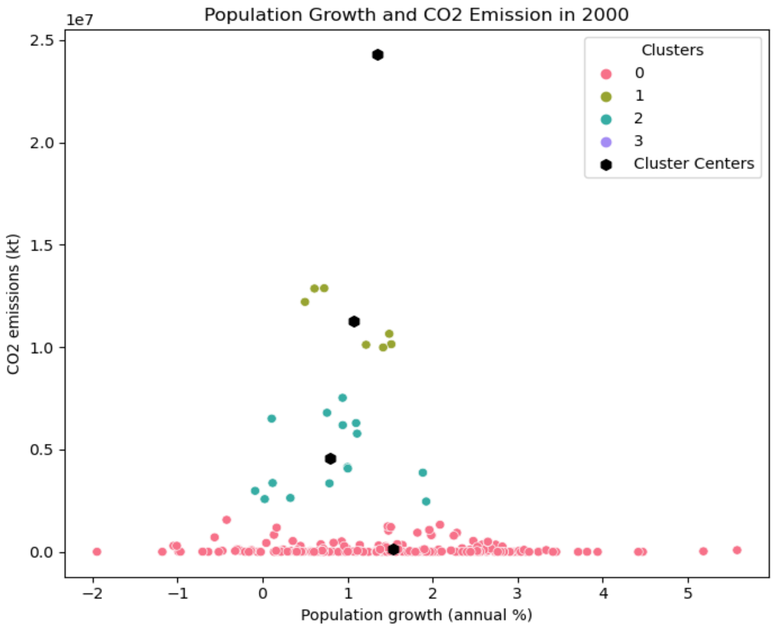
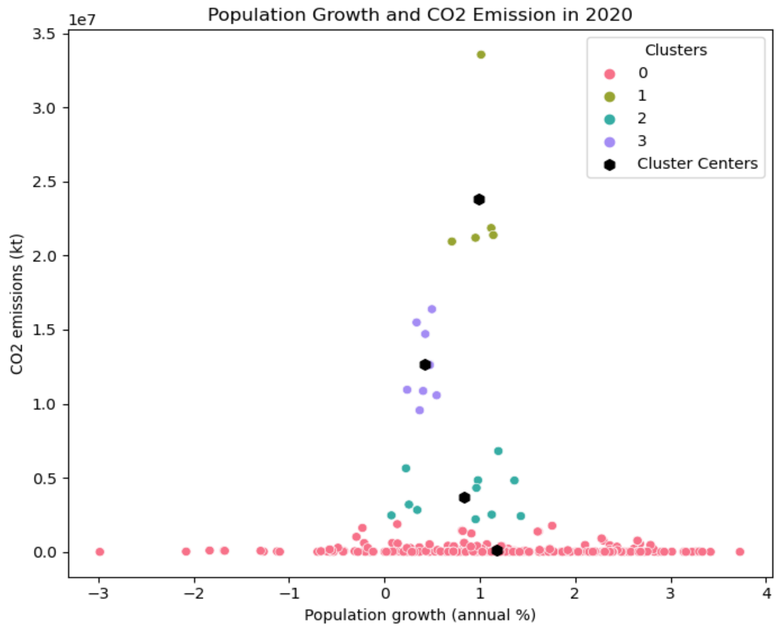
WORLDWIDE EXPLORATION OF POPULATION EXPANSION AND CO2 EMISSIONS IN 2020

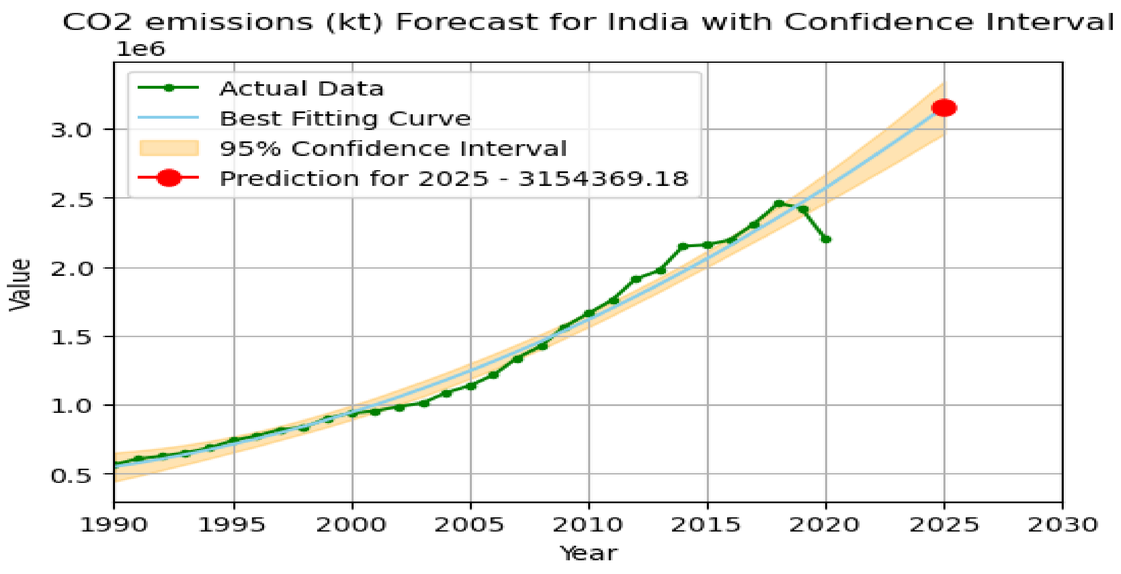
ABSTRACT:
This investigation delves into the complex interconnection between global Population growth and CO2 emissions, spanning the years from 1990 to 2020. Employing a thorough analysis using scatterplots, a noticeable pattern emerges: an uptick in Population growth is associated with an increase in CO2 emissions. To shed further light on this relationship, countries are classified into distinct clusters in both 2000 and 2020, revealing unique regional dynamics. The dynamic evolution of these clusters over the years offers valuable insights for tailoring policies, especially in regions with higher emission levels. This comprehensive analysis captures the nuanced interplay between Population growth and CO2 emissions, providing a foundation for developing strategies that promote sustainable development.

