Coronavirus Analysis (On a Global Perspective)

Introduction:- Coronavirus disease (Covid-19) is an infectious disease caused by a new virus. The disease causes respiratory illness (like the flu) with symptoms such as cough, fever, and in more severe cases, difficulty breathing. A person can protect himself/herself by washing their hands frequently, avoiding touching their face, and avoiding close contact (1 meter or 3 feet) with people who are unwell.

How it spreads:- Coronavirus disease spreads primarily through contact with an infected person when they cough or sneeze. It also spreads when a person touches the surface or object that has the virus on it, then touches their eyes, nose or mouth.

Treatment:- There are no specific medicines/vaccines to treat the disease as of now. People are adviced to follow the guidelines of treatment and safety precautionary measures by WHO and the instructions provided by the respective countries. Severe cases might need respiratory support. Patients has been responding well to Hydroxychloroquine (HCQ), although the drug is not yet clinically proved to be a 100% cure.

NOW LET US TAKE A LOOK AT THE GLOBAL SITUATION (AS OF 15th APRIL, 2020)

Data Source:- The data set is provided by Johns Hopkins University Center for Systems Science and Engineering (JHU CSSE) on their GitHub account. The data set is automatically updated and the source code imports the data directly from the web. Hence, user is provided with the latest results upon running the code (with slight modifications within it it extract the desired results). The link to the data set is provided below:

Link:- https://github.com/CSSEGISandData/COVID-19

Analysis:-

Currently, as of date of writing this report, the global count reads

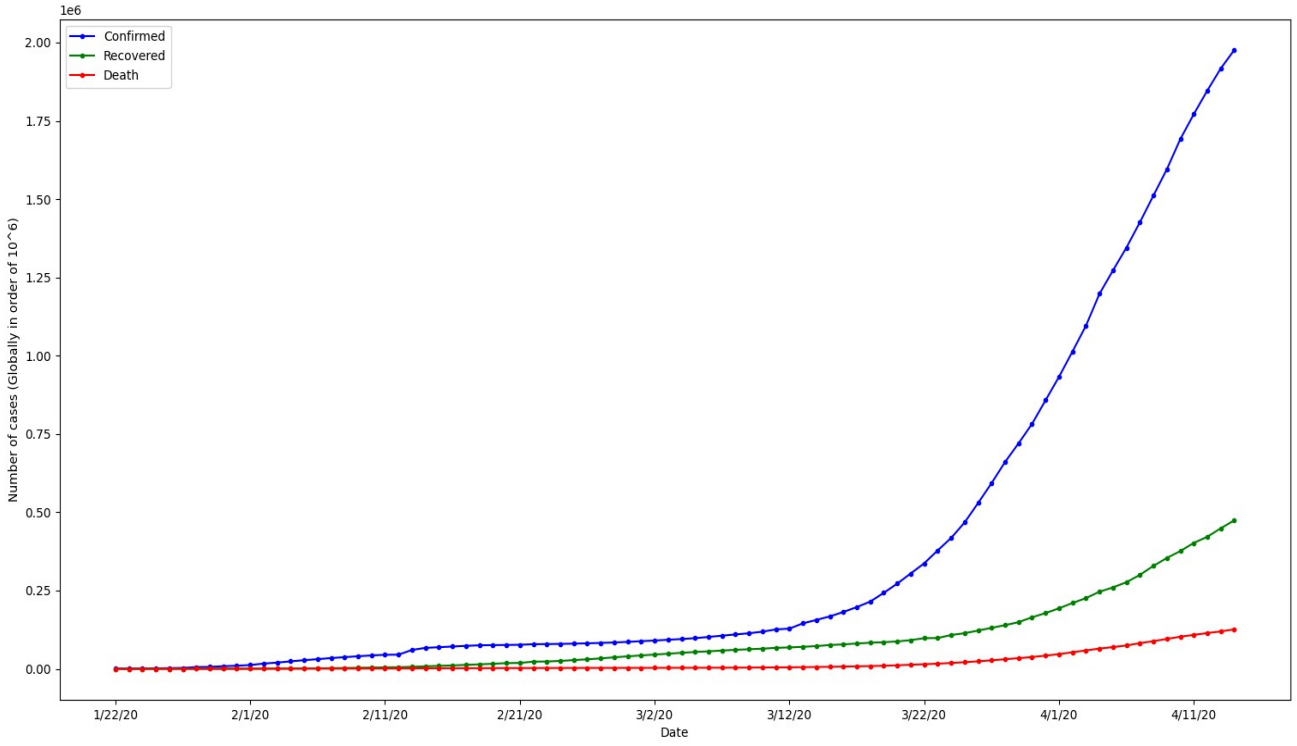
Total confirmed cases (Globally): 1976191
Total Deaths (Globally): 125984
Total Recovered (Globally): 474261

And the details of the Top 25 Confirmed countries are given below:

Country/ Region	Confirmed	Recovered	Death	Active	Deaths per 100 people affected
US	607670	47763	25832	534075	4.25

