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7PAM2000-0901-2023 APPLIED DATA SCIENCE 1

ASSIGNMENT – 2 STATISTICS AND TRENDS

"ANALYSING GLOBAL PATTERNS: KEY OBSERVATIONS FROM WORLD BANK INDICATORS AND TRENDS"

GITHUB LINK: https://github.com/Revathi343664/ADS-1-Assignment-2

DATA SET SOURCE LINK: https://databank.worldbank.org

Introduction:

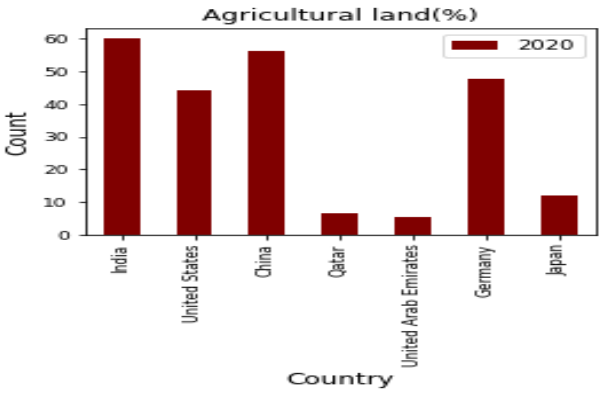
Explore a captivating journey through a 2010-2020 World Bank dataset, where economic and environmental variables weave interconnected stories. This Python script, powered by Pandas, NumPy, Matplotlib, and Seaborn, reveals dependencies among major global players, from agricultural land to CO2 emissions, electric power consumption to renewable energy. Unveiling a tapestry of global dynamics, the script employs advanced statistical measures to unravel hidden connections, offering nuanced insights into the intricate relationships shaping the global narrative.

Abstract:

This sophisticated Python script emerges as a powerful tool for unravelling the intricate relationships between pivotal economic and environmental indicators. Employing advanced statistical measures such as skewness and kurtosis, the script not only provides nuanced insights into individual variables but also unravels the hidden connections that shape the global narrative.

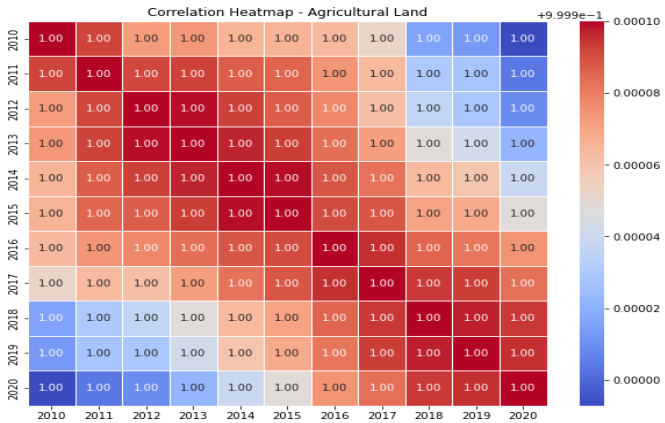
Agricultural Land Bar Graph:

Our journey begins with the agricultural heartbeat of nations. The bar graph for the year 2020 showcases India claiming the highest percentage of agricultural land, trailed by the United States, China, and others. This visual feast sets the stage, introducing us to the diverse landscapes of global agriculture.



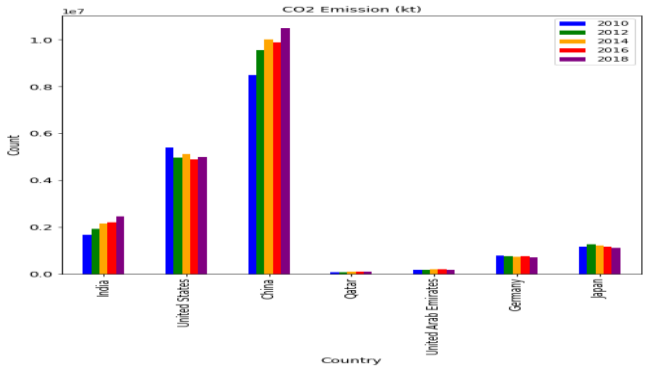
Correlation Heatmap - Agricultural Land:

Moving beyond the surface, the correlation heatmap unveils the consistent pulse of agricultural land percentages across countries. Strong positive correlations between years hint at synchronized patterns, providing a backstage pass to the intricate dance of agricultural land use over time.



