



Climate Emergency : A Glimpse on CO2 Emission

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Introduction

We see that over the last few decades, global temperature have been rising sharply to approximately 0.8 degrees celsius higher than our 1961-1990 baseline.

So through this analysis, we would like to take a look at the contribution of various countries over the decades to the overall carbon emission.



Problems to solve



1

To compare the annual CO₂ emission from 1900-2017 for the countries around the world.

2

To compare the annual CO₂ emission in the year 2017 for various countries.

3

To show the percentage contribution in CO₂ emission for various countries in 2017

4

To compare the growth rate of major CO₂ emitters

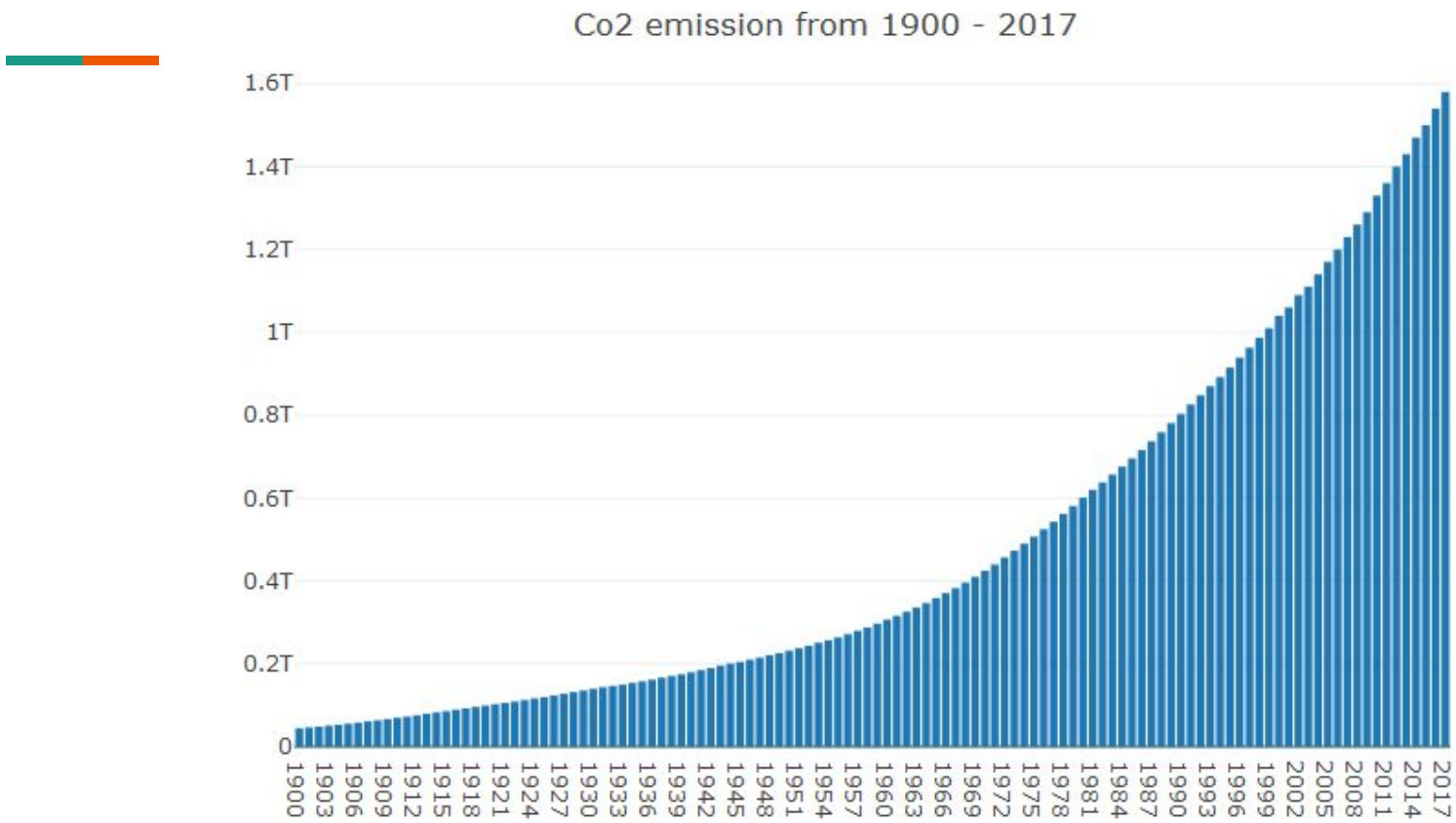
5

To compare the growth rate of all the countries

6

To predict the CO₂ emission for the years 2018 - 2020

1. Comparison of the annual CO2 emission of the world





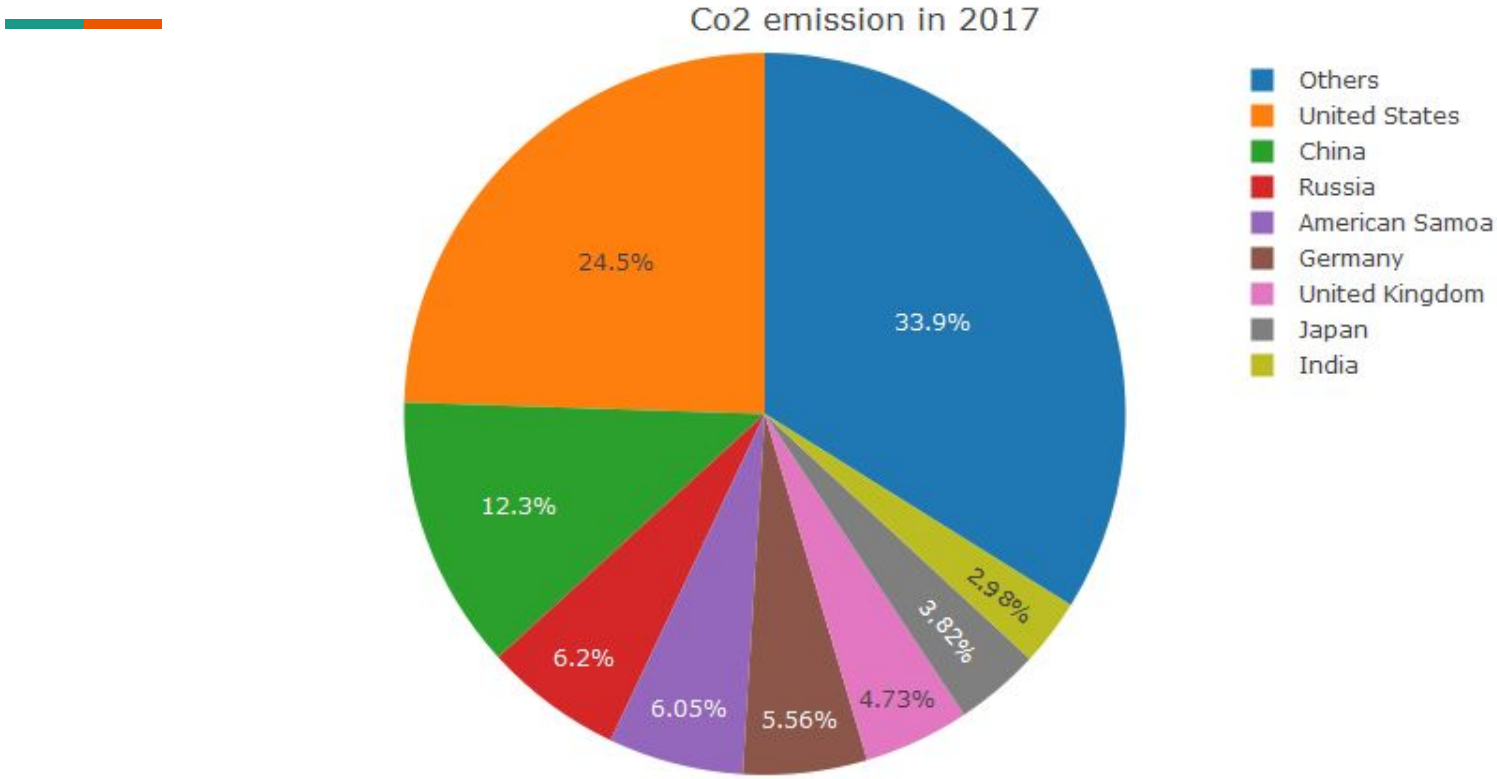
Inference

From the barplot, we infer that the global CO2 emission has been rapidly increasing from 1900 - 2017 to reach 1.6 trillion tonnes.