Spain	172541	67504	18056	86981	10.46
Italy	162488	37130	21067	104291	12.97
France	131361	29098	15748	86515	11.99
Germany	131359	68200	3294	59865	2.51
United Kingdom	94845	323	12129	82393	12.79
China	83306	78200	3345	1761	4.02
Iran	74877	48129	4683	22065	6.25
Turkey	65111	4799	1403	58909	2.15
Belgium	31119	6868	4157	20094	13.36
Netherlands	27580	297	2955	24328	10.71
Canada	27034	8210	899	17925	3.33
Switzerland	25936	13700	1174	11062	4.53
Brazil	25262	3046	1532	20684	6.06
Russia	21102	1694	170	19238	0.81
Portugal	17448	347	567	16534	3.25
Austria	14226	7633	384	6209	2.7
Israel	12046	2195	123	9728	1.02
India	11487	1359	393	9735	3.42
Ireland	11479	25	406	11048	3.54
Sweden	11445	381	1033	10031	9.03
Korea, South	10564	7534	222	2808	2.1
Peru	10303	2869	230	7204	2.23
Chile	7917	2646	92	5179	1.16
Japan	7645	799	143	6703	1.87

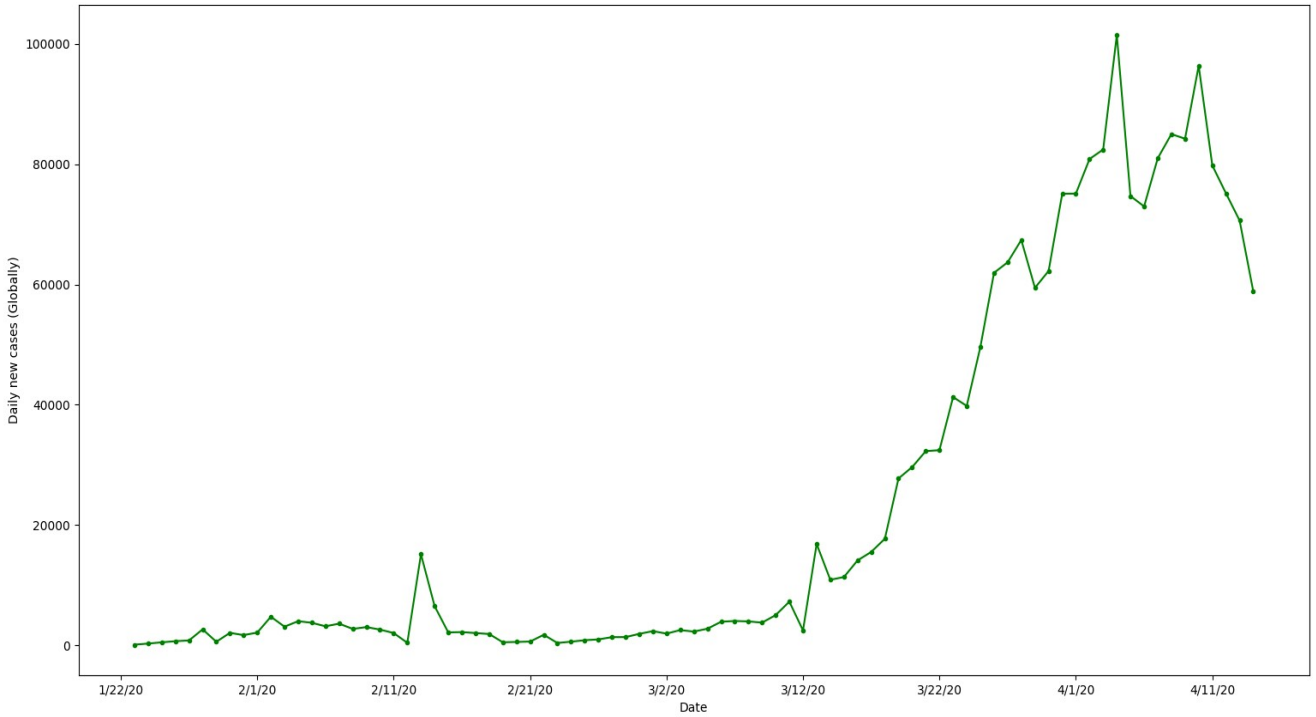
Now, let us take a look at the graph of the global situation



Clearly, the total number of confirmed cases is following an exponential curve with the recovered and death curve, although much lower than the confirmed curve, is also rising.

