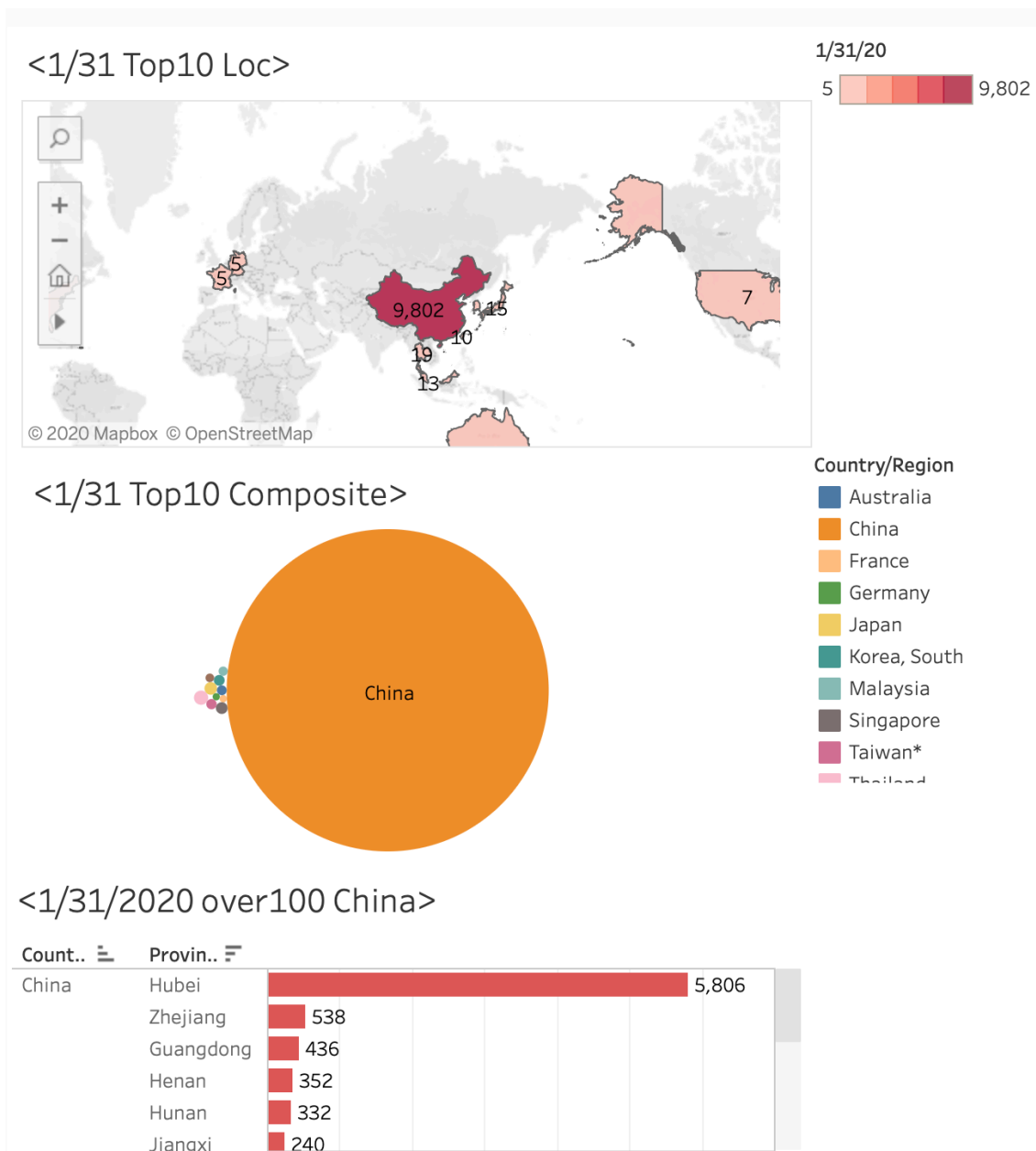


This repository contains data and code used to get and clean data from <https://github.com/CSSEGISandData/COVID-19> and <https://www.worldometers.info/coronavirus/>

The dataset is from data file: `time_series_covid19_confirmed_global.csv` which is made up of columns: Province/State, Country/Region, Longitude, Latitude, and time series of main countries in the world from 1/22/2020 to 5/30/2020 to describe coronavirus condition till now with number supplements.

Based on that, I decided to process data visualization using Tableau to draw a whole picture of coronavirus condition across the world. Firstly, I separate the time series into 5 parts by month and process month analysis.