Source Code

```
plot_ly(x=bar_df$year,y=bar_df$emission_world,type="bar") %>%  
layout(title="Co2 emission from 1900 - 2017")
```

2. Percentage contribution in CO2 emission for various countries in 2017





Inference

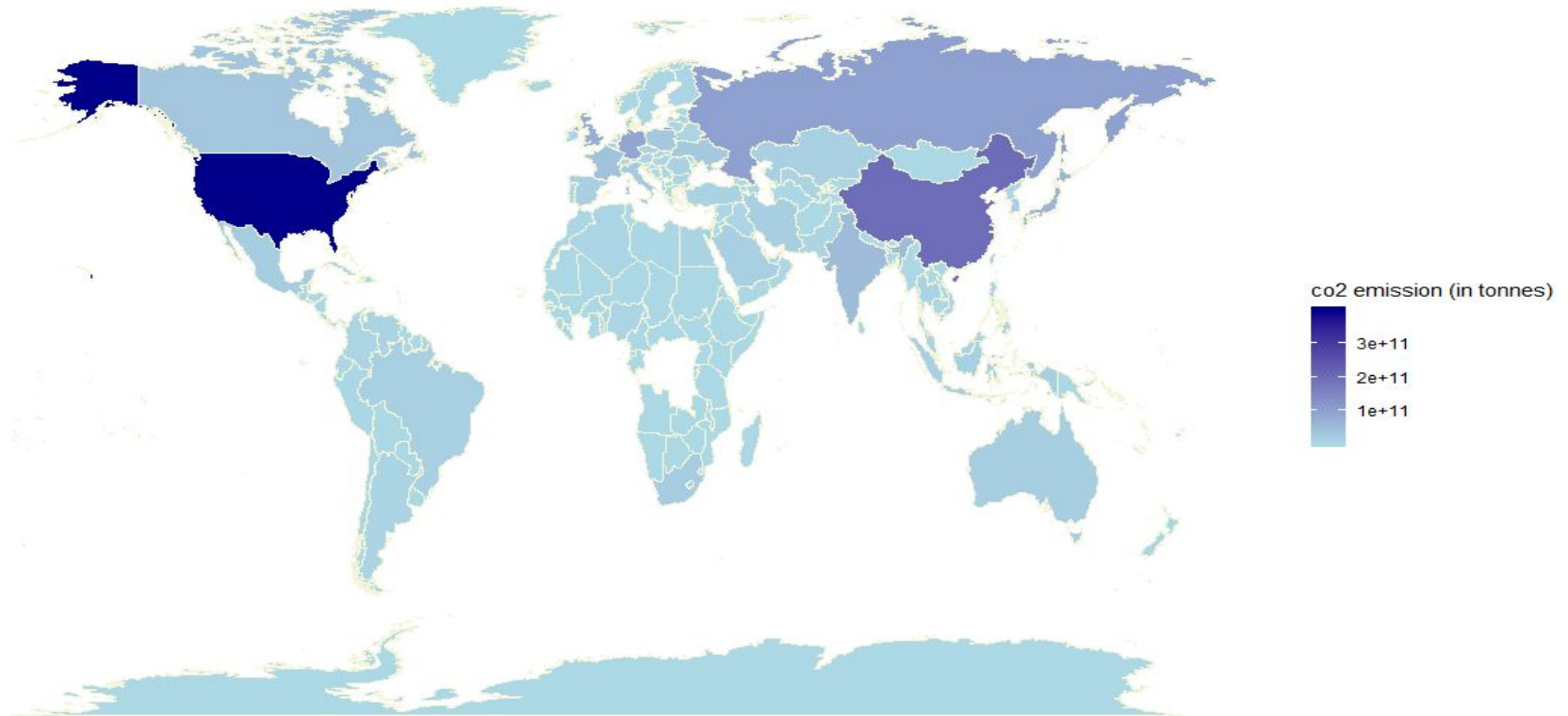
From the pie chart, we infer that USA has the highest CO2 emission as compared to other countries followed by China. We must note that among the 'others' category we have all major oil producing countries.