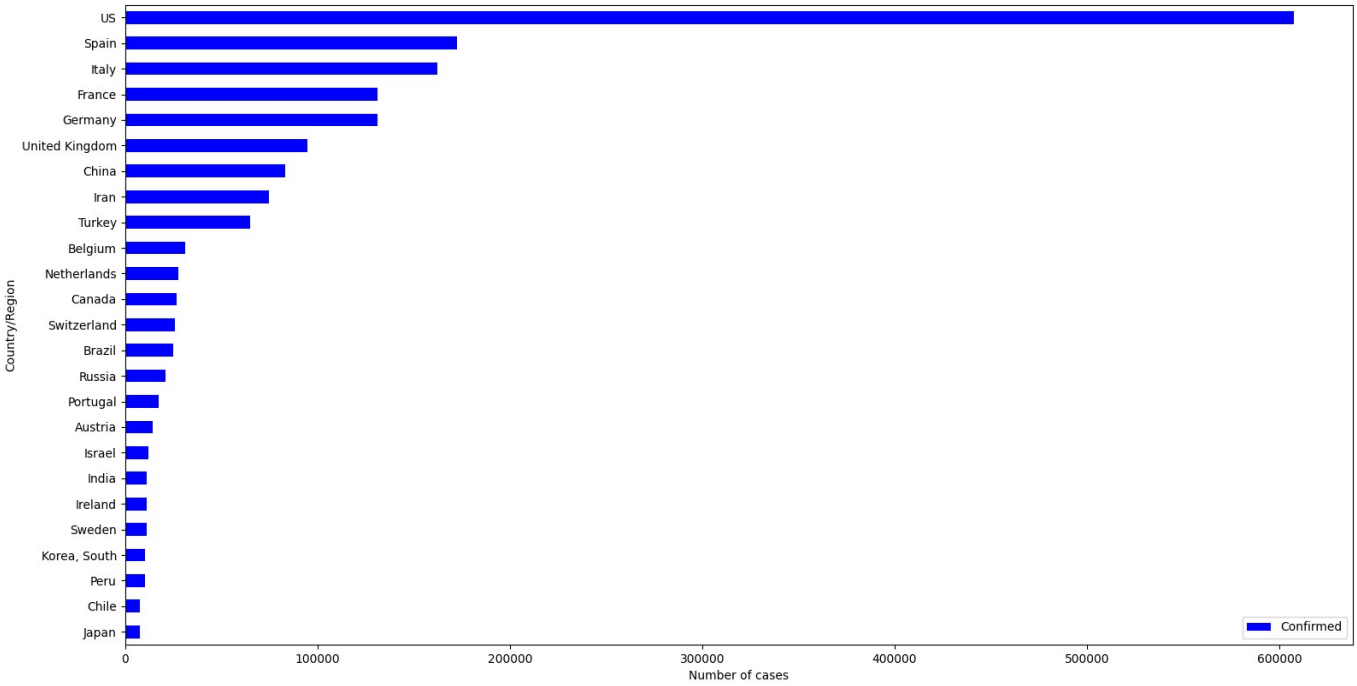
But, just looking at the curve of the Confirmed cases might not give us a good idea of where the world is heading. Looking at the daily new cases, we might have a better idea of how policies, such as the lockdown, taken all over the world, has affected the spread of the Coronavirus.

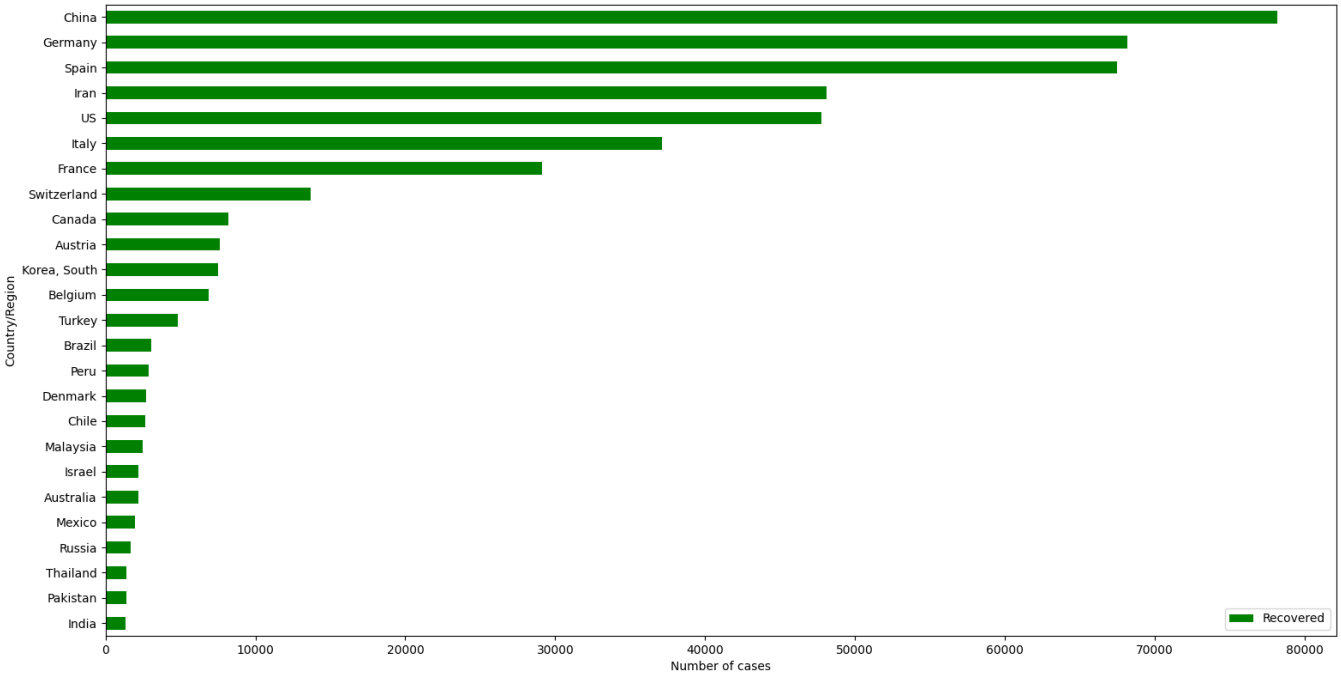
Plotting the graph of the daily new cases globally, we get a curve like this