Dashboard1 for 1/31/2020 Static Analysis

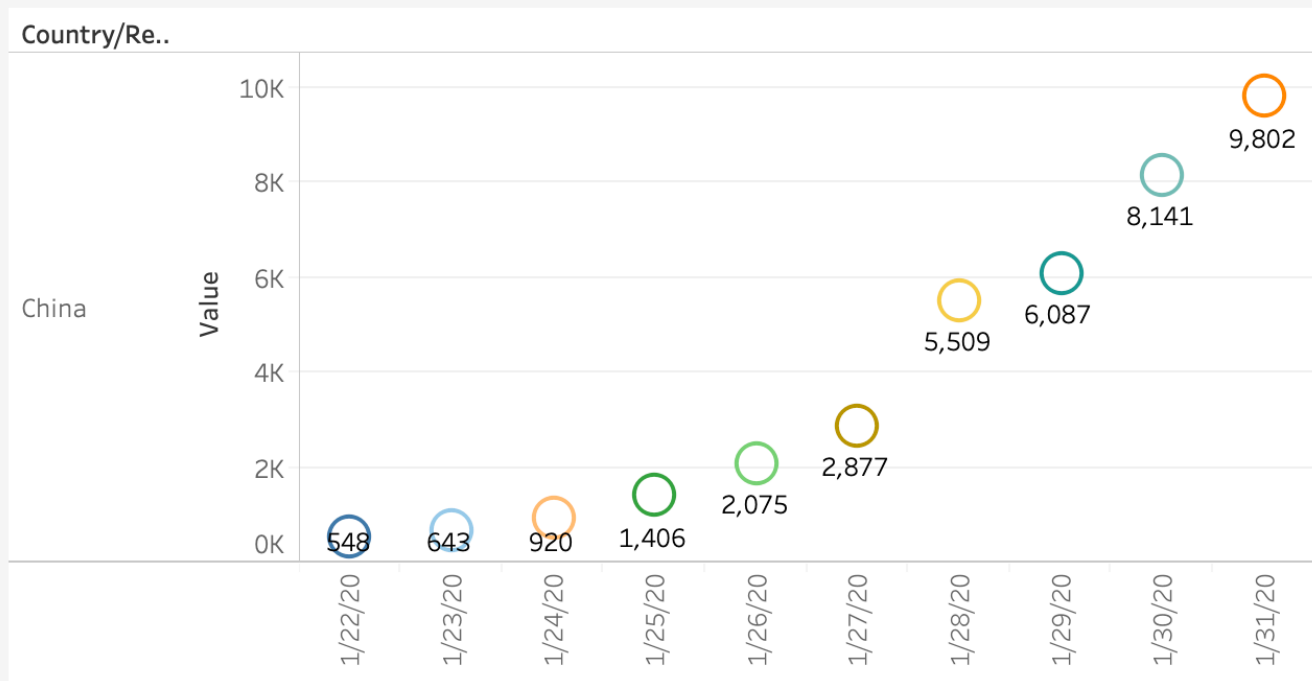
<https://public.tableau.com/profile/yansong.liu#!/vizhome/Coron1312020Structure/13120?publish=yes>

Based on the count value until 1/31/2020 in January, I made a dashboard to explain the static structure of the whole world step by step because it was the first month of COVID-19 recorded and signifies the start of COVID-19 period, a problem of ‘from zero to one’.

Firstly, from the dashboard, the locations of Top 10 countries are almost equally distributed across the world and the numbers shows that 9802 people affected were from China, which accounts for the 98.74% of the whole 9,922 people affected. And there are 14 countries in China where the number of affected people is over 100, especially the of people affected in Hubei Province has already up to 5,806, which accounts for around 59%.

## Dashboard2 for January Rate Analysis

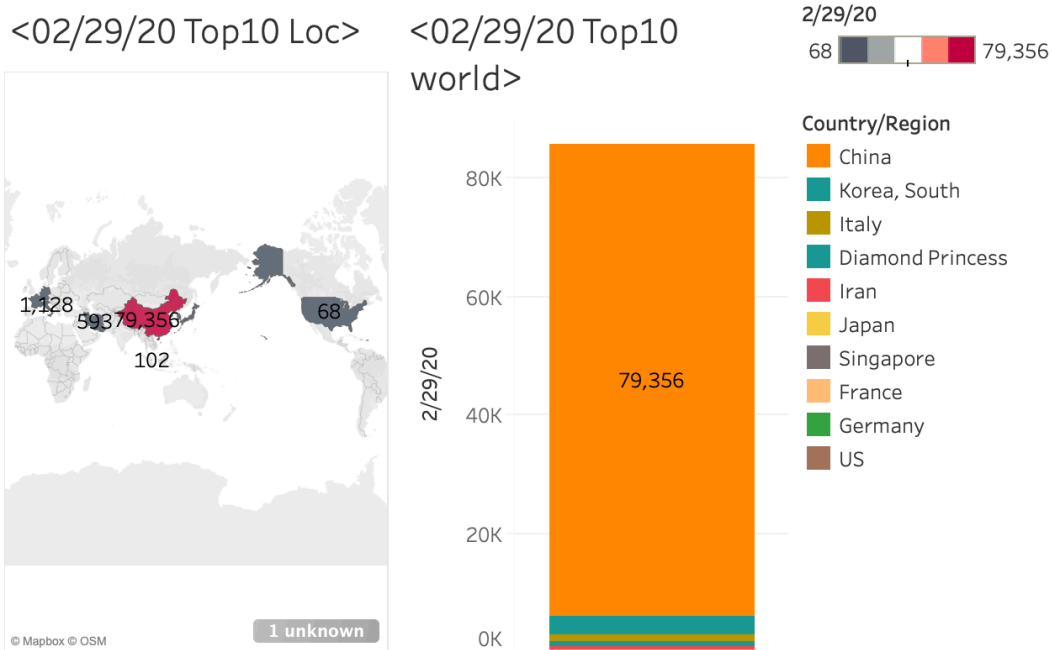
### <Jan China %>



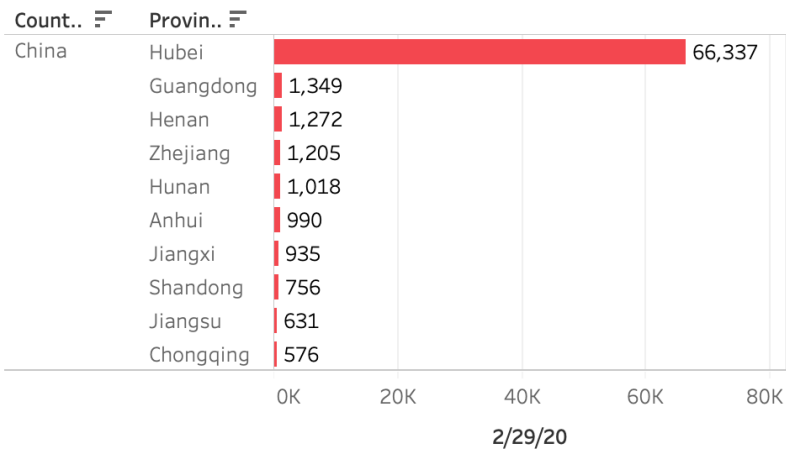
### <Jan China %>

Country/Re..	1/28/20 %	1/29/20 %	1/30/20 %	1/31/20 %
China	191.48%	110.49%	133.74%	120.40%

Then I want to know how did the number of infected people jump so fast so I make a dashboard to explain the increase rate of people infected in China in January. The total trend is increase for January and especially in 1/28/20, the number jumped rapidly, up to 91%, then the rate slowed down in 1/29/20, at the rate of 10%, however, the next two days the number still increased at a fast rate, up to 34% and 20% at 1/30/20, 1/31/20.