Source Code

```
plot_ly(my_pie, labels = ~country, values = ~emission_2017, type = 'pie') %>%  
  layout(title = 'Co2 emission in 2017',  
    xaxis = list(showgrid = FALSE, zeroline = FALSE, showticklabels = FALSE),  
    yaxis = list(showgrid = FALSE, zeroline = FALSE, showticklabels = FALSE))
```


3. Intensity of CO2 emission for various countries in 2017

Co2 emission in 2017





CO₂ Emission

399B

USA

200B

China

101B

Russia



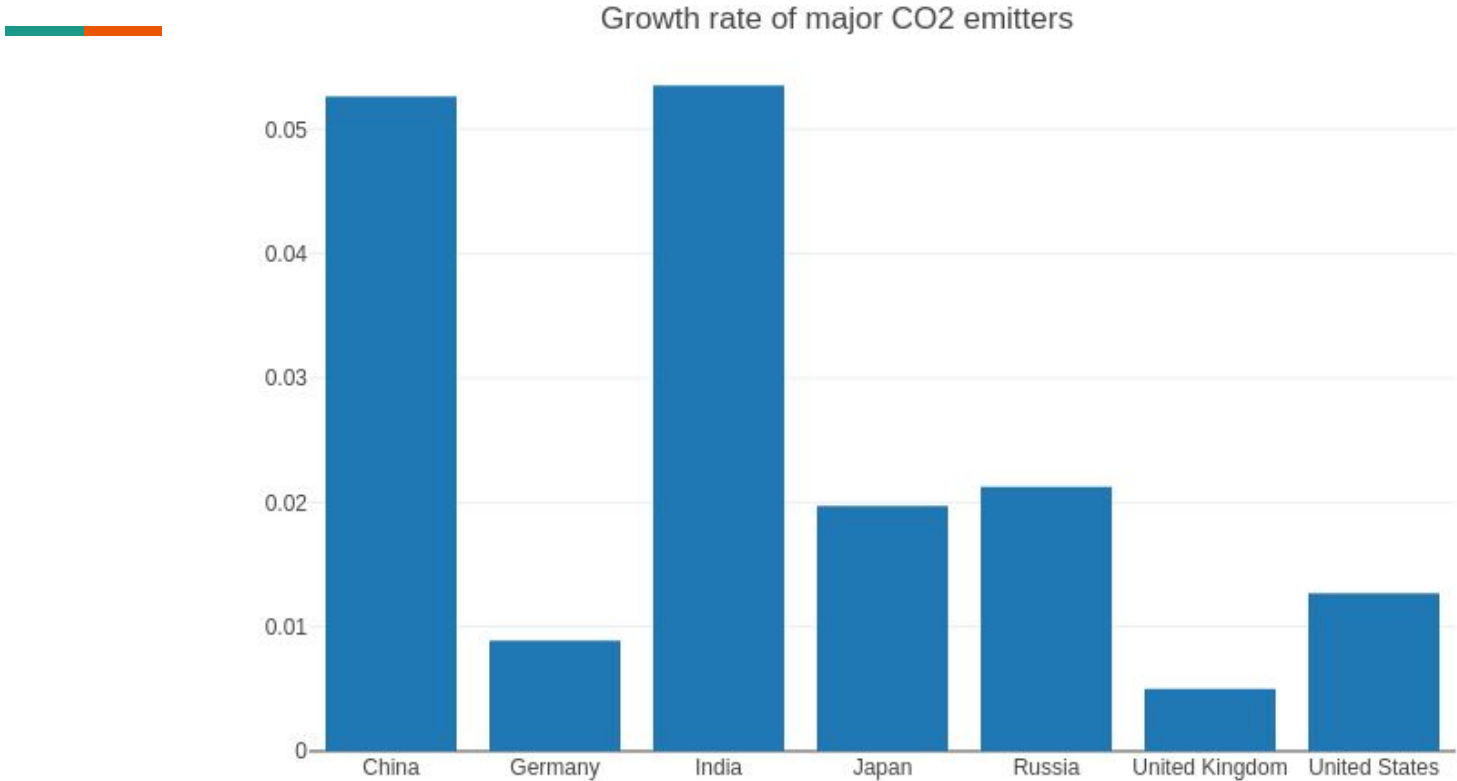
Inference

From the world map, we infer that USA has the maximum contribution to CO2 emission in 2017 followed by China & Russia.

