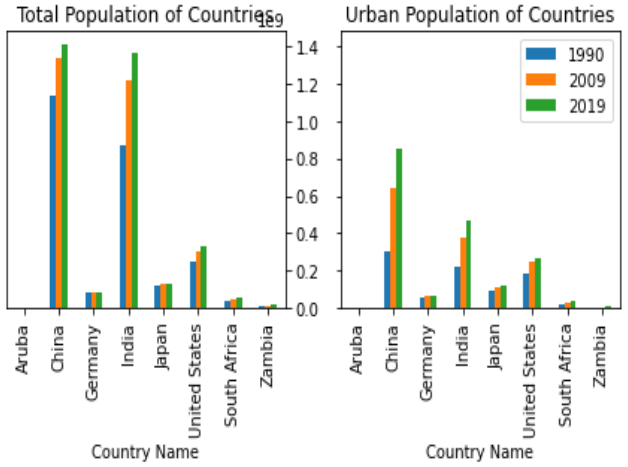
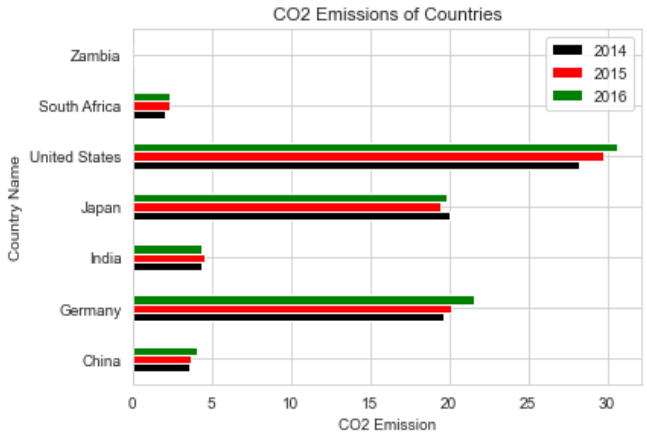
Climate change data analysis based on World Bank data

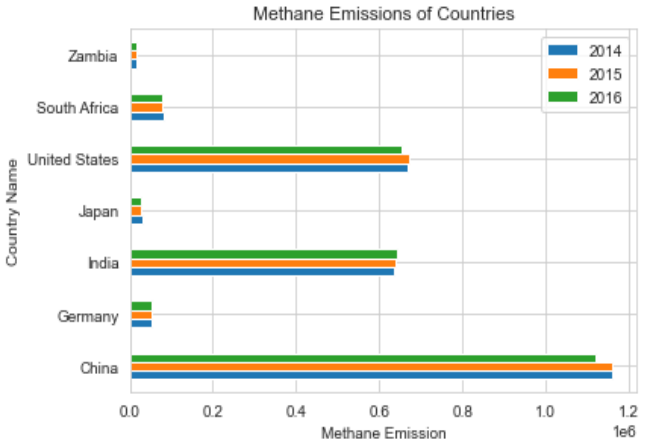
World climate is changing drastically due to human activities, so it is quite thought to analyse various factors of certain countries in order to judge the real cause of climatic change. Indicators like CO2 emission, Methane emission, GDP production, countries' expenditures Total population and its comparison with urban population are analysed deeply and their correlations are visualized to see the impact and role of countries on climate in different years.



Total population is one of the major factors which effect the climate, as population increases it also increase climate-changing gases. So, total population of 8 countries with the gap of 10 years is analysed and compared with their urban population because urbanization also causes direct increase in stream temperatures from burning fossil fuels. From above graph it is quite evident that China and India are the top two most populated countries whereas South Africa has a less increase of population in 30 years and Zambia and Aruba has little or no increment in its population and same trend of population can be seen in urbanization of countries.

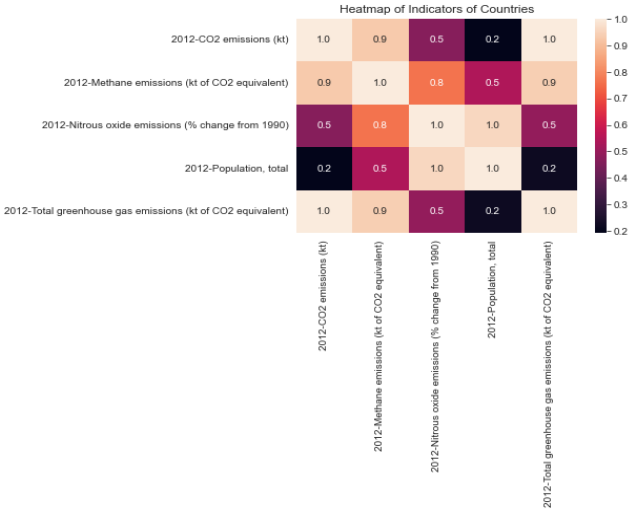


As we know, population increase has direct relation with CO_2 production, so it is also significant to visualize CO_2 emissions of the countries. The graph above shows that United States is continuously having an increase in CO_2 production from the years 2014 to 2016 leading Germany and Japan simultaneously on its back, whereas India and China to be one of the most populous countries has shown its part to control its CO2 emission and played an important role for the betterment of climate.

