Greenhouse gas emission analysis

By

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a. Abstract

We have used the greenhouse gas emission data to analyze the emissions pollutant wise and country wise.

From the pollutant wise analysis of the entire emissions of the gases from the year 1990 to 2020 we have found that gases like GHG, GHG Indirect-CO2, direct carbon dioxide emissions and methane-CH4 are the pollutants that have been predominantly emitted into the atmosphere in the last two decades. For the top emitted gases United States of America, the Russian federation, Japan and Germany are being the principal emitters of these pollutants. The Russian federation is at the top of the charts in case of methane-CH4 emissions.

From the country wise emission of the pollution data United States, Russian federation, Japan and Germany principally emitted GHG, GHG indirect carbon dioxide and carbon dioxide in large quantities. By tracking the pollution emission levels across a time period of two decades for the top countries we have found that the emission curve for the United States of America the Russian federation is in the rising manner and in case of Japan and Germany the pollution emission curve is in a falling trend.

b. Introduction (Statement of problem, brief description of data):

Statement of problem: We have a data set with information on emissions of major pollutants from major countries and just by looking at the data it is just numbers in just one column and hence in this project our principal focus is to turn the numbers into actionable insights and identify the focus areas like specific gases for specific countries to reduce the overall emission of the greenhouse gases country wise and gas wise on our planet and make the visualizations and implied insights be available on an easy to access user interface using the shiny app, which would enable wider audience to perceive and understand the various greenhouse gas emission levels across the countries of the world.

Brief description of data:

We have used the Greenhouse Gas (GHG) Inventory Data with data from 1990 to the latest available year, it contains information on anthropogenic emissions (emissions from fossil fuels, deforestation, land use changes, livestock, fertilization) It consists data on unspecified mix of HFCs and PFCs, sulphur hexafluoride (SF6) and nitrogen triflouride (NF3)) that are not within the scope of Montreal Protocol, an international agreement in 1987, aimed at curbing the emission of ozone depleting substances.

Data Set Characteristics	Multivariate	Number of Instances:	2921
Associated Tasks:	Exploratory Data analysis	Number of Attributes:	5232

c. Methods

Description of the processes of data manipulation:

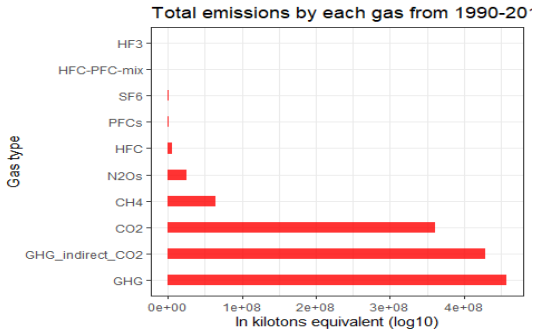
Initially the data set had just four columns with one of them being the serial number the other column contains the country, year, value and a category variable that contains information about what pollutant it is. In order to perform analysis on the data and visualize it we will need to clean the data.

The analysis using R:

We have used the recode function to rename the category variables according to the gas name using simper terms. The GG plot has been extensively used to generate visualizations of various kinds of data. We have also used the shiny app generate a user interface to access the visualizations and the insights from the current project.

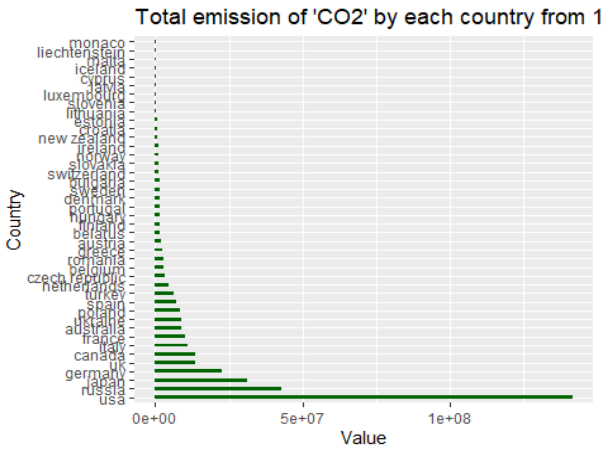
d. Results (Interpretation of plots, web-apps, or computing models):

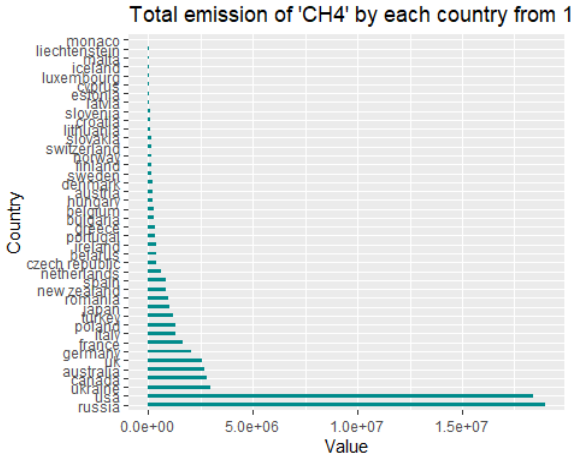
Summary of emissions:



The adjacent plot shows us the gas emitted during the period of two decades during which the readings have been collected, We moved on to plot the country wise emission levels for the top four pollutants, we have found that United States is the highest emitter of GHG, indirect-CO2 and CO2, the Russian federation is the number one emitter of methane CH4 gas.