Source Code

```
ggplot(world_map,aes(x=long,y=lat,group=group,fill=emission_2017))+geom_polygon(color="black")+scale_fill_continuous(low="light blue",high="dark blue",guide="colorbar")+theme_bw()+labs(fill="co2 emission (in tonnes)",title="Co2 emission in 2017",x="",y="")+scale_y_continuous(breaks=c())+scale_x_continuous(breaks=c())+theme(panel.border=element_blank())
```

4. Growth rate of major CO2 emitters





Inference

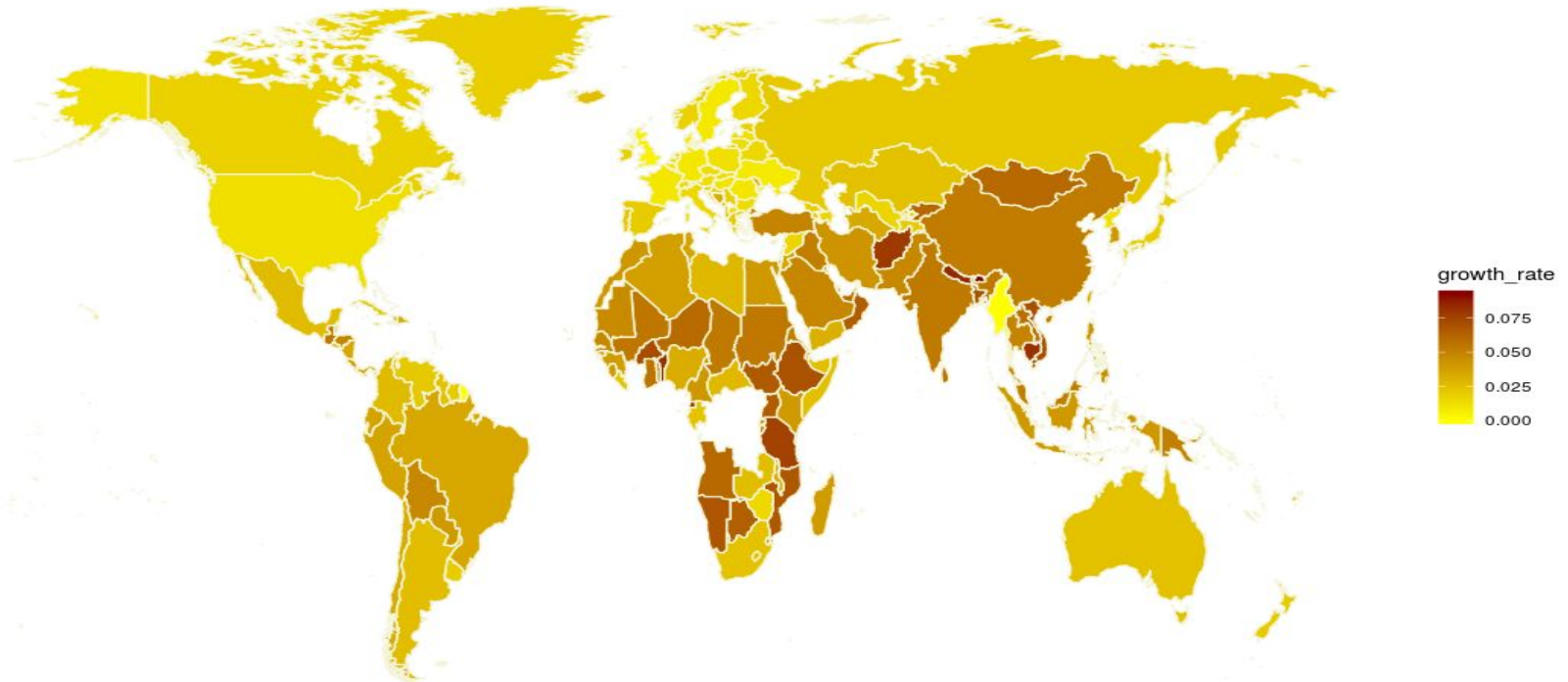
From the bar plot, we infer that India has the highest carbon emission growth rate followed by China. UK has least carbon emission growth rate.

