APPLIED DATA SCIENCE-1

ASSIGNMENT-2:
STATISTICAL AND TRENDS

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Git Hub Link: https://github.com/Sindhu385/ADS1_Assignement2

Dataset Link: https://data.worldbank.org/topic/climate-change

ABSTRACT:

This comprehensive analysis spanning from 2001 to 2020 illuminates the diverse trajectories of environmental indicators and economic activities across China, Indonesia, India, Japan, United States, United Kingdom. Let's explore the diverse narratives woven by Greenhouse gas emissions, Population growth, Methane emissions, Forest areas and Co2 emissions.

A Comprehensive Exploration of Environmental Dynamics and Economic Shifts (2001-2020)
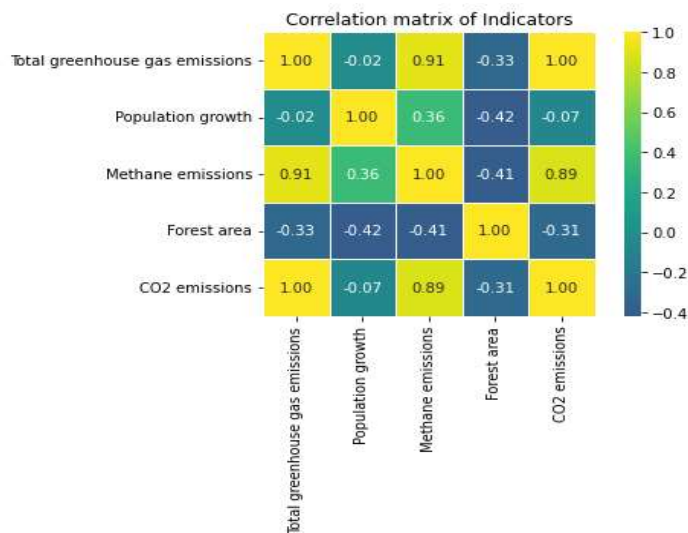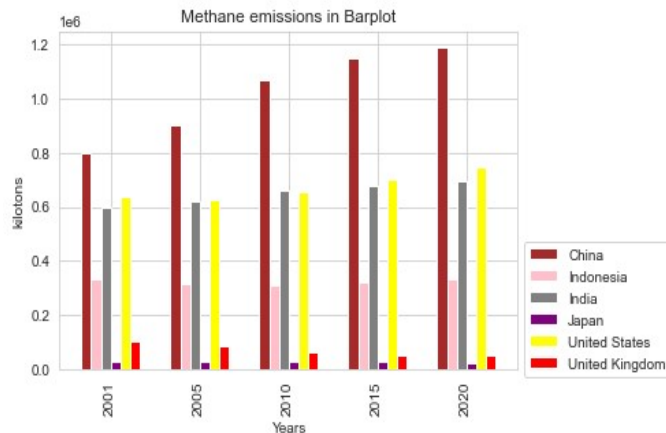

Correlation matrix of Indicators

While some countries, such as Japan, have maintained relatively stable forest areas, others, like Indonesia and the United States, have seen rapid declines in their forest areas. India, despite facing numerous challenges, has managed to stabilize its forest area. To ensure the long-term sustainability of the planet's forests, it is crucial to implement and enforce sustainable forest management practices globally. the weak negative correlation between greenhouse gas emissions and forest area r=-0.03 highlights the need for sustained efforts in protecting and expanding forest areas. These areas continue to play a vital role in mitigating climate change and maintaining the balance of global greenhouse gas emissions.

China embarked on a rapid industrialization journey, leading to a substantial increase in greenhouse gas emissions. The country's commitment to economic growth resulted in a surge from 4.76 million tons in 2001 to a staggering 12.94 million tons by 2020. While China's emissions soared, the United Kingdom, known for its focus on sustainability, managed to reduce emissions from 0.70 million tons in 2001 to a mere 0.40 million tons in 2020. The United States has seen fluctuations in greenhouse gas emissions, with a recent decrease.