### 02/29/20 Top10 China



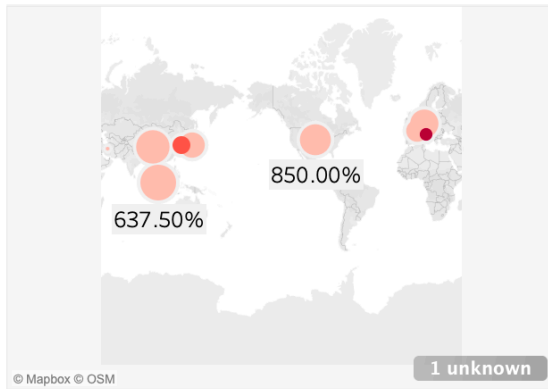
## Dashboard 3 for 2/29/2020 Static Analysis

When it came to February, from the dashboard, we can see that, though China still has most people infected, there were other countries jumping out such as Korea South, Italy. However, it is not surprising, they were all from countries where people infected have already been found. Just because the numbers were small and they were not been treated seriously. That happened in Korea South, Japan, neighbor countries of China and in France, Germany, Italy, European countries. And the for the U.S., things also have become serious.

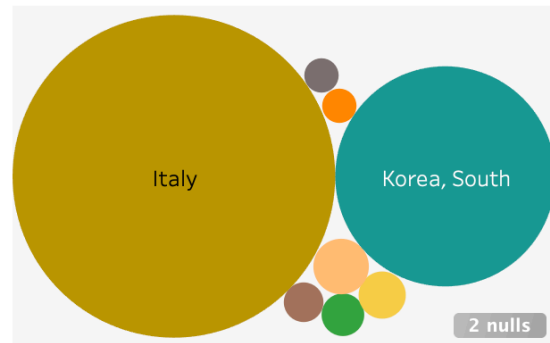
And for China, though number of other province still are increasing, infection number mainly came from Hubei Province, accounted for 84%, jumped from 5,806 to 66,337 at the rate of 1042%.

## <Feb Rate Analysis>

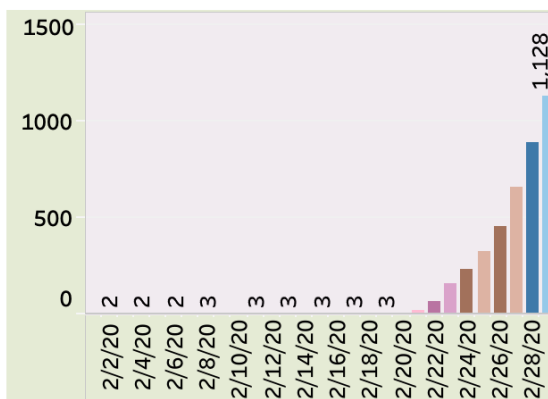
<Top10 Countries Location>



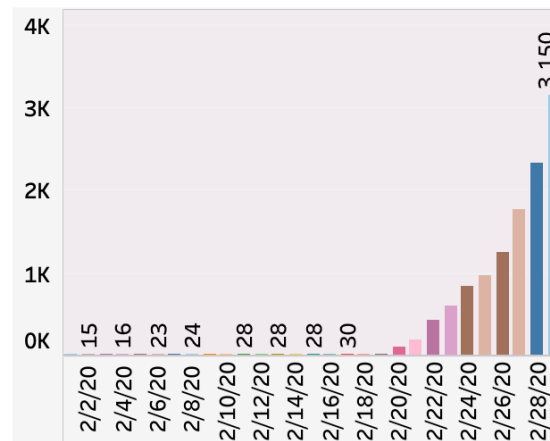
<Top Countries>



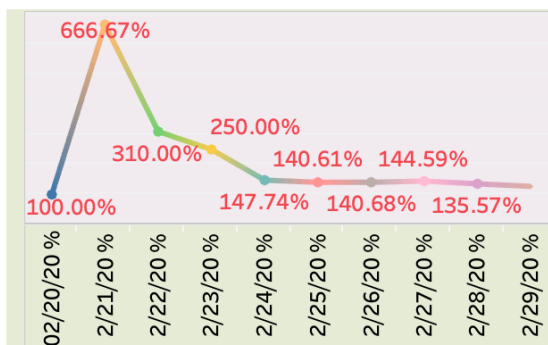
<Rate of Italy>



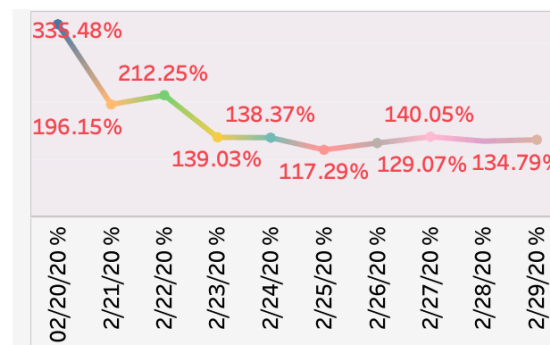
<Rate of Korea, South>



<Speed of Italy's Rate>



<Speed of Korea South's Rate>



Dashboard4 for February Rate

From the dashboard for February, we can see that though the total number is still large for China, the increase rate of China has already out of Top 10 countries in the world. However, for Italy and Korea, South, Top 2 rate across the world, the rate increased significantly, and ,especially, there was a turning point in around 2/20/20. Just on 2/20/2020, the rate of Korea, South has jumped to 335%. On 2/21/2020, the rate of Italy has jumped to 667% and after that the rates of these two countries start to decrease and stoped at 130%-140%, which means there was an increase rate of 30%-40% per day during the two countries. With the stable huge increase rate per day, we can assume that the total number of these countries will increase significantly.