Source Code

```
plot_ly(x=X_bar,y=Y_bar,type="bar") %>%  
layout(title="Growth rate of major CO2 emitters")
```

5. Growth rate of all the countries

Growth Rate of Countries





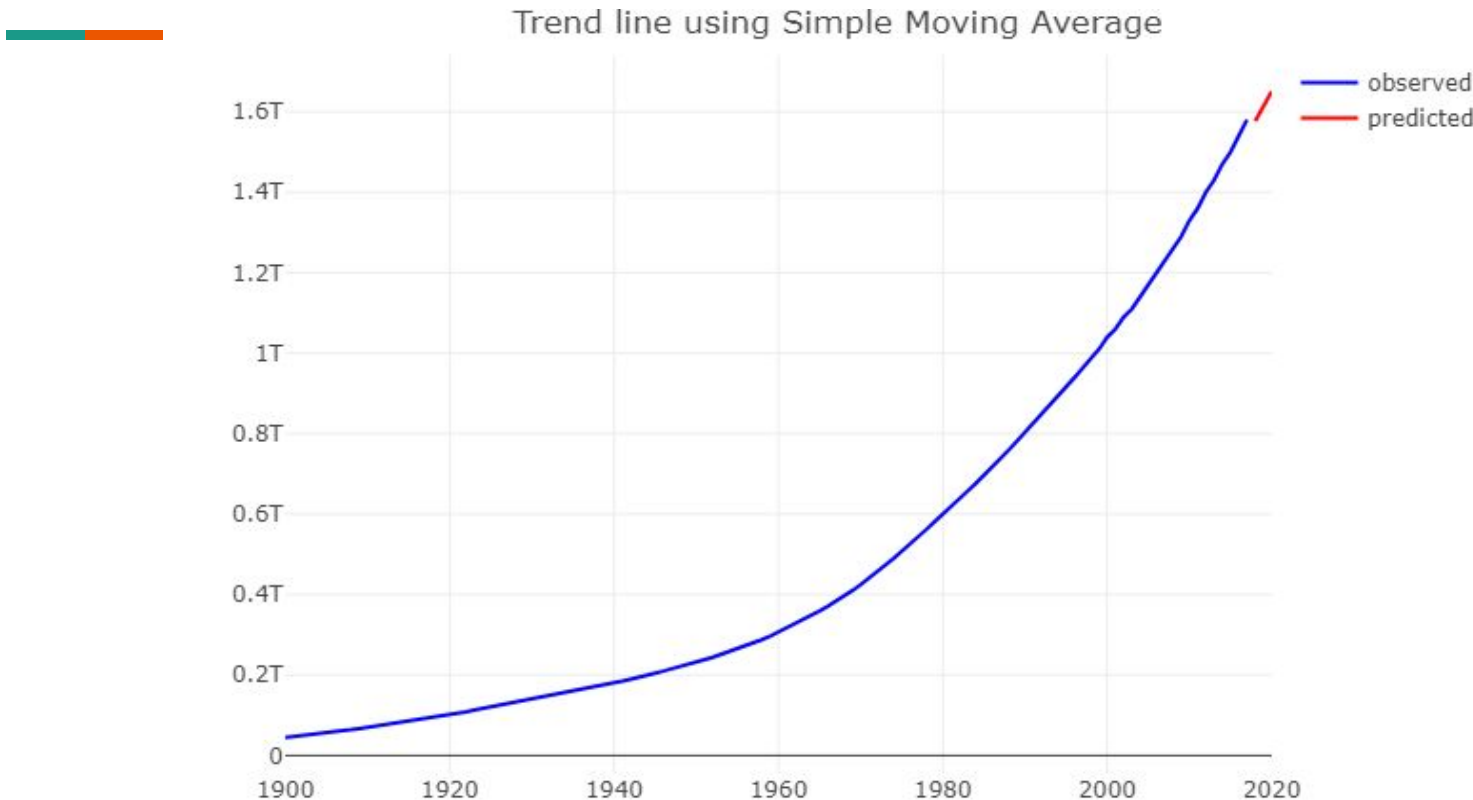
Inference

From the world map, we infer that the growth rate of China and India are among the highest. Developed countries like USA, Russia has least growth rate.

