A Global Tale of Forests and CO2 Emissions (2020)

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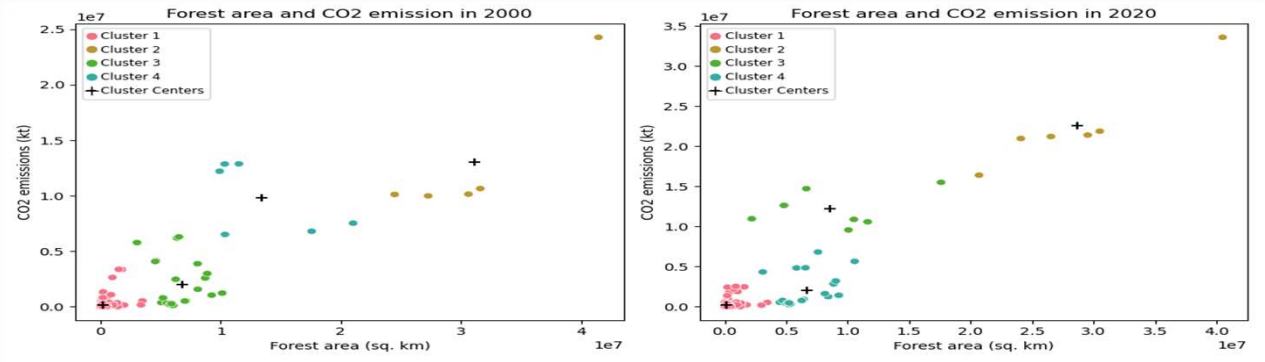
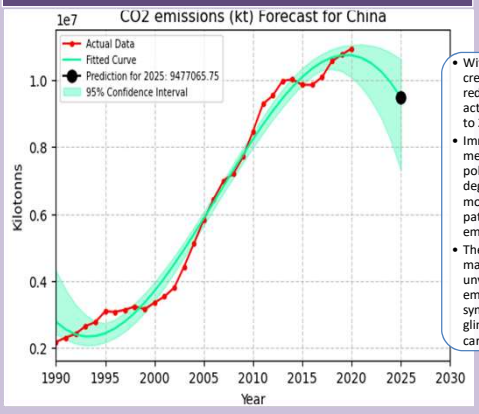
Abstract:
This study delves into the intricate relationship between forest area and CO2 emissions on a global scale, spanning the years 1990 to 2020. Through a comprehensive scatter plot analysis, a discernible trend emerges: an increase in forest area correlates with a rise in CO2 emissions. To further illuminate this dynamic, countries are categorized into four clusters in both 2000 and 2020, revealing distinct regional dynamics. The evolving nature of these clusters over the years provides insights for tailoring policies, particularly in high-emission regions. This integrated analysis captures the nuanced interplay between forest area and CO2 emissions, guiding the formulation of strategies for sustainable development.

Introduction:
Let's explore a cool story about trees and pollution from 1990 to 2020. We found out that when there are more trees (forest area increases), there's more pollution (CO2 emissions go up). We divided countries into groups to see how each region plays a part. This helps us make special plans for places where pollution is higher. We also zoom in on China, India, and the United States, showing their pollution stories with easy-to-follow pictures and predictions for 2025. Come along as we figure out the Earth's environmental music and how we can make it sound better in the future!



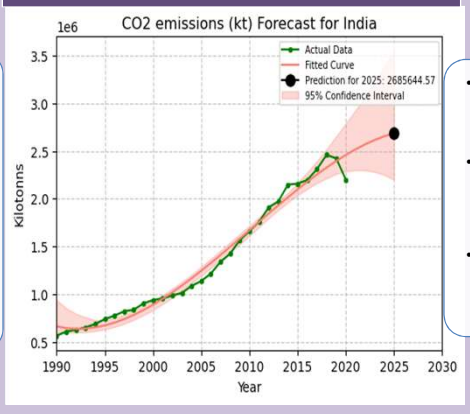
The figure 1 and 2 of the scatter plot, spanning from 1990 to 2020, illustrates a global trend: as forest area increases, CO2 emissions tend to rise. By categorizing countries into 4 clusters in 2000 and 2020, distinct groups emerge, offering insights into regional dynamics. These clusters, analysed over the years, suggest tailored policies for high-emission regions. The integrated analysis captures the evolving relationship between forest area and CO2 emissions, guiding strategies for sustainable development.

China's Carbon Symphony: A Glimpse into 2025



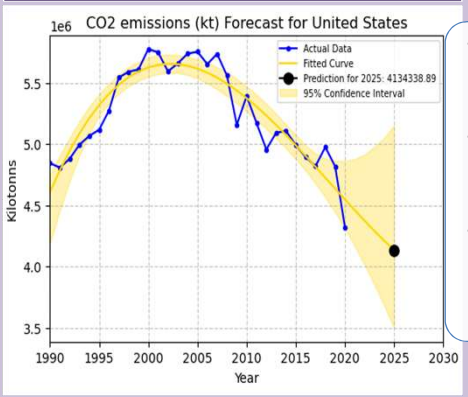
- Witness China's carbon crescendo with the mesmerizing red line, portraying the nation's actual CO2 emissions from 1990 to 2020.
- Immerse yourself in the vibrant mediumgreen curve, a polyphonic creation shaped by a degree-3 polynomial regression model. It captures the intricate patterns in China's CO2 emissions over the years.
- The black marker delicately marks the spot at 2025, unveiling the forecasted CO2 emissions value for China. It's a symphonic projection, offering a glimpse into the anticipated carbon melody in 2025.

India's Carbon Tale: Unfolding in 2025



- The green serenade narrates the tale of India's actual CO2 emissions, a harmonious blend echoing through the years from 1990 to 2020.
- An enchanting salmon crescendo, orchestrated by a polynomial regression ballet of degree 3, pirouettes through time, encapsulating India's emissions melody.
- In a symphonic climax at 2025, a resplendent black note reveals the foreseen CO2 emissions value for India. A musical prelude to India's environmental future!

United States' Carbon Sonata: Echoes of 2025



- Immerse yourself in the resonant blue line, echoing the United States' emissions saga from 1990 to 2020. Each note reflects a chapter in the nation's carbon melody.
- The gold curve, a symphonic masterpiece crafted by a degree-3 polynomial regression model, captures the intricate patterns in the United States' CO2 emissions.
- The black marker at 2025 unveils the forecasted CO2 emissions value for the United States. It's the climactic note in the United States' carbon sonata, offering a glimpse into the anticipated melody in 2025.

Predicted values:
- Prediction value of China in 2025 is 9477065.75 kilotons.
- Prediction value of India in 2025 is 2685644.57 kilotons.
- Prediction value of United States in 2025 is 4134338.89 kilotons.

With the Confidence Interval of 95%.

Conclusion:
In summary, our exploration of the relationship between forest area and CO2 emissions from 1990 to 2020 has revealed a clear trend: as forest area increases, so do CO2 emissions. Categorizing countries into clusters has provided valuable insights for tailored policies, especially in high-emission regions. Examining the carbon symphonies of China, India, and the United States, both past and projected, enhances our understanding and guides us towards a more sustainable future. As we anticipate the environmental melodies of 2025, this study serves as a prelude to harmonizing our efforts for a greener and more balanced planet.

GitHub Link: https://github.com/Tamil2095/ADS1_Clustering

Data source link: https://data.worldbank.org/topic/climate-change