<3/31/20>

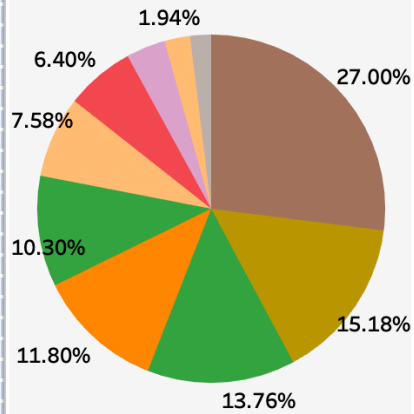
### <Top 10 Countries>

Country/Region	
US	188,172
Italy	105,792
Spain	95,923
China	82,279
Germany	71,808
France	52,827
Iran	44,605
United Kingdom	25,481
Switzerland	16,605
Turkey	13,531

0K 100K 200K 300K

3/31/20

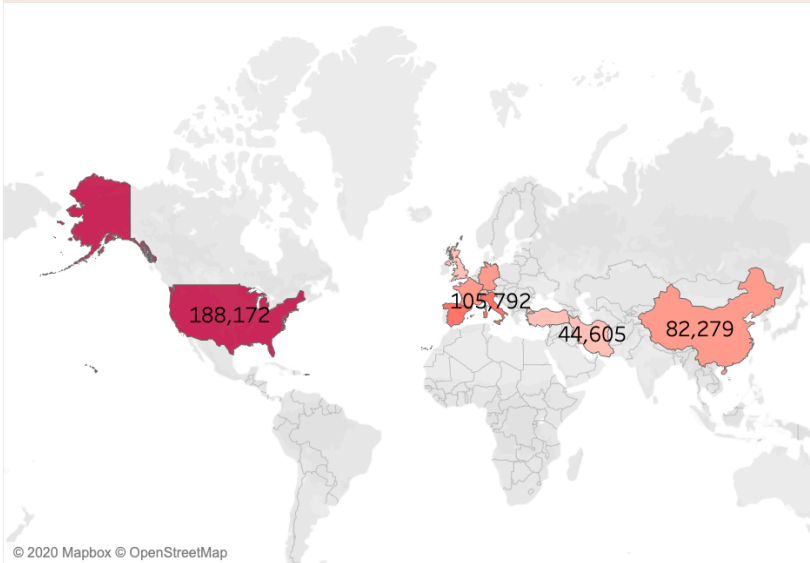
### <Top 10 Countries Composite>



#### Country/Region

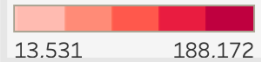
- US
- Italy
- Spain
- China
- Germany
- France
- Iran
- United Kingdom
- Switzerland
- Turkey

### <Top 10 Countries Location>



© 2020 Mapbox © OpenStreetMap

3/31/20

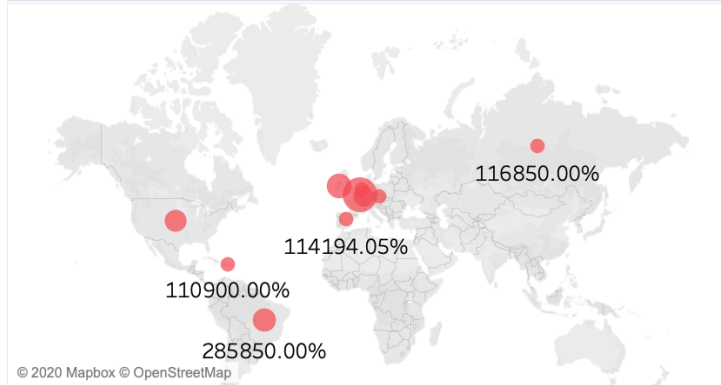


Dashboard5 for 3/31/2020 Static Analysis

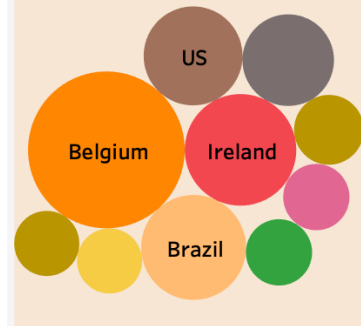
Until 3/31/2020, China has already been out of Top 1 total number of infected people across the world, though it has already not the Top 1 countries of increase rate of infected people in the world. Instead, US became the Top 1 countries of total numbers, which accounts for 27% of total numbers of top 10 countries. The following four countries are Italy, Spain, China and Germany. From the perspective of Location, the center of COVID-19 has already turned to Western Europe, Western Asia, North America. This location is basically similar to that in February, but the total number of these countries has increased significantly, reached to Top countries across the whole world.