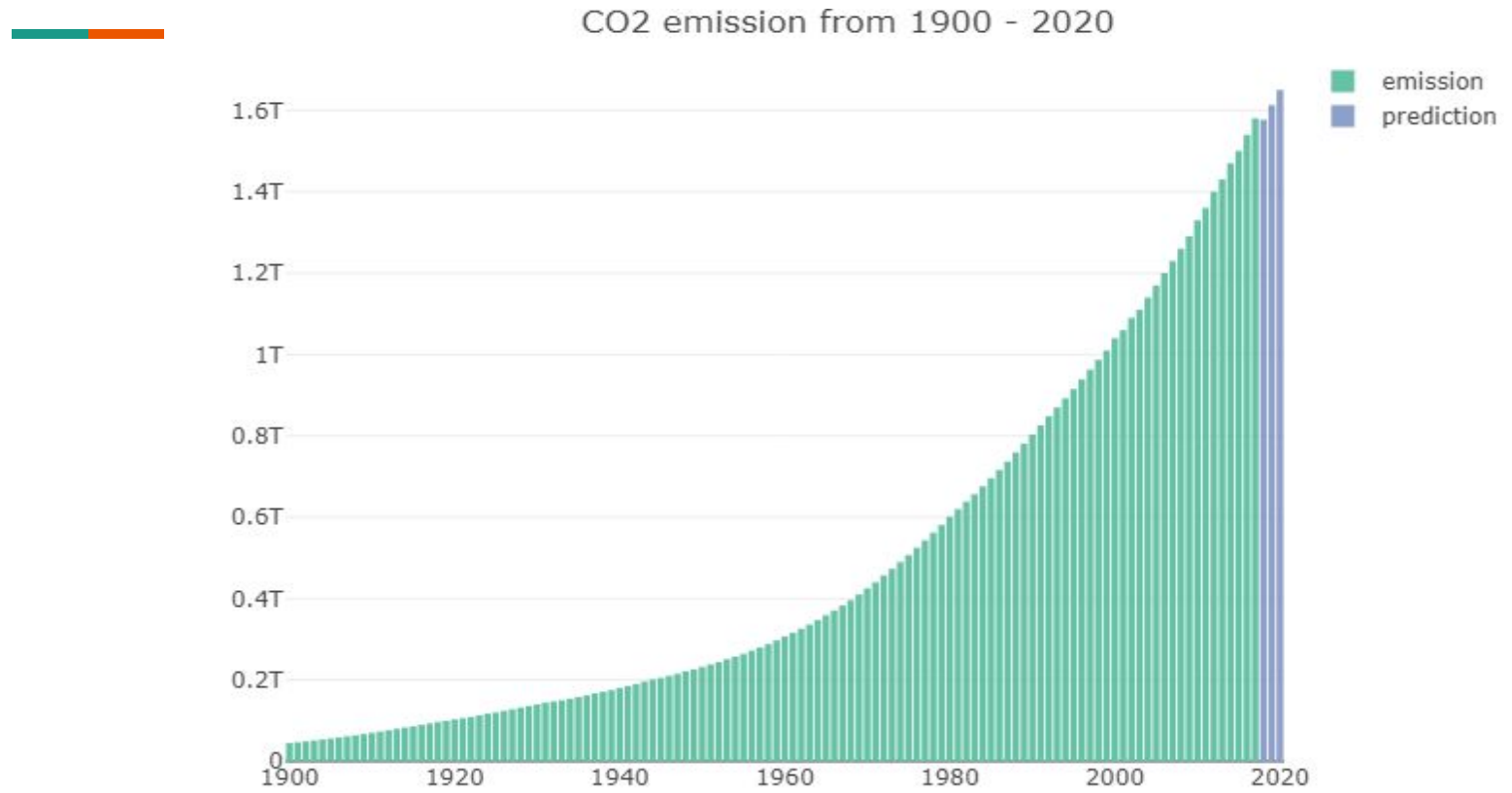
Source Code

```
ggplot(world_map,aes(x=long,y=lat,group=group,fill=growth_rate))+geom_polygon(color="beige")+  
scale_fill_continuous(low="yellow",high="dark  
red",guide="colorbar")+theme_bw()+labs(title="Growth Rate of  
Countries",x="",y="")+scale_y_continuous(breaks=c())+scale_x_continuous(breaks=c())+theme(panel.border=element_blank())
```

