**Problem**

Climate refers to the long-term regional or even global average of temperature, humidity and rainfall patterns over seasons, years or decades. Climate change has become a huge problem that affects the very existence of life on the planet and a majority of climate change in the recent years in our industrial age is caused due to human activity. Global warming is the long-term heating of Earth’s climate system observed since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth’s atmosphere. This has caused a dramatic increase of temperatures on both land and water surfaces, meltdown of ice caps, rise in sea levels, increase in the magnitude and frequency of hurricanes, and extinction of many species. These adverse effects can be slowed down or reversed with changes in human activity and proper education.

Gross domestic product (GDP) is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period.

This project’s goal is to show the correlation between the rise in temperatures due to rise in atmospheric greenhouse gases (CO2) caused by human activity and to conclude that controlling the CO2 emissions can regulate climate change phenomenon. In addition, using historical GDP, and CO22 emissions data, we aim to identify the current and long-term impact of climate change on economic activity across countries, and ultimately recognize economic gains from reducing carbon footprint.

**Applicability**

This analysis is applicable to the general public as well as many companies in various industries like automobile, fossil fuel extraction, food processing, chemicals, etc. that cause an increase in atmospheric greenhouse gases. It provides and overview of how rise in CO2 levels is causing a rise in average temperatures by country, which is the reason for all the adverse effects on various life forms including humans on Earth.

In addition, our analysis will show the projected impact of climate change on GDP per capital between now and 2100 for a select group of countries.

***Data Source***

1. Temperature​ - All the temperature data necessary for the study is downloaded from Source
2. The dataset is a global metric dataset from Jan 1949 to Oct 2018. The dataset includes Country Name, Year, CO2 level, CO2 Growth, Consumption, CO2 from Trade, CO2 Per Capita, % of Global CO2, CO2 from Cement, CO2 from Coal, CO2 from Oil, CO2 from Gas, Population, and Total GDP.
3. Darnae - Add your dataset here

***Methodology***

1. The aim of the project is to show the trends in temperature increase and the

prime factor is the increase in CO2 levels due to human activity in the industrial

age.

1. Since the cause has many factors and the data is available to show the

correlation between factors and effects, this study will be a ​supervised​​ learning.

1. This supervised learning model is going to be ​regression and time series

forecast model to show the correlation, recent trends and future trends

1. The variable this project is aiming to predict is temperature - average, min, and

max by Country

1. The training data will be the raise of CO2 levels. The idea is to build a forecast model with varying levels of CO2 data once the relationship is established and show the sensitivity analysis by changing the trend in factor variables (e.g. CO2 from cement, CO2 from gas, etc..), increasing trend, prediction trend, decreasing trend in CO2, and also show how CO2 is changed in the atmosphere by varying the tree cover predictors (We need forestation data for this – I found a really good dataset and added it to my branch)

**Potential Outputs**

The deliverable will be a presentation with associated visualizations of sensitivity analysis, and an explanation of the approach.

**How does GDP rates respond to temperature?**

Determining this response is one of the main exercises of our project. As described in the paper, we use 70 year of historical data for more than 174 countries to arrive at this estimate.

**Predict future temperature change**

TBD