## <March Rate Anlysis>

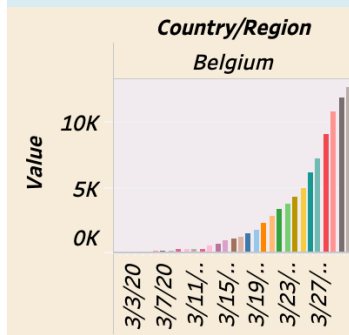
### <Top 10 Countries Location>



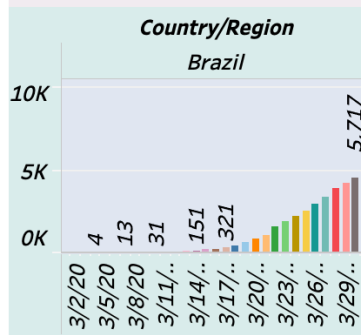
### <Top Countries>



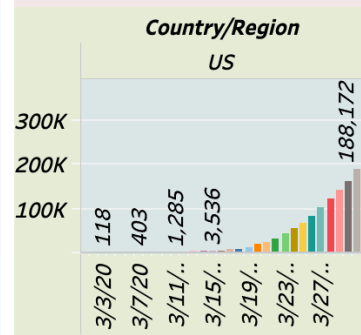
### <Rate of Belgium>



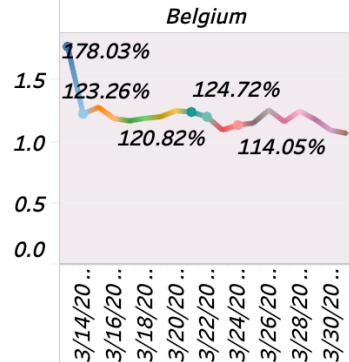
### <Rate of Brazil>



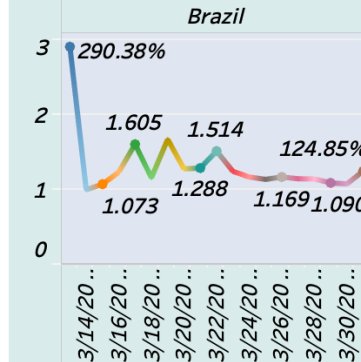
### <Rate of US>



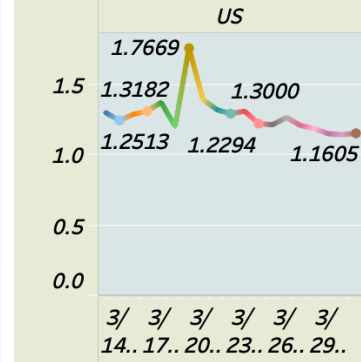
### <Rate of Belgium>



### <Rate of Brazil>



### <Rate of US>



Dashboard6 for March Rate Analysis

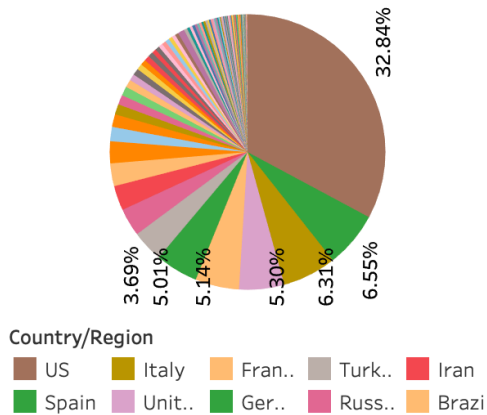
For rate in March, top 10 countries are mainly located in Western Europe, especially, top 4 countries are Belgium, Ireland, Brazil and U.S.. For Belgium, though its total number was not within top countries, its rate was highest during the whole month of March. There was a turning point in 3/14/2020, rate has reached 178% one day, which means there was an increase rate of 78% in a single day. After that, rate slowed down to 10%-20% and became stable until end of March. Number of people infected increased rapidly, which didn't only happened in Belgium because it was the same for several western European Countries, such as Ireland, Luxembourg, Netherland and Spain.

Another countries where rate increased significantly is Brazil located in South America. The turning point for Brazil is on 3/14/2020 and rate reached 290% in a single day and on 3/15/2020 the rate decreased suddenly to 100%. On 3/16/2020, 3/18/2020 and 3/22/2020 rate jumped 160%, 167% 151% again. After that, rates were controlled within 20%. From 3/14/2020 to 3/22/2020, rates were alternatively high and low, the range of which has reached to 190%.

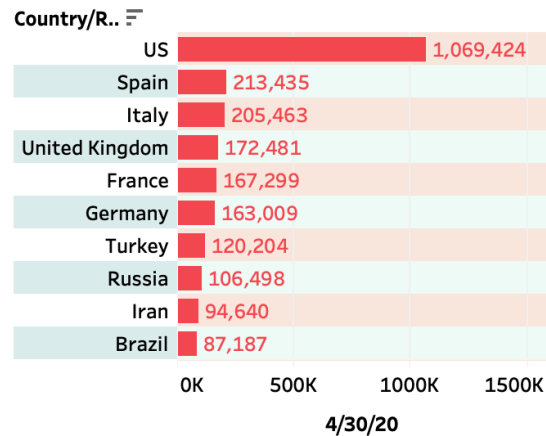
There is still a countries where rate increased significantly, that is, the U.S.. There was only one jump on 3/19/2020, reached to 77%. Other rates were around 20%-30%. What differs from other top countries is that the Total number of the U.S. has already been top 1 across the world and increase rate also belong to top countries. The trend shows that the total number of the U.S. for next month will still increase significantly.

<4/30/2020>

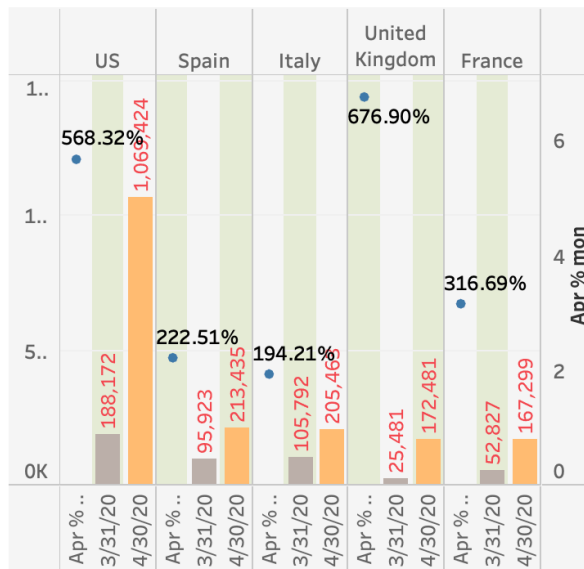
<Top Countries Composite of the World>



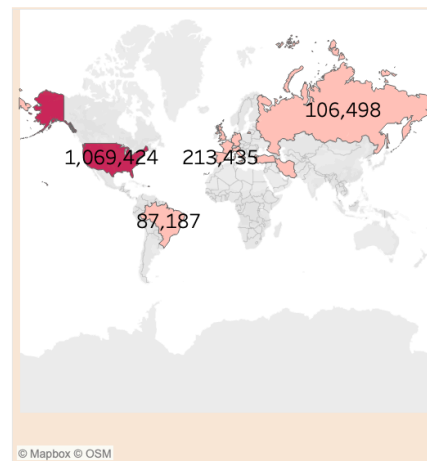
<Top 10 Countries Total >



<3/31/2020-4/30/2020 Change>



<Locations>



Measure Names  
 Apr % mon  
 3/31/20  
 4/30/20

Dashboard7 for 4/30/20 Static Analysis

When it came to April, until 4/30/2020, the total number of people affected has already reached 3,256,910 from 933,010 in 4/01/2020, where the increased rate has jumped to 249%.