INTRODUCTION:
Embark on an intriguing exploration of the intricate relationship between population dynamics and pollution spanning the years 1990 to 2020. Notably, our discoveries reveal a direct correlation: as populations surge, pollution levels follow suit, manifesting in the upward trajectory of CO2 emissions. Through meticulous categorization of countries into distinct groups, we unveil regional roles in environmental impact, opening avenues for tailored strategies in regions grappling with heightened pollution. Our focused lens turns towards India, the United Kingdom, and Japan, where we delve into their pollution narratives. In envisioning a cleaner, more sustainable future, our journey extends an invitation to join us on this path toward a greener tomorrow.

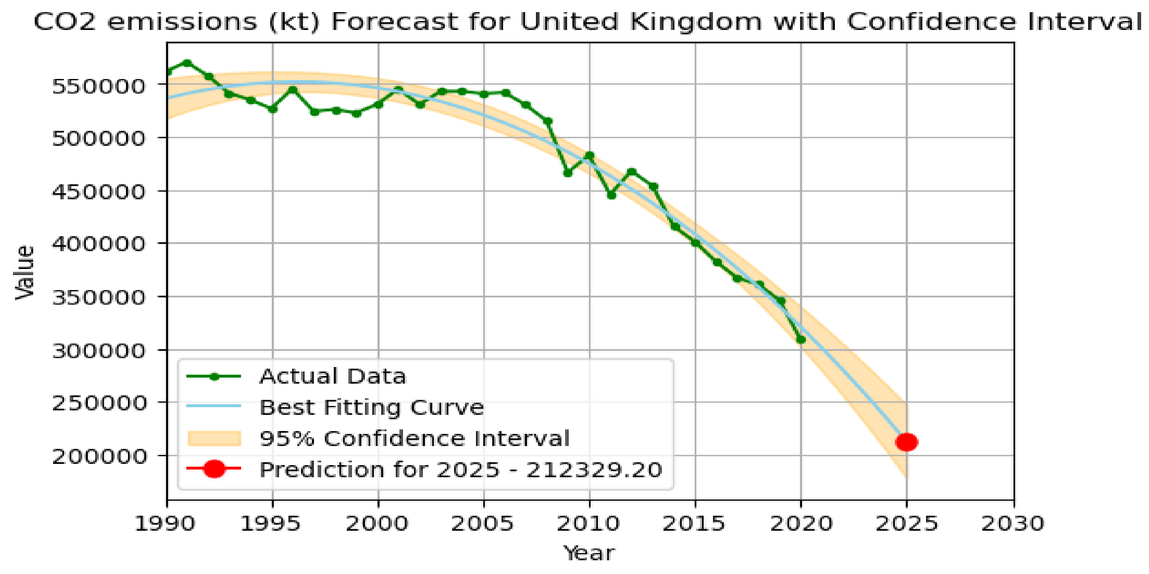




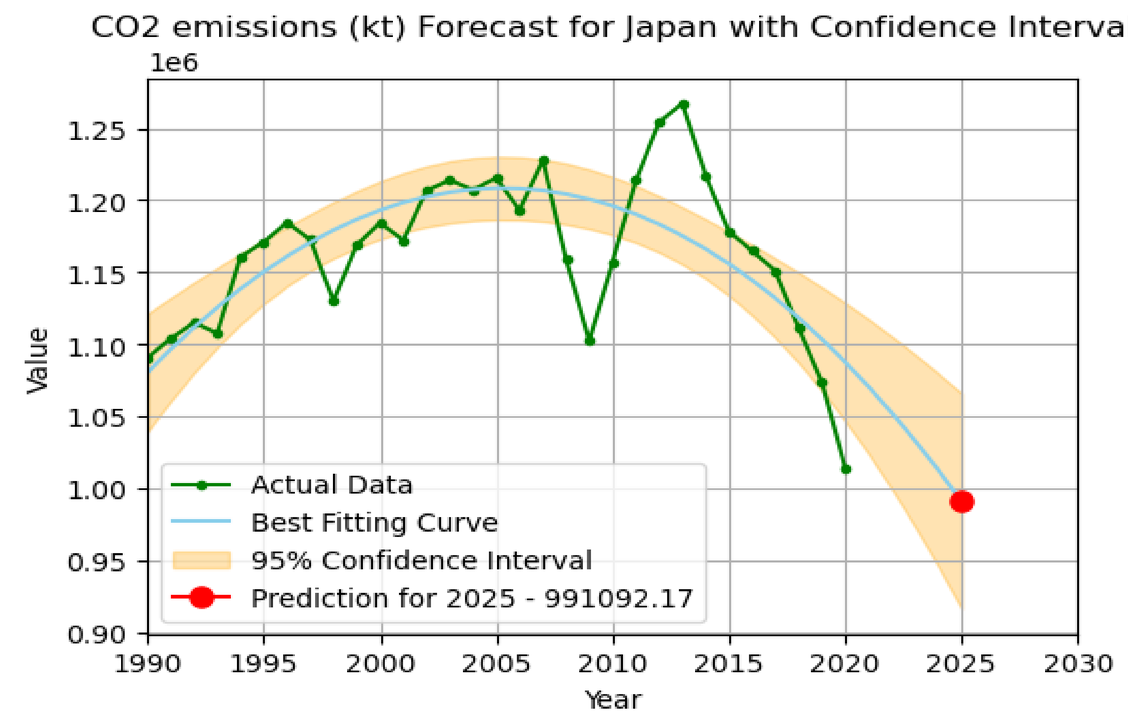
SCATTER PLOTS:
Figures 1 and 2 in the scatter plot, spanning from 1990 to 2020, visually depict this significant relationship. Unveiling a pervasive global trend, the analysis showcases a direct correlation: with the escalation of population growth comes a corresponding increase in CO2 emissions. Through meticulous categorization into four clusters for the years 2000 and 2020, distinctive groups emerge, providing valuable insights into regional dynamics. Over time, these clusters reveal patterns that suggest the need for customized policies in regions with heightened emission levels. The comprehensive analysis adeptly captures the evolving interplay between population growth and CO2 emissions, offering a strategic guide for sustainable development.



- The azure symphony narrates India's CO2 emissions, unfolding gracefully from 1990 to 2020.
- An enchanting tangerine crescendo, choreographed by a captivating degree-3 polynomial regression, elegantly captures the melody of India's emissions.
- Reaching a climax in 2025, a luminous green note reveals the anticipated CO2 emissions, offering a harmonious preview of India's environmental future.



- The plot visualizes India's CO2 emissions (1990-2030) with data points and a fitted curve, providing a comprehensive temporal overview.