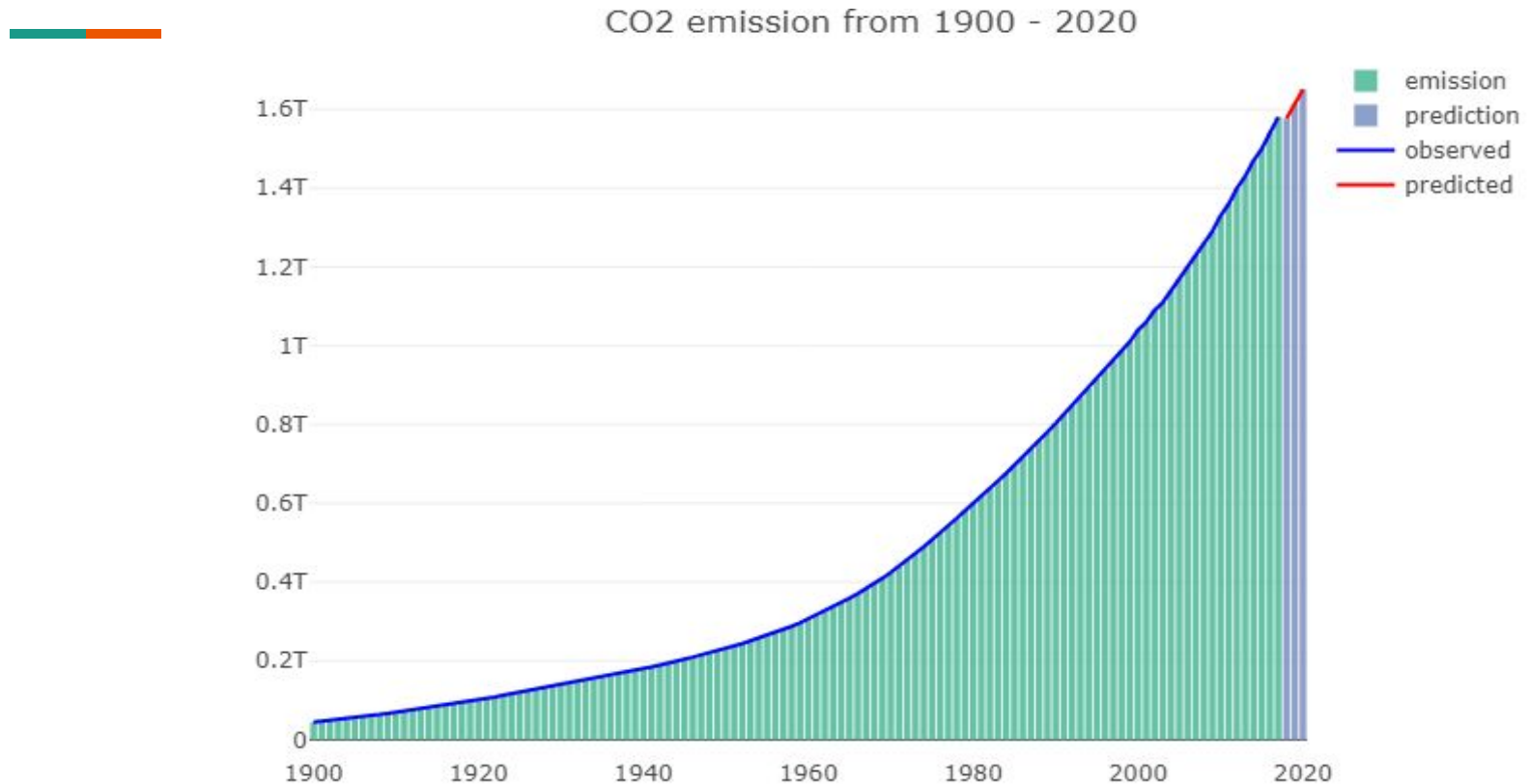
6. Predicting CO2 emission for the years 2018 - 2020 using Simple Moving Average (3)



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Inference

We have used simple moving average of order 3 to predict the CO2 emission for the years 2018 - 2020.

Source Code

```
m<-movavg(emission_world,3,"s")  
f<-forecast(m,3)  
p<-f$mean
```



Conclusion

Many of the major oil producers have a relatively low population size meaning their total annual emissions are low. However, more populous countries with some of the highest per capita emissions – and therefore high total emissions – are the United States, China, and Russia. They have more than 3 times higher carbon emissions than the global average, which in 2017 was 4.8 tonnes per person.



Bibliography

- <https://www.kaggle.com/srikantsahu/co2-and-ghg-emission-data>
- <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions>
- <https://stackoverflow.com/>



Thank you.