Of the total number, top 10 countries accounted for 74%, especially the top 1 country is US and its total number reached 1,069,424, accounted for 32% of all. Comparing total number on 3/31/2020, rate of total number of US reached 568%, which means total number has increased 468% in the whole month April. And its total number has already ranked the first place in the world at the end of March.

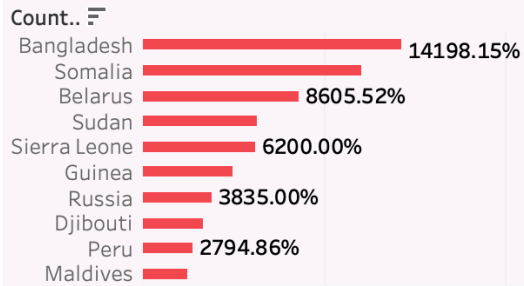
Top 2 countries is Spain, jumped from the third rank in March. Its total number reached 213,435 on 4/30/2020 from 95,923, total number on 3/31/2020, accounted for 6.6% of all and increase rate reached 123%. The pattern is similar for Italy, the total number reached 205,465 on 4/30/2020 from 105,792 on 3/31/2020, accounted for 6.3% of all and its increase rate reached 94%.

United Kingdom ranked number there from rank number eight in March. Its total number reached 172,481 on 4/30/2020 from 25,481 on 3/31/2020, accounted for 5.3% of all, and its increase rate reached 577%.

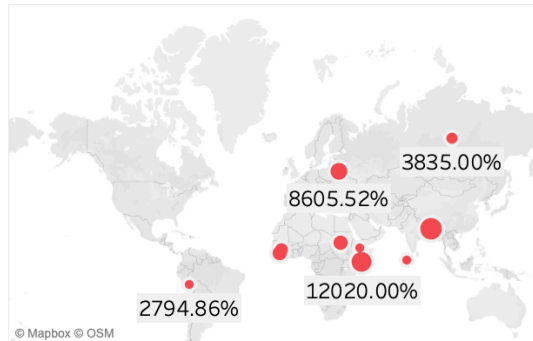
At the end of April, the center located in the whole Europe, North America and part of South America.

## <April Rate Analysis>

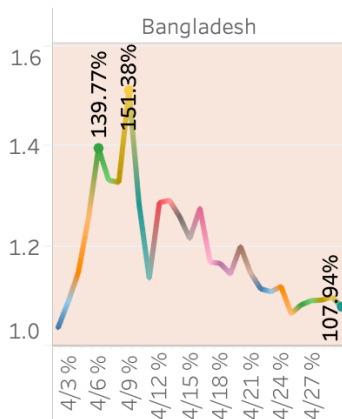
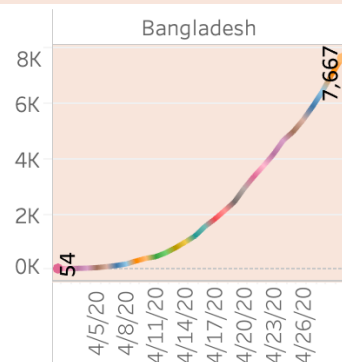
### <Top Countries>



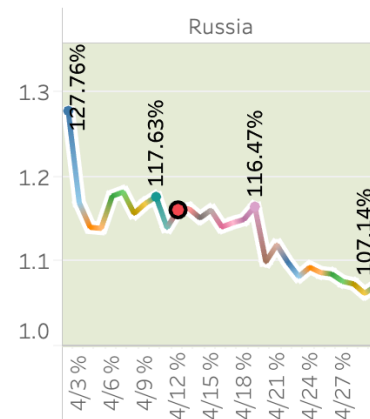
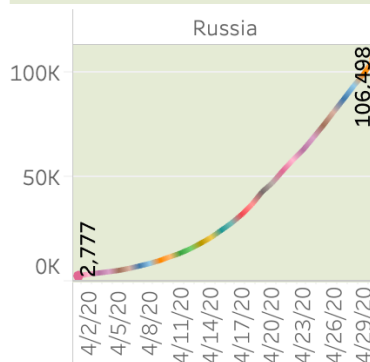
### <Locations>



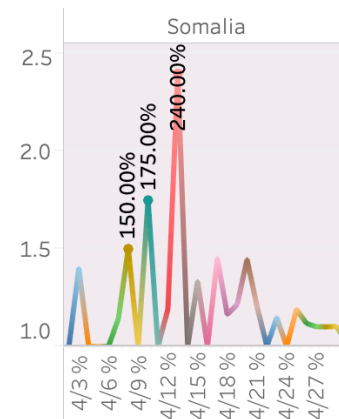
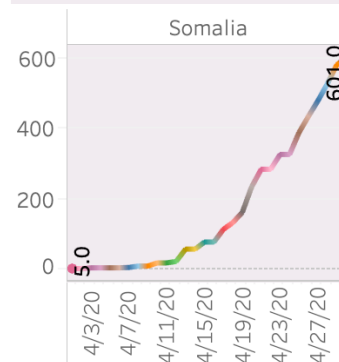
### <Pattern 1>



### <Pattern 2>



### <Pattern 3>



Dashboard8 for April Rate Analysis

What differs from total number, cross sectional data on 4/30/2020, the rate in April measures countries where increase speed during month of April from time series data of the whole month.