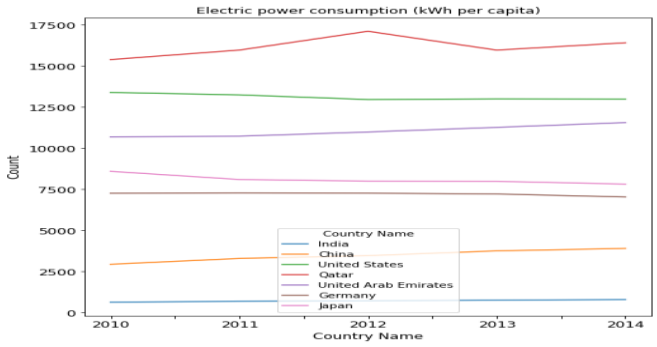
CO2 Emission Bar Graph:

As the narrative unfolds, we delve into the environmental symphony with a bar graph depicting CO2 emissions from select countries (2010 to 2018). China takes the lead, shadowed by the United States and others. This graph not only casts a spotlight on variations and trends in carbon emissions but also sets the stage for understanding how environmental factors are linked to agricultural practices.



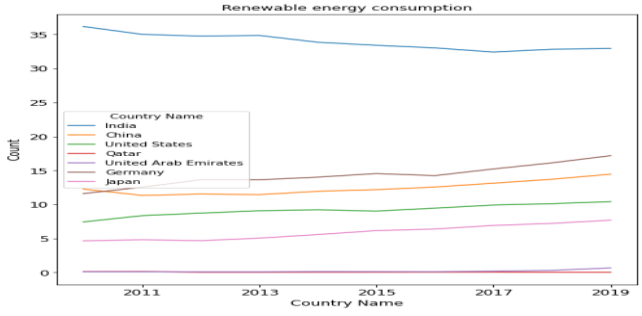
Electric Power Consumption (kWh per Capita) Line Graph:

The storyline evolves to the realm of energy, where a line graph paints a vivid portrait of electric power consumption per capita. Qatar and the United States emerge as notable consumers, emphasizing disparities in energy usage. The graph, while standing alone as a narrative on energy trends, also lays the groundwork for exploring the impact of energy consumption on environmental variables like CO2 emissions.



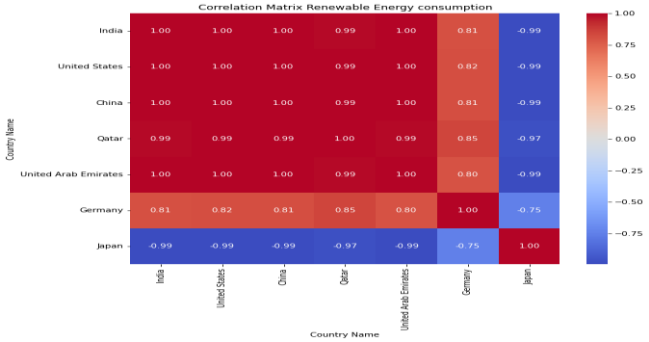
Renewable Energy Consumption Line Graph:

A subplot unfolds as we transition to renewable energy consumption. Germany's commitment shines bright, and the graph captures variations in consumption patterns among nations. This snapshot becomes a crucial chapter in the global narrative of sustainable energy practices. The connection with CO2 emissions becomes apparent, as nations committed to renewables may exhibit lower carbon footprints.



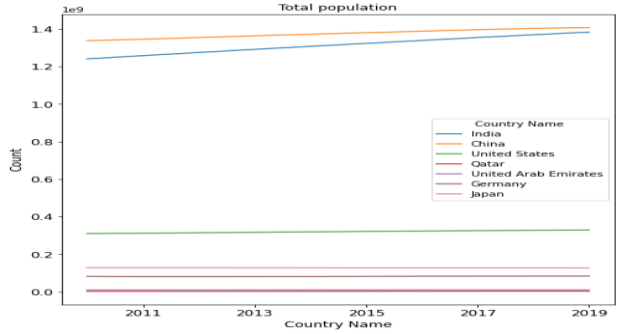
Renewable Energy Consumption Correlation Map:

The stage widens, revealing the interplay between nations in the realm of renewable energy. Positive correlations signal synchronized trends, while negatives hint at divergent approaches. Germany's commitment echoes, illustrating the nuanced relationships in global efforts towards sustainable energy. The link with CO2 emissions solidifies, as the adoption of renewable energy practices correlates with reduced carbon emissions.



