Title:

Does Economic Growth Increase CO_2 Emissions? An Analysis of Global GDP and Environmental Impact

Project Description:

For this project, I want to explore whether a country's economic development is associated with its CO_2 emissions. Specifically, I'll analyze if higher GDP leads to higher carbon emissions and whether that pattern is consistent across countries and over time. This question is important because it connects economic progress with environmental sustainability and can help us understand if wealthier nations are contributing more to climate change.

I plan to use a linear regression model to see if GDP can predict CO_2 emissions. I'll also consider whether other factors like population or continent might act as confounders. To visualize the relationships, I'll use scatter plots, time series plots, and maybe log transformations if the variables are skewed. I also want to apply simulation techniques from class, like testing how predicted emissions might change if GDP increases by a fixed percentage. I might compare developed vs developing countries too, using subsets of the data.

Data Source:

I'll be using publicly available data from *Our World in Data*, which includes global CO_2 emissions, GDP per capita, total GDP, population, and more. The dataset is structured by country and year and goes back several decades. It's in CSV format and is mostly clean, but I'll filter and wrangle it as needed for the analysis.

Dataset Link:

GitHub page: https://github.com/owid/co2-data

Relevance to Course:

This project uses key topics from DATA 375 like regression modeling, data visualization, simulation, and inference. It also involves cleaning and analyzing a real dataset, similar to examples we've seen in class and in previous student projects. I'll be applying tools like ggplot2, linear models, and Monte Carlo simulation, all of which connect directly to our lecture notes and textbook material.