There were different trends during the month of April.

The first one is in Bangladesh, where rate has ranked the top one across the world. Its total number was 54 on 4/01/2020 and then continued increasing during the whole month to 7,667 on 4/30/2020, the range of which reached 7,613. There were two rate spikes in April, which were 140% on 4/06/2020 and 151% on 4/9/2020 and after that rates decreased gradually within the limit of 120%.

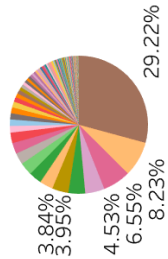
However, there are still tiny differences among them and the most typical example is Somalia. Before April, its total number is very small, almost digit numbers. In April, the total number increased rapidly from 5 on 4/01/2020 to 601 on 4/30/2020 and range was small, up to 597. There were several spikes of increase rate during the month which caused number changed significantly which were 240% on 4/13/2020, 175% on 4/10/2020, 150% on 4/08/2020.

The second trend is in Russia, where total number has already been large in March. In April, its total number still continued increasing, the rate of which was decreased steadily from 130% to 110%. Because of high total number and stable increase rate, at the end of April, the total number of Russia has ranked number eight across the world.

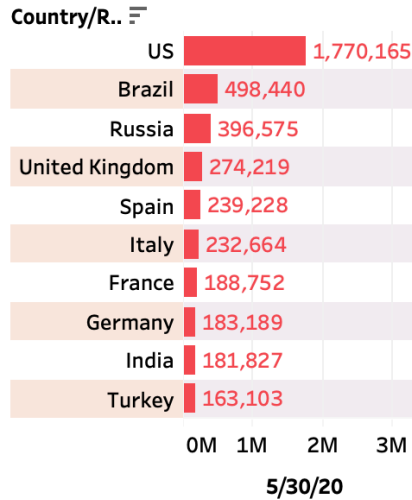


<5/30/2020>

<Total Number  
Composites>



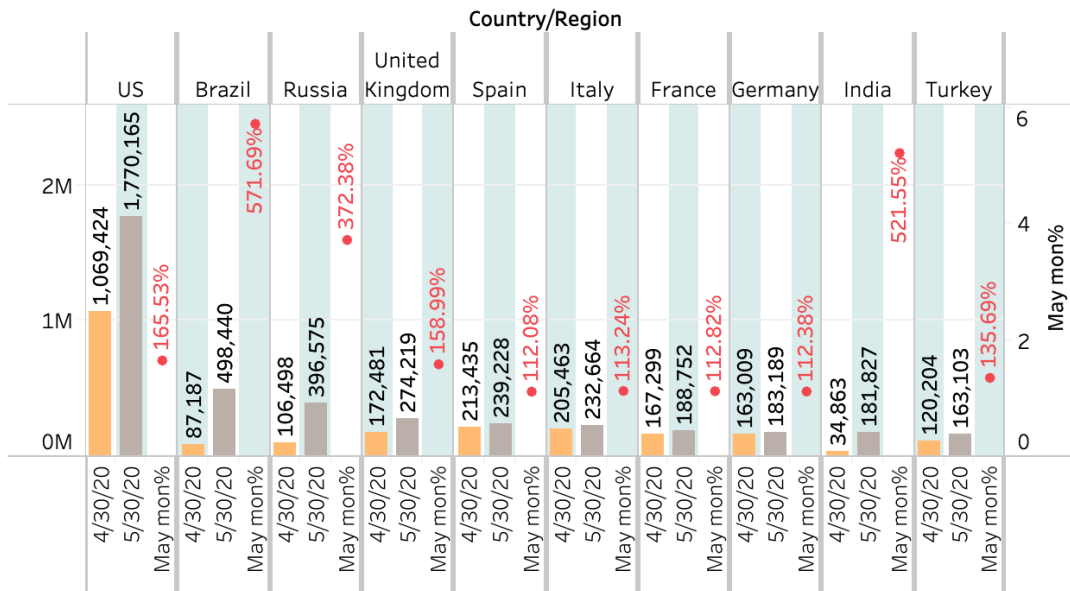
<Top 10 Countries>



<Locations>



<May Monthly Changes>



Dashboard9 for 5/30/2020 Static Analysis

Until 5/30/2020, the total number of people infected across the world has reached 6,059,017 from 3,256,910 on 4/30/20, increasing at a rate of 186%, which is smaller than 249%, rate of March.

Of total numbers, top 10 countries account for 68%. The top 1 country is US, its total number reached 1,770,165 on 5/30/2020 from 1,609,424 on 4/30/2020, increasing at a rate of 166% and accounts for 29% of all. The increase rate, 166% is smaller than that of March, 568% and total number weights less from 33% to 29%.

The top 2 country is Brazil, its total number is 498,440 on 5/30/2020 from 87,187 on 4/30/2020, increasing at a rate of 572%. Its rank jumped to number two from number ten in March.

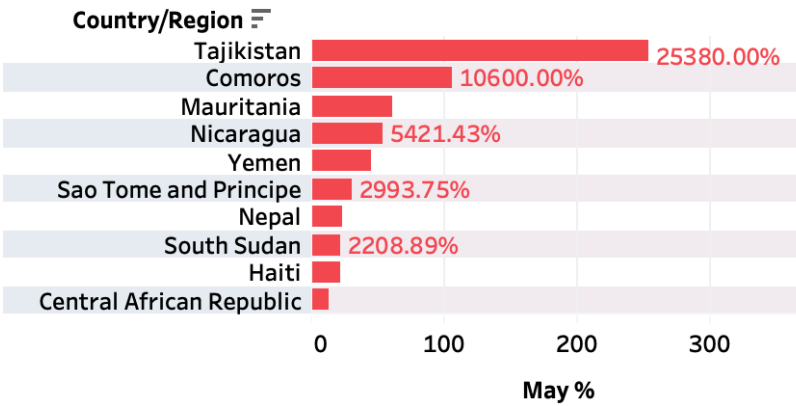
The top 3 country is Russia, its total number is 396,575 on 5/30/2020 from 106,498 on 4/30/2020, increasing at a rate of 372%. In last month, April, the rate of Russia has shown that the speed of increase was stable and high and this month, its total number still increased rapidly.