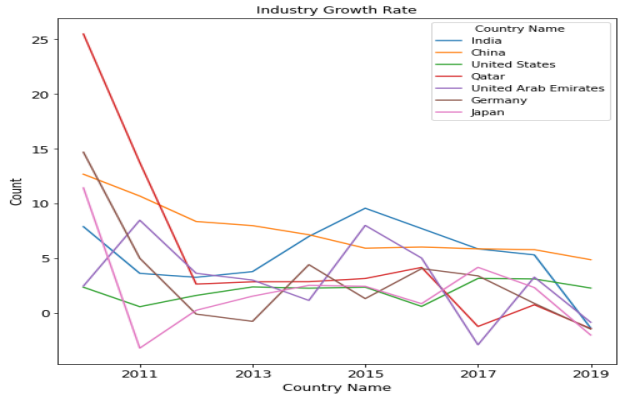
Total Population Line Graph:

The population narrative takes center stage, with a line graph illustrating trends in select countries. China and India emerge as the most populous, their growth rates carving a distinctive chapter in demographic patterns. This subplot lays the groundwork for understanding the economic and environmental pressures associated with population growth.



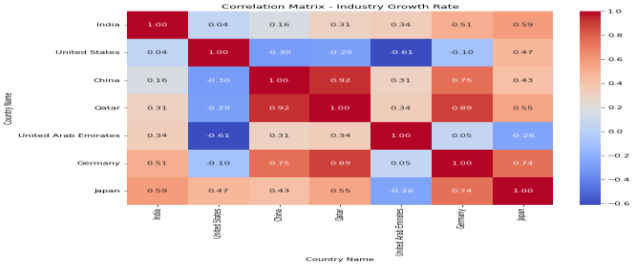
Industry Growth Rate Line Graph:

Our journey reaches its crescendo with a line graph capturing the growth rates in the industrial sector. China and India lead the charge, while other nations weave diverse patterns. This visualization provides a grand finale, unravelling global industrial trends and economic development. The link between population growth and industrialization becomes evident, as populous nations exhibit substantial industrial growth.



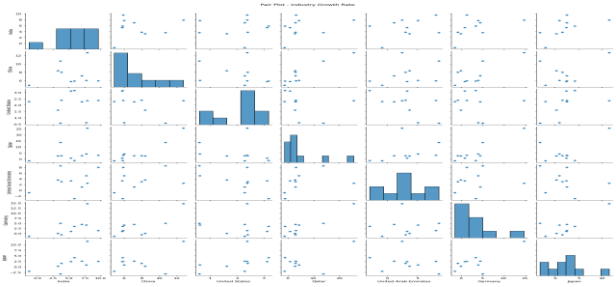
Correlation Matrix - Industry Growth Rate Heatmap:

The concluding act features a heatmap displaying the correlation matrix for industrial growth rates. Positive correlations hint at synchronized industrial growth, completing the intricate tapestry of economic interplay. The interconnectedness of population growth, energy consumption, and industrialization becomes a central theme, revealing how these factors collectively shape global economic and environmental landscapes.



Pair Plot Industry Growth Rate:

The global economic narrative unfolds through a pair plot, illustrating industrial sector growth rates in India, China, the United States, Qatar, the United Arab Emirates, Germany, and Japan. Each scatterplot tells a unique tale of economic dynamics between two countries, while diagonal histograms reveal individual stories. Outliers emerge as distinctive characters with unique trajectories, contributing to the collective narrative of global economic landscapes. The pair plot invites us to decipher patterns, correlations, and outliers, revealing the nuanced growth tales of nations in a concise visual narrative



Comparative Evaluation:

The script delves into global agricultural land distribution, revealing consistent patterns across countries. The focus then shifts to CO2 emissions, spotlighting China and the United States as major contributors, highlighting the connection between land use and environmental impact. The narrative transitions to electric power consumption and renewable energy utilization, emphasizing Germany's leadership in renewables. A correlation map underscores synchronized efforts in sustainable energy practices, crucial for reducing CO2 emissions. Population dynamics, particularly in populous nations like China and India, take center stage. The exploration of industrial growth rates completes the economic narrative, unveiling the interplay between population growth, energy consumption, and industrialization.

Conclusion:

In conclusion, the script's visualizations offer a comprehensive view of interconnected global trends, linking agricultural practices to environmental impact and energy patterns to emission outcomes. It guides policymakers and researchers towards sustainable development, providing insights into the intricate interplay of land use, environmental impact, energy practices, population dynamics, and economic growth globally.