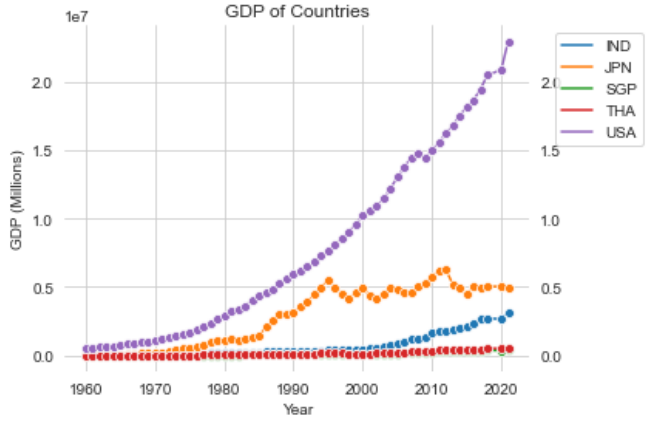


From research it is proved that Methane is one the reasons of increase of global warming. Today 25% of global warming is caused by methane due to human activities. So, Methane emission is used as another indicator to visualize and drive out the findings, it is seen clearly from three consecutive years comparison that China is on top in Methane production, while India and USA are on second in high emission of Methane leaving Zambia and Japan that shows very less methane emission and making them as one of the climate friendly countries. It is concluded that countries with high emission of Methane like China must find some ways to reduce it.

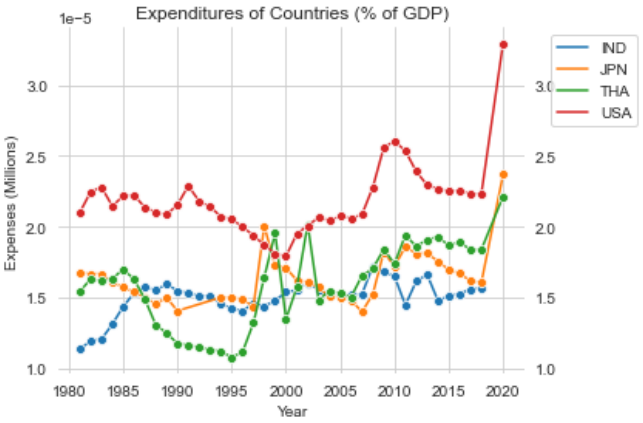
Next pasted is the heat map of CO2 emission, its main aim is to visualize the correlation (linear relationship) of CO2 with other indicators used.



Next one is heatmap that is plotted by using some of the important indicators of year 2012 form dataset. From the heat map, it can be clearly seen that none of the variable used has negative correlation with other. In addition, it shows methane emission has a strong positive correlation with CO_2 emission with value of 0.9 nearly 1 and total population has a very weak relation with CO_2 emission with only value of 0.2. Likewise, greenhouse gas emission and total population are weakly correlated.



The production of goods and their usage can deplete natural resources and generate pollution and increase in GDP by increasing production is another factor which is depleting climate in ans adverse manner. So, analysis is also done on GDP comparison of 5 different countries for last 50 years and it is visualized clearly from the graph that in past 50 years USA has grown so enormous economically that it has highest value of GDP as comparison to other countries under analysis, whereas Japan's GDP in 35 years is fluctuating and then became constant from 2015 to 2020. Whereas Thailand's GDP remains same throughout in 50 years and India has shown a rise in year 2010 ad is also continuously increasing. It can be concluded from above countries that three out of four countries are taking part in effecting the climate adversely.



After GDP analysis, another indicator related to countries expenditures is presented to have a clearer picture of the countries that are contributing in climate change. It can be observed from above graph that USA has high level of expenditures in 2020 which was relatively very low before 2017. Japan has a mix trend of expenditure with high and low bumps in the graph showing instability in its economy till 2017 but after that it is demonstrating continuous increase. Similarly, rest of the countries have relatively a mix kind of high and low expenditures till 2017. It is concluded USA is affecting climate the most as compared to other countries because of having high GDP and expense.

Github Link:
https://github.com/AaMNAHZaAFAR/AppliedDataScienceAssignment2

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