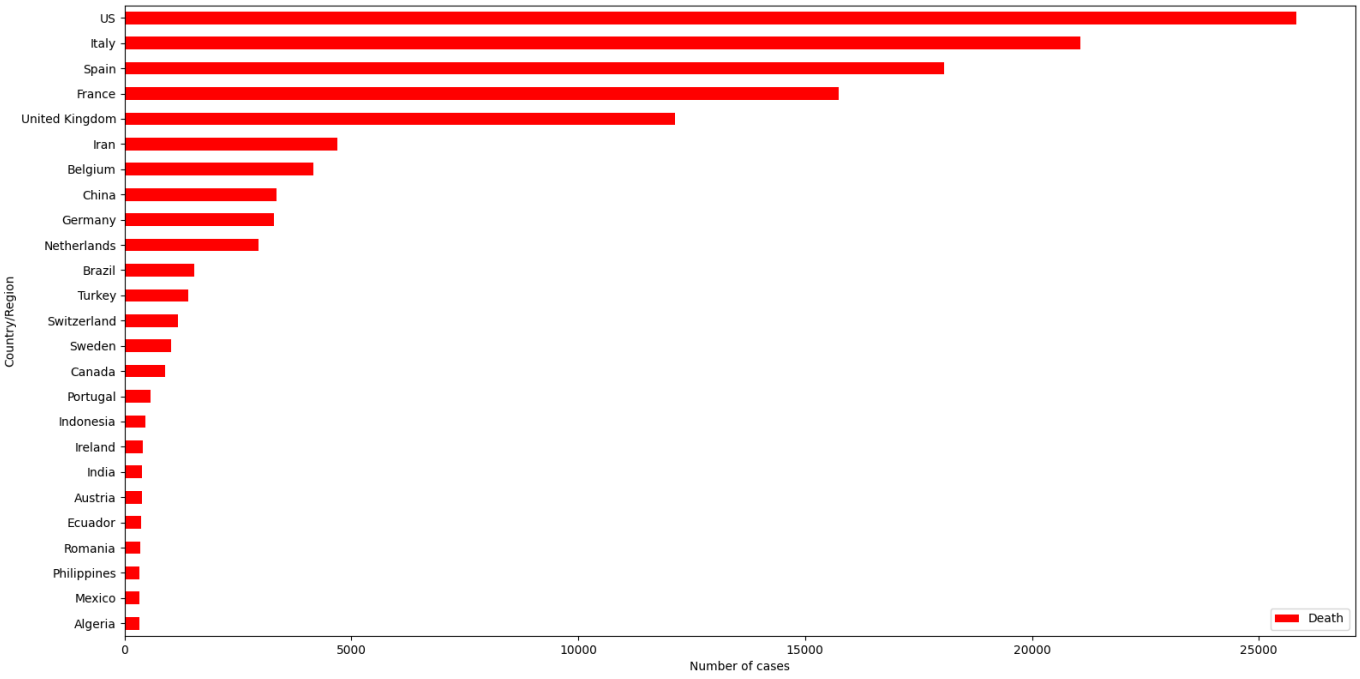


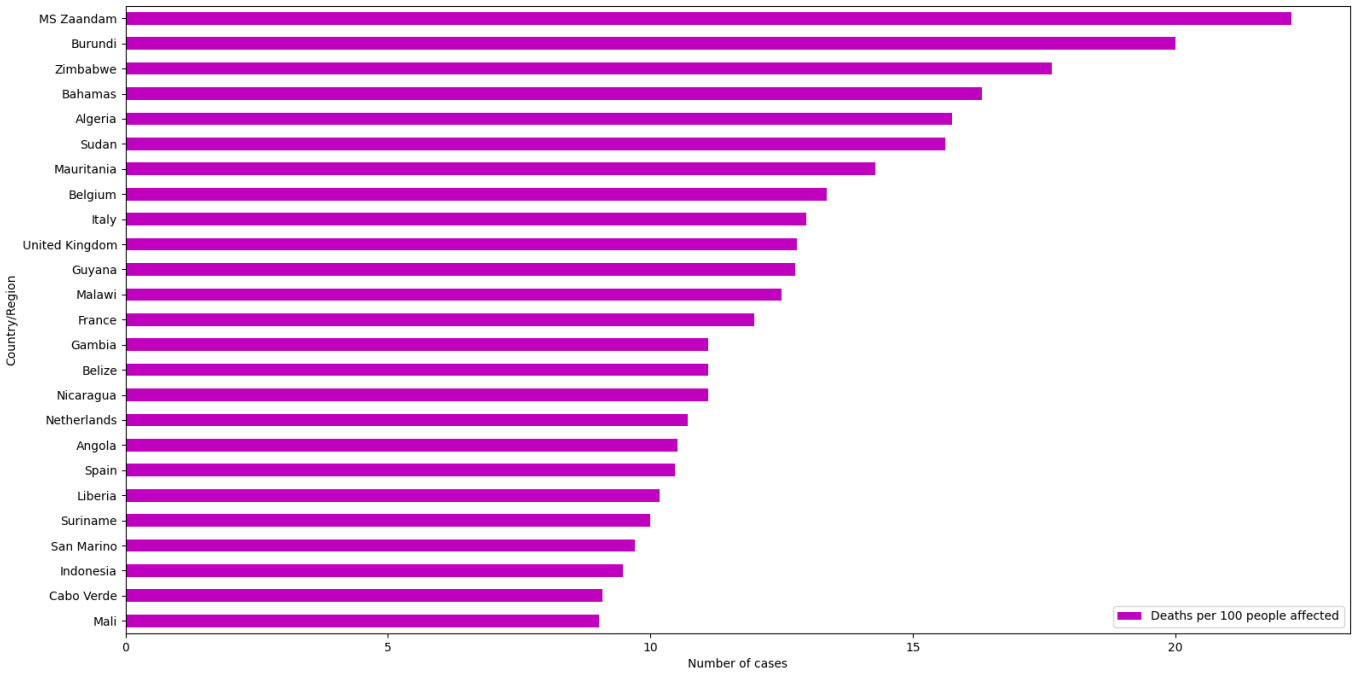
From the above graph, it is almost next to impossible to predict how many new cases might be reported tomorrow, whether the number would go up, or down. But, in general, we notice that the total cases reported each day has been slowly rising since the third week of February this year, with a significantly high rise from the middle of March. Althought, a slightly positive note here is that, the daily new cases has been lowering since the last 4 days, the longest in a stretch. Let us hope this trend continues and the tough time slowly comes to an end for the entire planet.