Total greenhouse gas emission in line plot

Population Growth in box plot
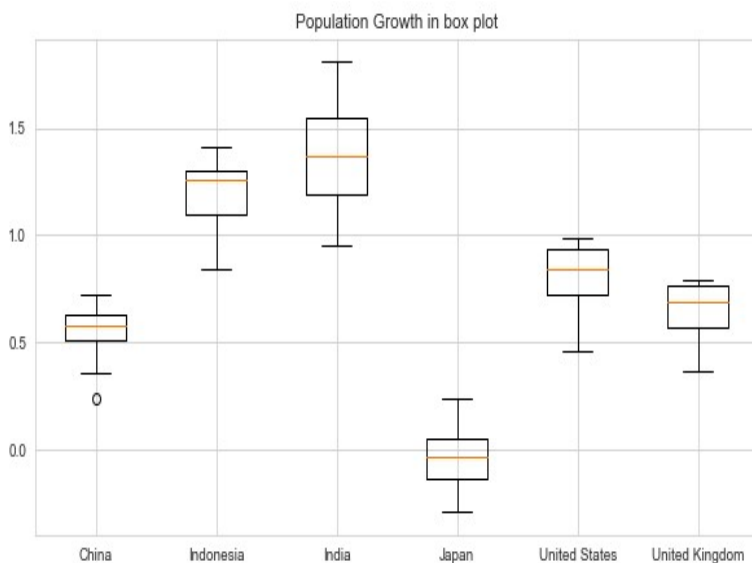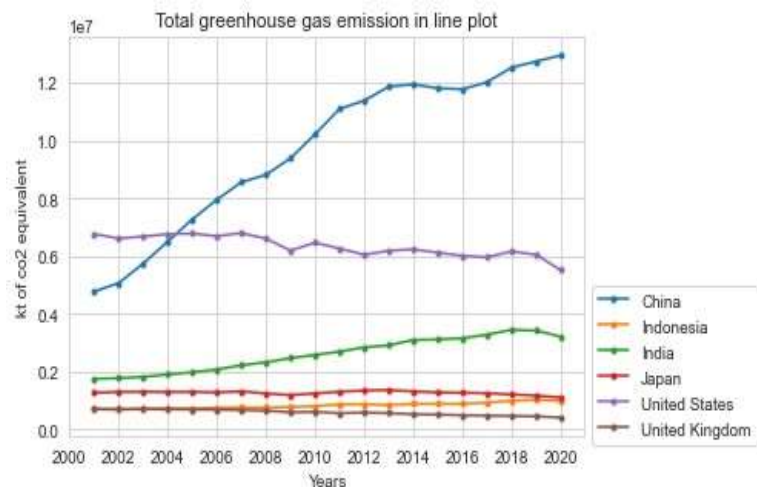
As, the human population swells, India takes the lead in terms of growth rates, with a consistent upward trend. China's growth, once a rapid ascent, stabilizes, revealing the impacts of demographic shifts and policy measures. United Kingdom experiences more modest growth, reflective of mature demographic patterns. The United States, while experiencing steady growth, maintains a more moderate pace compared to the Asian giants. Japan, however, takes an unexpected turn, with a declining population—a unique subplot in this global narrative. Indonesia has a relatively high population growth rate, reflecting its demographic trends.

Methane emissions, a potent greenhouse gas, exhibit notable variations. China and India show consistent increases, emphasizing the need for targeted mitigation strategies. Despite efforts to increase energy efficiency and promote renewable energy sources, the level of methane emissions in the United States rose. The United Kingdom displays a decreasing trend, possibly attributable to cleaner energy sources. Indonesia demonstrates a fluctuating pattern, suggesting the influence of various factors on methane emissions.

The global forest has been experiencing a mix of countries. While some countries, such as Japan, have maintained relatively stable forest areas, others, like Indonesia and the United States, have seen rapid declines in their forest areas. India, despite facing numerous challenges, has managed to stabilize its forest area. To ensure the long-term sustainability of the planet's forests, it is crucial to implement and enforce sustainable forest management practices globally.
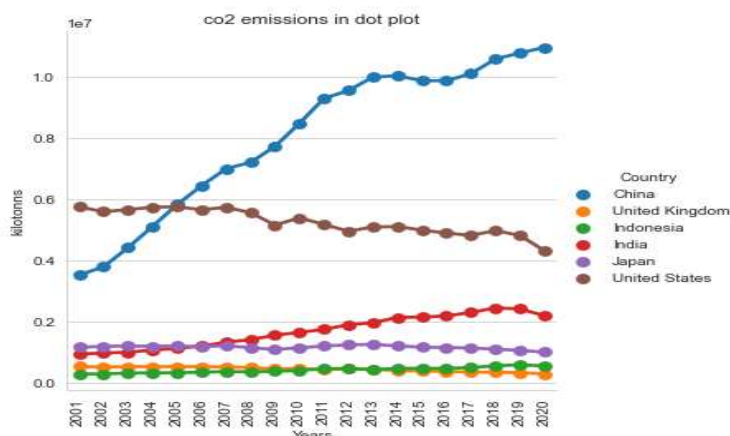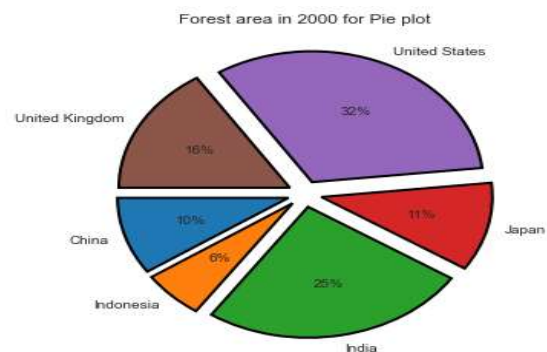
CO2 emissions, a major contributor to climate change, showcase distinct trajectories. China's emissions surge over the years, underscoring the challenges of balancing economic growth and environmental sustainability. The United States exhibits a recent decline, possibly linked to increased adoption of renewable energy. India and Indonesia display upward trends, while the United Kingdom demonstrates consistent efforts in reducing CO2 emissions.

Skewness and Kurtosis, bring forth a tale of deviation and distribution within the dataset under scrutiny. The skewness value of -0.095 unveils a slight inclination towards the negative side, suggesting a gentle leftward skew. The kurtosis value of -1.50, which paints a picture of a distribution that is less peaked than the normal distribution. The negative kurtosis indicates a flatter, more spread-out pattern, indicates a flatter, more spread-out pattern.

In conclusion, the points that represent the complex interplay between human activities and the environment. while there are still many challenges ahead in the fight against climate change, the collective efforts of countries like Indonesia, Japan, and the global community show that progress is possible. By working together and taking urgent action, we can help reduce greenhouse gas emissions and mitigate the devastating effects of climate change on our planet.