Climate Change

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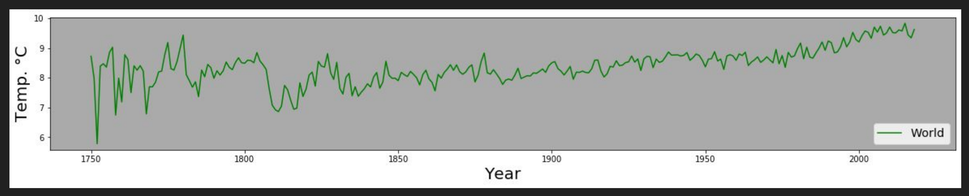
Climate Change - Fact or Fiction

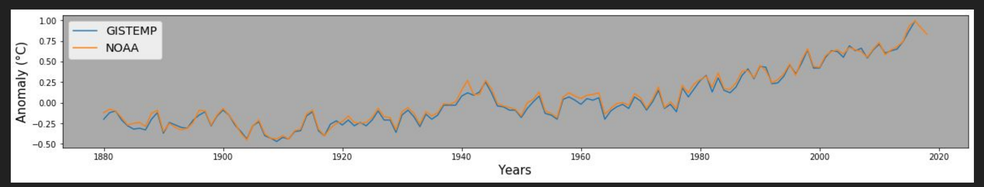
In recent times global warming has been a threatening issue all over the world that concerns everyone and yet there are still a lot of people who think that global warming isn't real. The aim of our project is to take a look at the available data and find out if there is any question about climate change. For this we have analyzed the data of the last 250 years and provided charts of average temperatures for the time period



Average temperature of decade:

1950-1959 - 8.62°C

2010-2018 - 9.67°C

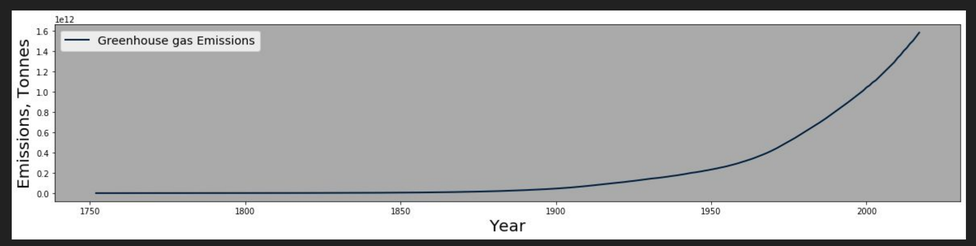


Anomaly shows the difference of a given year when compared to the average temperature of 20th century which was 8.5°C

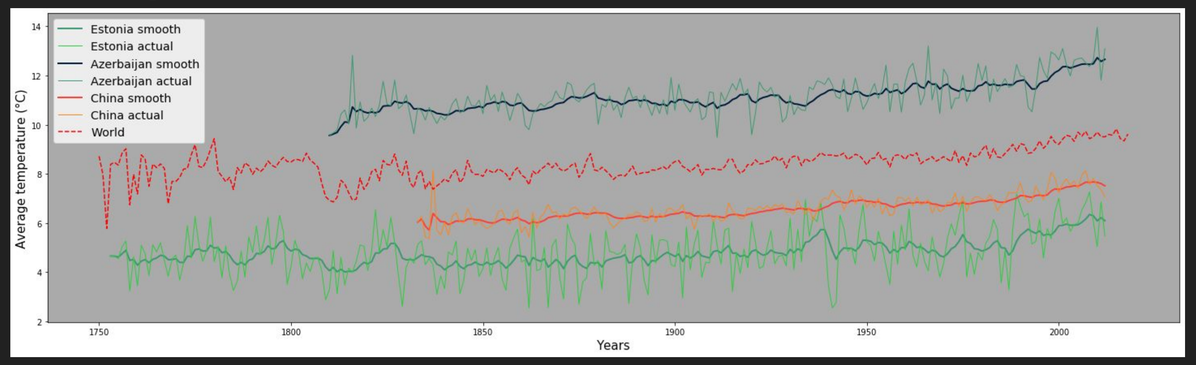
So if the anomaly is 0.25 it means that the average temperature of that year was 8.75°C

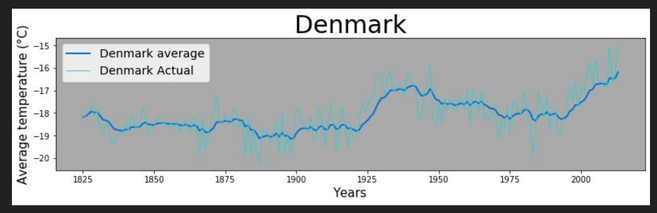
Cause?

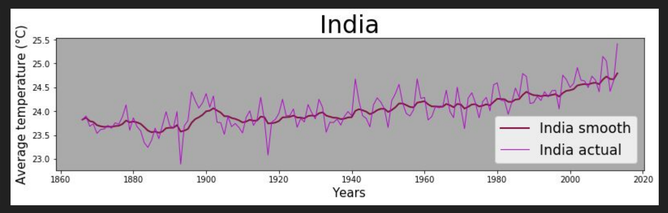
Of course, there are natural causes as well but we are looking for artificial causes.
First industrial revolution spans from the end of the 18th century to the beginning of the 19th century. It witnessed the emergence of mechanization. Mass extraction of coal created a new type of energy.
Second revolution came nearly a century later at the end of the 19th century, new technological advancements initiated the emergence of a new source of energy: electricity, gas and oil.
At the beginning of 20th century is when the global GHG emissions really started to increase, and in the 1950s the GHG emissions skyrocketed. Since 1950, global annual GHG emissions have increased by a factor of 6



Comparison of different countries







China observed a ground average temperature increase of 0.24°C/decade from 1951 to 2017, exceeding the global rate. The sea level rise was 3.3mm/year from 1980 to 2017.
There was an annual increase in concentrations of carbon dioxide from 1990 to 2016.
In India average temperatures have increased by 0.6 degrees Celsius (° C) between 1901-10 and 2009-18.
Denmark is the country with the highest rate of temperature change - Over the last 20 years their temperature has increased by 1.2°C, compared to 0.52°C global average

A look into predicting the future - ARIMA model

Autoregressive integrated Moving Average

Here is a graph that compares predictions made by the ARIMA model to the actual data, as well as 2 predictions into the future
For the purpose of testing the ARIMA model, we added cutoffs to the data at years 1900 and 2000. We then chose different p values for the ARIMA model, which dictates how many previous data points are used in making predictions.
The results show that the prediction follows the actual data quite well in the predictions starting from 2000, as well as the p=25 prediction from 1900.
The future prediction starts from the year 2019 and predicts that by 2024, global average land temperature will be above 10 °C and by 2040 will be the first year when it exceeds 10.5 °C