Let us now take a closer look at where the top 25 countries with respect to confirmed, recovered, death, active and death per 100 cases lie, with respect to each other:

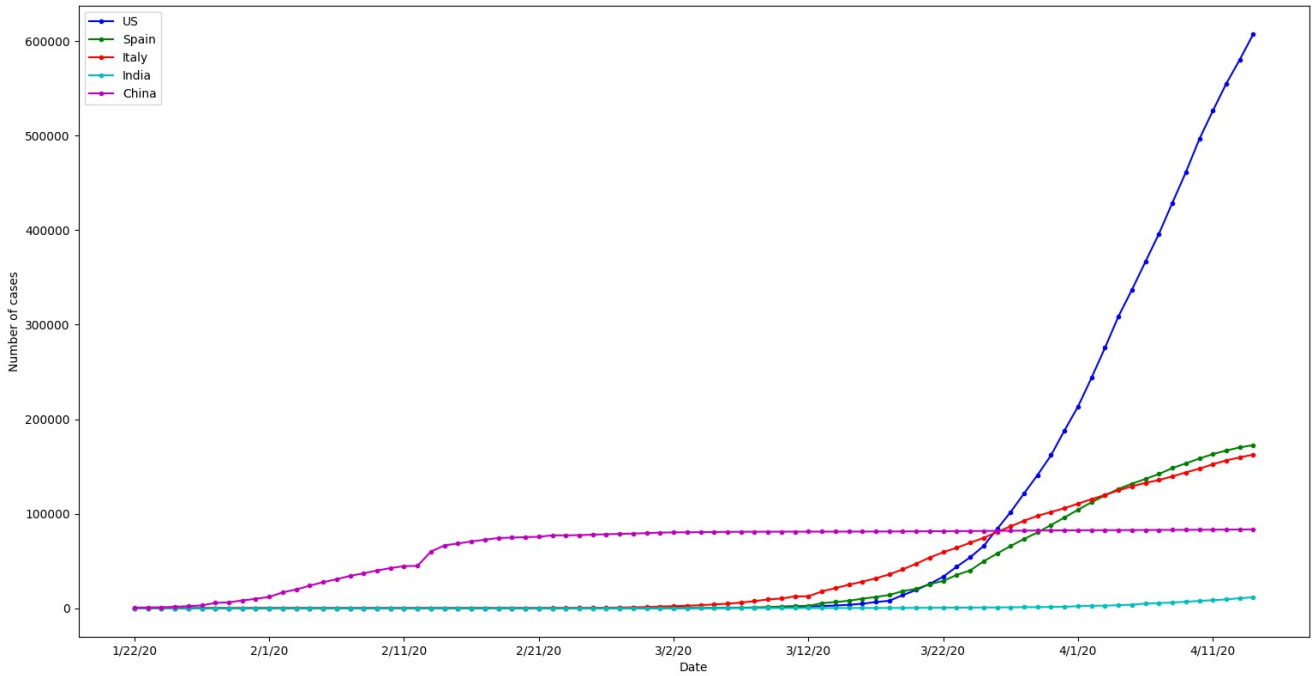

US
Spain
Italy
France
Germany
United Kingdom
China
Iran
Turkey
Belgium
Netherlands
Canada
Switzerland
Brazil
Russia
Portugal
Austria
Israel
India
Ireland
Sweden
Korea, South
Peru
Chile
Japan
Country/Region
0
100000
200000
300000
400000
500000
600000
Number of cases
Confirmed