The top4-8 are all western European countries, United Kingdom, Spain, Italy, France, Germany. They have shown similar pattern, the increase range is not large, and rate was relatively small. Especially, United Kingdom ranked top of them, and its total number was 274, 219 on 5/30/2020 from 172,481 on 4/30/2020, increasing at the rate of 159%.

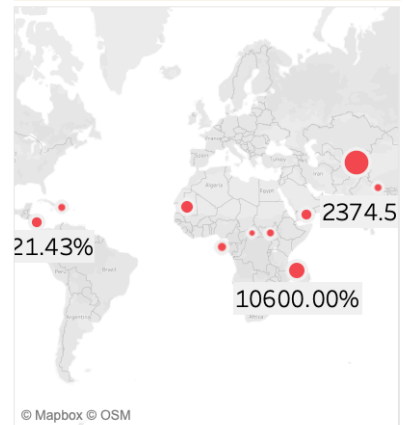
Among the top 10 countries, most of them are familiar because they has already been top countries in April, except India. The total number of India was 181,827 on 5/30/2020 from 34,863 on 4/30/2020, relatively small number, increasing at the rate of 522% and ranked number nine on 5/30/2020. And it is also the only Asia country ranked within top ten across the world

## <May Rate Analysis>

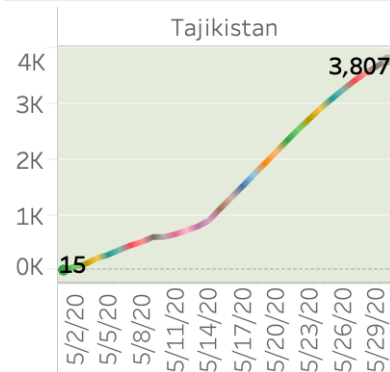
### <Top 10 Countries>



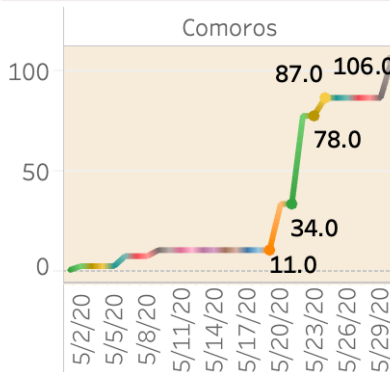
### <Locations>



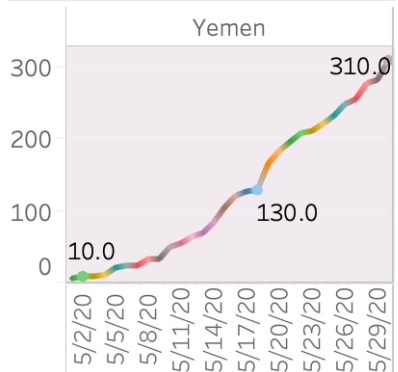
### <Time Series\_Tajikistan>



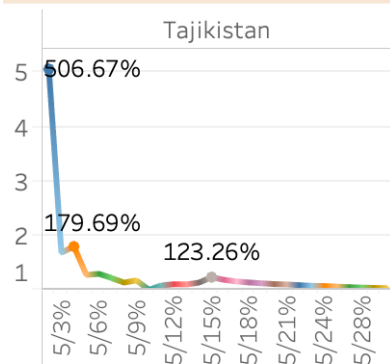
### <Time Series\_Comoros>



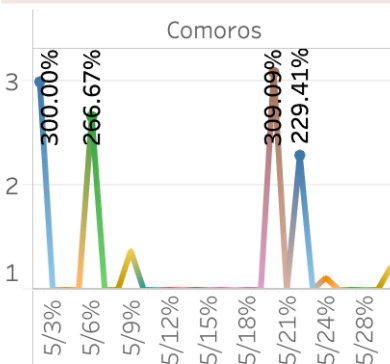
### <Time Series\_Yemen>



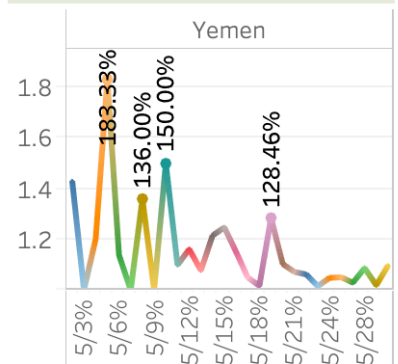
### <Rate\_Tajikistan>



### <Rate\_Comoros>



### <Rate\_Yemen>



Dashboard10 for May Rate Analysis

Among top 10 countries, there were also different patterns of rate.

The top 1 country is Tajikistan, its rate has reached to 25380% during the whole month. Its total number also increased from 15 on 5/1/2020, a small number to 3,807 on 5/30/2020, which causes large range of increase. Just because the start number is small, at begin of the month, the rate jumped to 507% and then decreased rapidly. And after 5/5/2020, the rate became stable within the limit of 110%-120%.

Another pattern was found in Comoros, top 2 country. Its rate has reached 10600% during the month. What differs from Tajikistan is that until 5/20/2020, the total number did not change obviously and still keep small, 11. However, after that, total number increased transitionally in two or three days, though the number still did not change a lot. With the pattern, there were alternatively large-scale rate spikes.

There was still one pattern which was found in Yemen, top 4 country across the world. Its rate reached 4429% during the whole month. At the start of month, its total number was small, 10 and increased steadily to 310 on 5/30/2020. There were several small rate spikes, 183% on 5/6, 150% on 5/10/2020 and then became stable to around 110%.