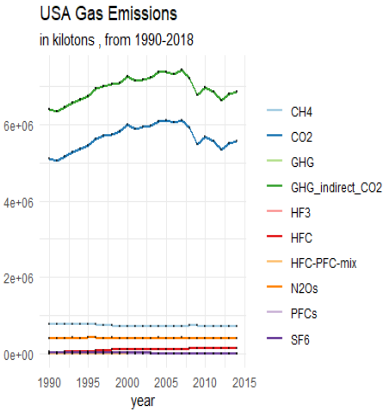
Gas wise Analysis:

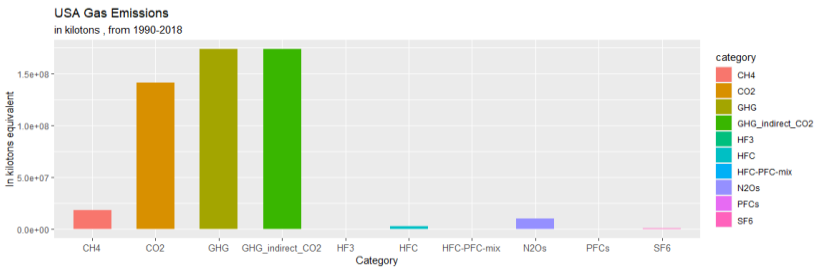




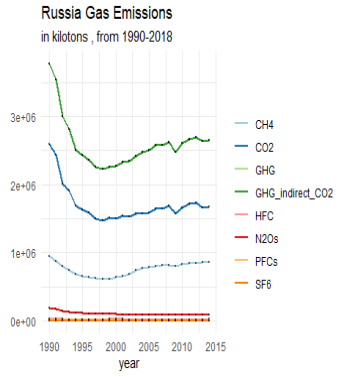
Country wise Analysis of Gas emissions:

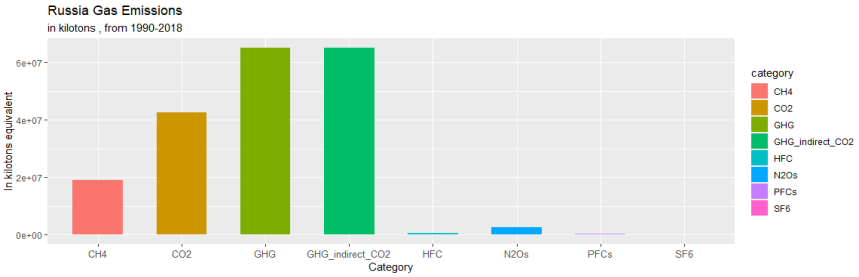
The United States:



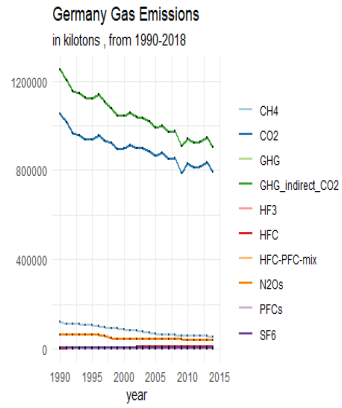


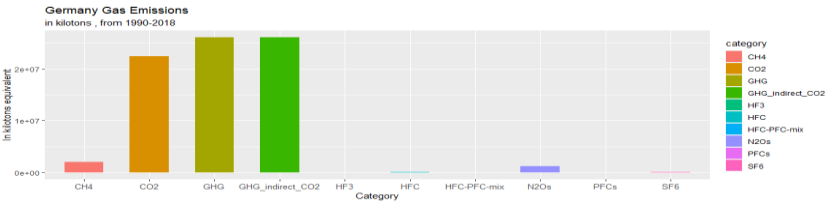
Russian Federation





Germany:





Conclusion
Final Interpretation:

The gas emission curve of the United States and the Russian federation shows a rising trend but the gas emission curve of Germany shows a downward trend which implies that the greenhouse gas emissions are going down since the last two decades in case of Germany.

Recommendations

The United States needs to reducing the GHG and carbon dioxide emission and Russian federation must focus on mainly reducing the methane CH4 emissions has implied from our data analysis and its visualization.

a. Appendix (Anything of overly technical nature should be put in an appendix). You may want to include more plots or code snippets.