China
Germany
Spain
Iran
US
Italy
France
Switzerland
Canada
Austria
Korea, South
Belgium
Turkey
Brazil
Peru
Denmark
Chile
Malaysia
Israel
Australia
Mexico
Russia
Thailand
Pakistan
India
Country/Region
0
10000
20000
30000
40000
50000
60000
70000
80000
Number of cases
Recovered


US
Italy
Spain
France
United Kingdom
Iran
Belgium
China
Germany
Netherlands
Brazil
Turkey
Switzerland
Sweden
Canada
Portugal
Indonesia
Ireland
India
Austria
Ecuador
Romania
Philippines
Mexico
Algeria
Country/Region
0
5000
10000
15000
20000
25000
Number of cases
Death

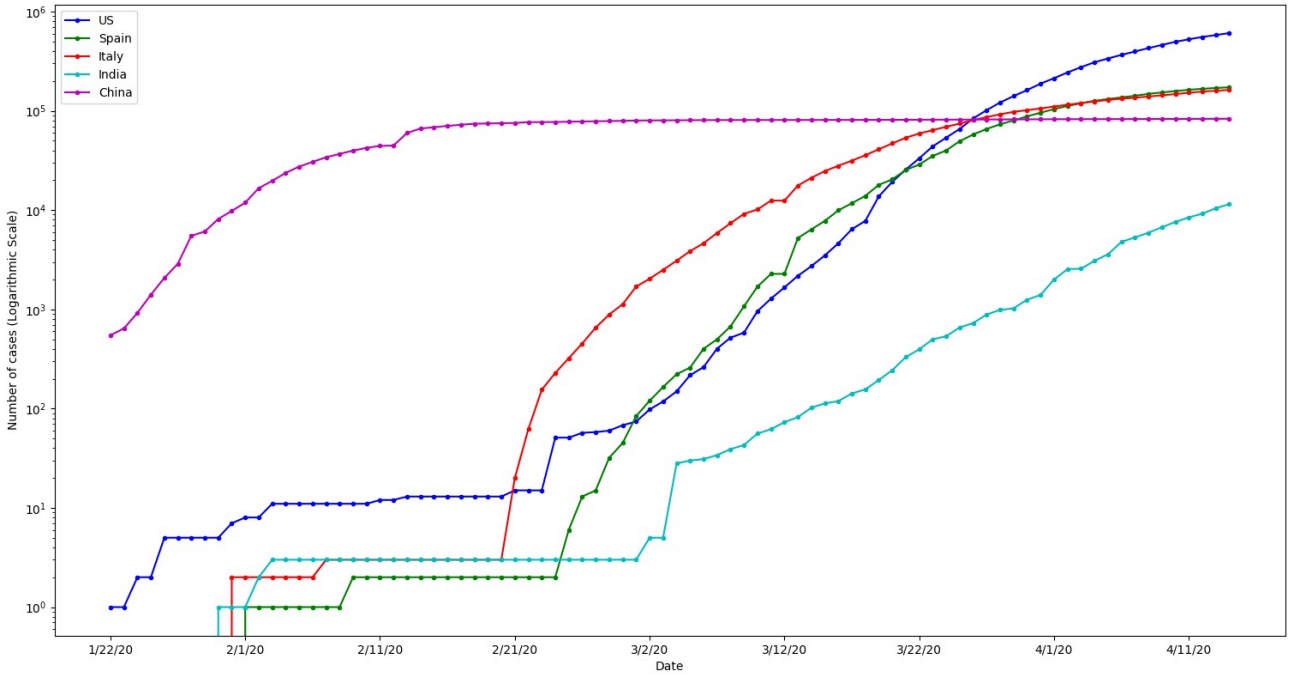


We would now like to take a look where India is right now, compared to the top affected countries and some neighbouring countries