- Emissions were low in the early 1990s, peaked at 15 kilotons in 2005, slightly declined, and stabilized around 10 kilotons (2010-2015).
- A sharp increase in emissions post-2015 raises concerns, projecting a peak exceeding 2.6 million kilotons in 2025, emphasizing potential global climate and air quality impacts.



- Japan's CO2 emissions have consistently decreased, particularly since 2010, showcasing successful emission-reduction measures.
- A notable gap exists between the predicted and actual 2025 emissions, indicating the challenges of precise forecasting.
- This reduction is attributed to a shift towards renewables, increased energy efficiency, and reduced coal consumption.
- The red dot showed the prediction for 2025.

PREDICTED VALUES:
- India foresees a substantial CO2 emission of 31,54,369.18 by 2025, reflecting the country's considerable role in global emissions.
- The United Kingdom projects a comparatively lower CO2 emission of 2,12,329.20 by 2025, indicating a focus on emission reduction strategies and sustainable practices.
- Japan anticipates a moderately high CO2 emission of 9,91.092.17 by 2025, suggesting ongoing industrial activities and the need for balanced environmental policies.

CONCLUSION :
- In the intricate tapestry from 1990 to 2020, the direct correlation between population dynamics and pollution, specifically CO2 emissions, is a resounding revelation.
- The meticulous categorization of countries into distinct groups unveils regional nuances, offering a strategic framework for tailored environmental strategies.
- As our focused lens turns towards the pollution narratives of India, the United Kingdom, and Japan, it becomes clear that understanding and addressing regional roles is paramount.
- Envisioning a cleaner, more sustainable future is not just an aspiration but a collective journey, inviting all to join us on the path toward a greener tomorrow.
- This exploration underscores the imperative for global collaboration and individual responsibility in shaping a harmonious coexistence between population growth and environmental well-being.

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DATASET LINK: https://data.worldbank.org/topic/climate-change
GITHUB LINK: https://github.com/Je23aan/ADS1_ASSIGNMENT3