries using plotly scatter plot
2. Plotting confirmed cases as a bubble chart
3. Plotting line chart
4. Plotting bar chart
5. Plotting line chart
6. Plotting Density chart
7. Plotting scatter plot

Referred YouTube link:

https://www.youtube.com/watch?v=FngV4VdYrkA

----------*Thank you*----------