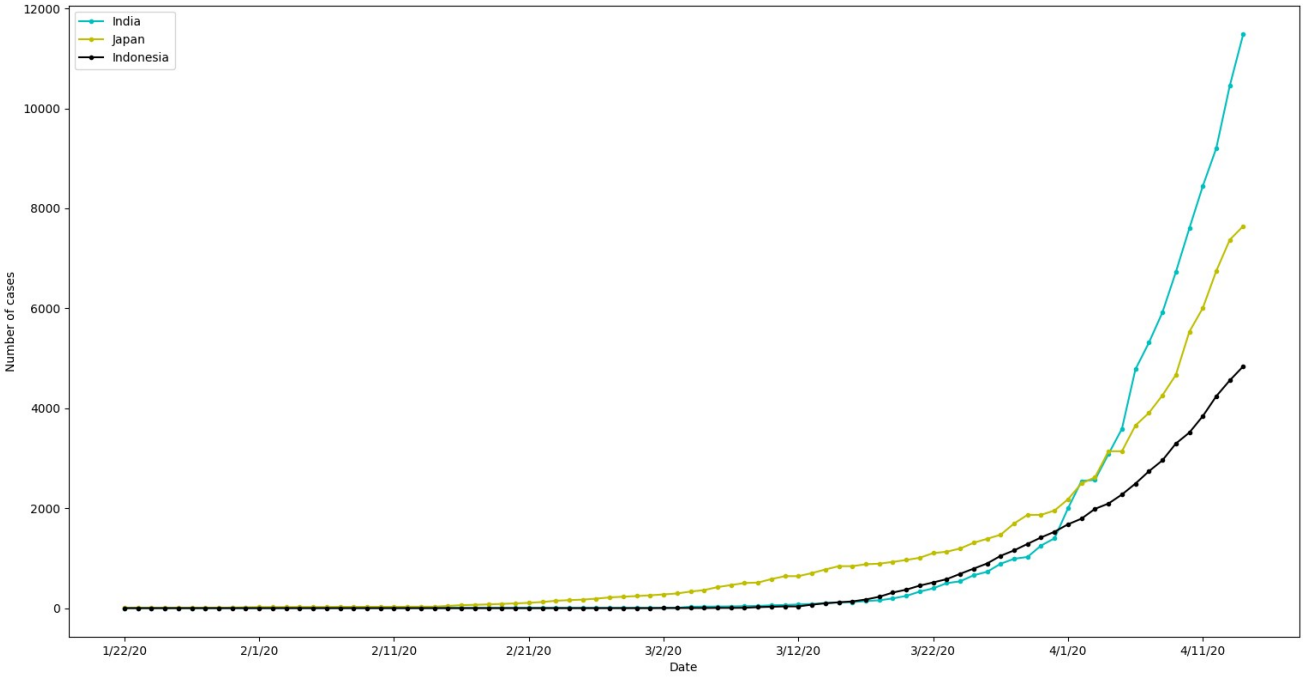
The graph is pretty much self-explanatory. According to the global data, India is still in a better position than the top European countries where the Confirmed cases are the highest. In fact, the graph explains India is pretty much doing good compared to China (the country that reported the first ever case of the coronavirus).

Here is the logarithmic graph of India and top european countries:



One con of the logarithmic curve is that, it might give the viewer the impression that the total confirmed cases are not rising that fast across the globe. But, the point one must keep in mind is that the markings on the y-axis is plotted on a logarithmic scale, which means, 10^5 is much closer to 10^4, than 10^4 is to 10^3.

But the situation in India is not as good as some of it's neighbouring countries, like Japan and Indonesia, as is evident from the graph below:



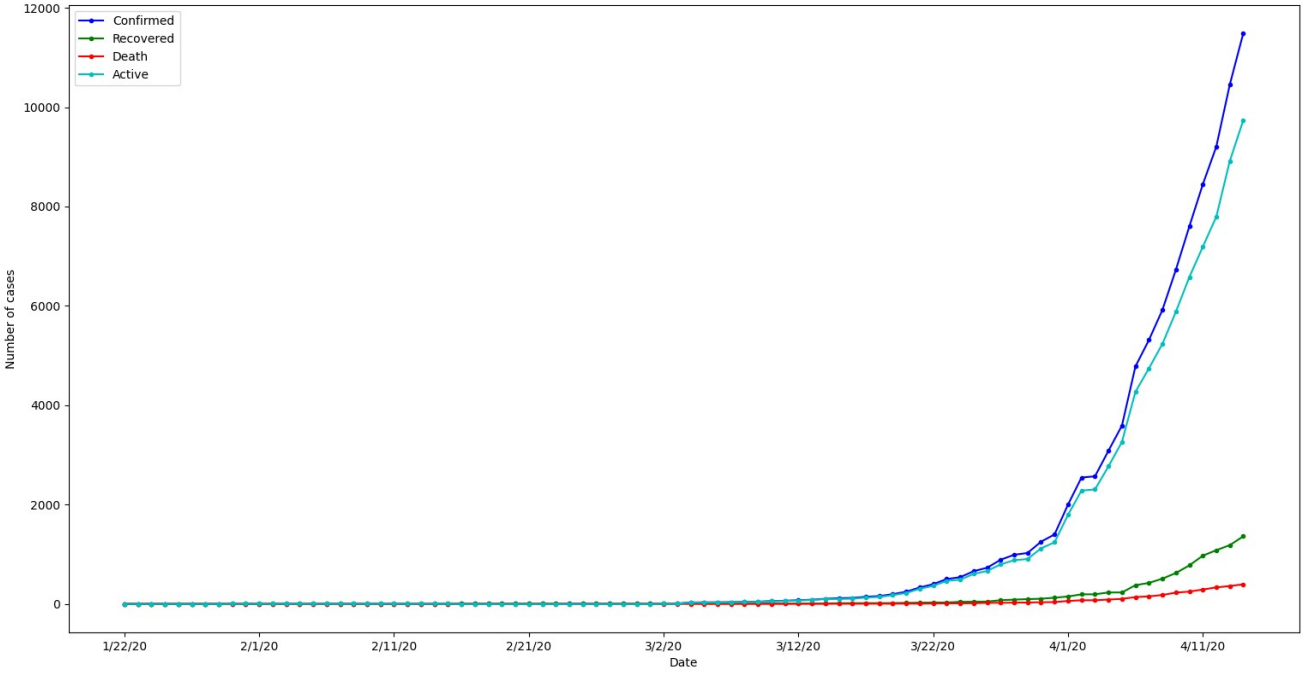
Why is India in a much better postion than the top european countries in terms of the total number of cases?

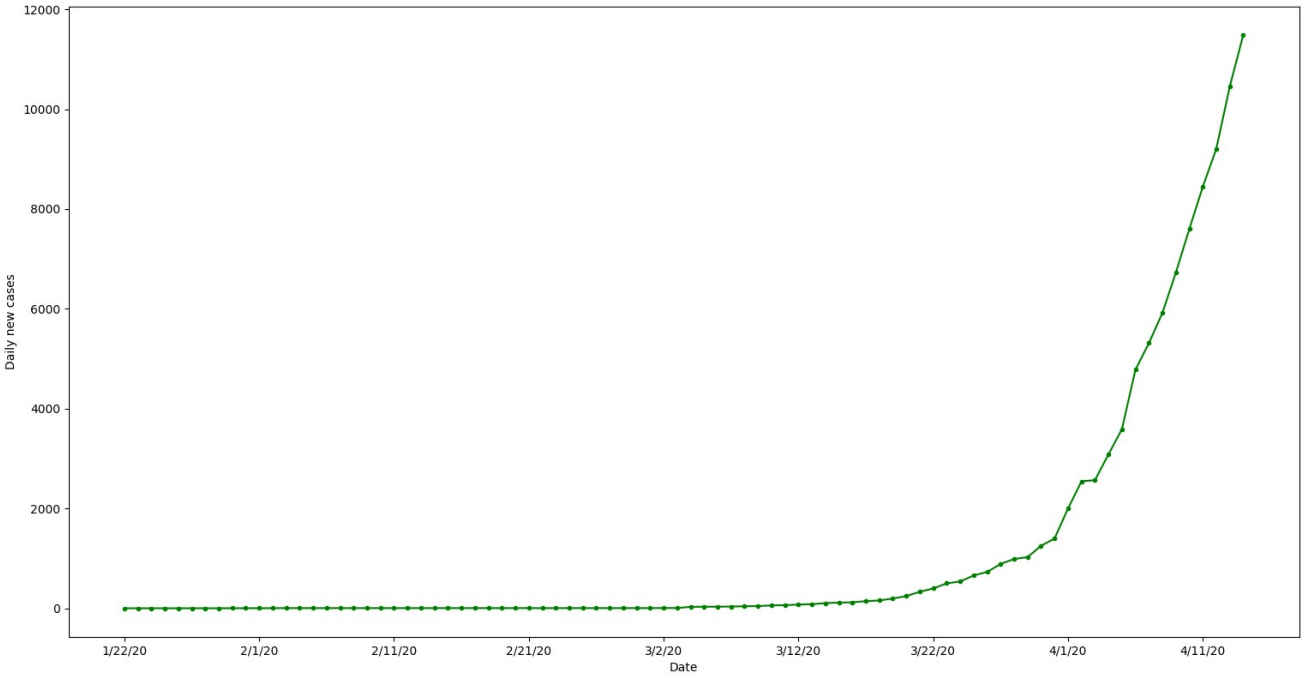
There could be two possible explainations:-

1) Lockdown:- The Indian Government announced on March 24th that the country would go on a lockdown. This ensured social distancing and controlled the spread of the virus by avoiding gatherings. The other European countries like USA, Italy, France and many others, also have taken similar measures, but one point that it has been so effective in India could be that, India took the step at a very early stage compared to the countries we are comparing with.

2) Not Enough Testing:- This could be a very critical point. India needs to do more testing on it's citizens to ensure that the total number of confirmed cases isn't much higher than what is reported. It is certainly true that the total cases, even on a global basis, is much higher than the number of cases confirmed, but with the help of testing more people, we can ensure that the actual total number of cases isn't significantly higher than the number reported.

Finally, we would like to take a look at the current situation in India with the data we have at hand


Confirmed
Recovered
Death
Active
Number of cases
Date
12000
10000
8000
6000
4000
2000
0
1/22/20
2/1/20
2/11/20
2/21/20
3/2/20
3/12/20
3/22/20
4/1/20
4/11/20


Daily new cases
Date
12000
10000
8000
6000
4000
2000
0
1/22/20
2/1/20
2/11/20
2/21/20
3/2/20
3/12/20
3/22/20
4/1/20
4/11/20

From the graph of the Daily New Cases of India, we notice that it has been rising exponentially, inspite of the lockdown measures. This could be scary! According to a report in 2019, the total number of hospital beds in India is 7,13,986. Although from our table, it is clear that the current total number of active cases in India is much lower than the total number of beds, but if the daily cases keep on rising at this rate, it could be a problematic situtation in no time. More stricter measures need to be taken by the government to keep the situation under control.

Conclusion:- The worst thing about a pandemic, in general, is that everything seems to be absolutely normal, until it's not. Even from the global graph, we have seen that the total number of cases has been rising exponentially. The pandemic curve, without a doubt, would follow a sigmoid curve. But in a sigmoid curve, we cannot have any idea how far we are from the peak of the curve when we're somewhere middle of it. At this point of time, the entire planet needs to come together to tackle the situation and make sure that curve of the total number of cases starts to slow down, and ultimately comes under control, until a cure is found.

STAY HOME, STAY SAFE!

THANK YOU

Santanu Banerjee

15th April, 2020