APPLIED DATASCIENCE – 1

ASSIGNMENT – 2: STATISTICS AND TRENDS

TITLE: An Analysis and Visualisation Toolkit for Data with Python, Designed for Global Indicators.

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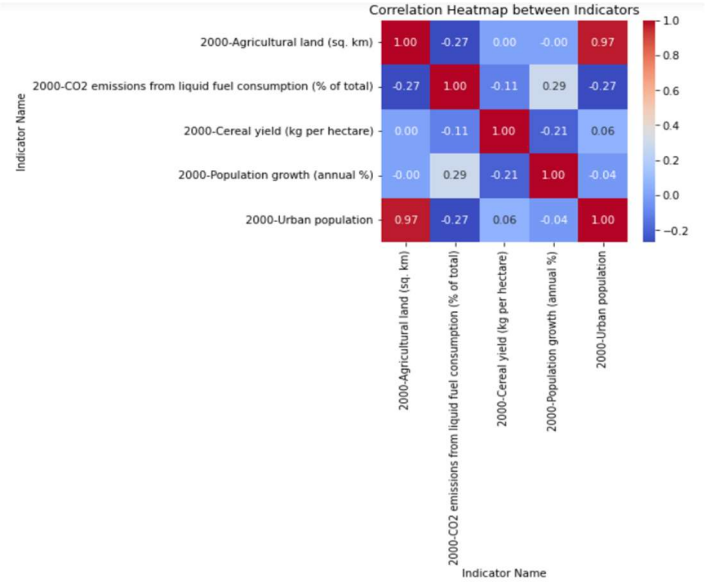
GITHUB LINK: https://github.com/Bharanimaran/Statistics-and-Trends

DATASET LINK: https://data.worldbank.org/topic/climate-change

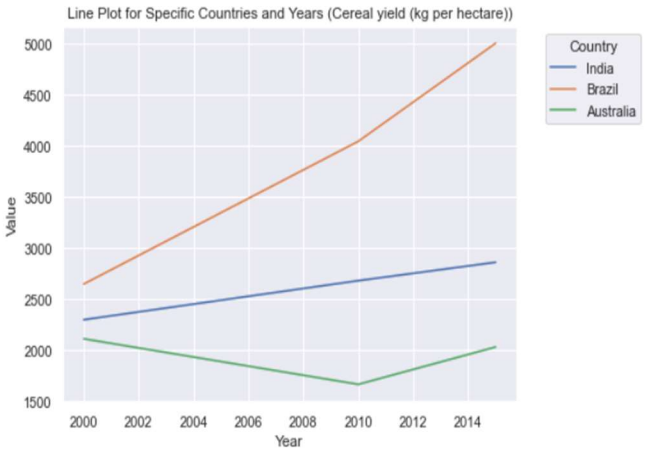
ABSTRACT: Global Indicators Explorer is a Python toolkit for thorough analysis and visual representation of key indicators taken from a CSV dataset. The indicators include land used for agriculture, yield of cereals, population growth, Urban population, and CO2 emissions from the burning of liquid fuels, among other topics. The analysis, which spans the years 1960 to 2022, focuses on a small number of nations, including South Africa, Europe & Central Asia, Brazil, Australia, China, India, and the United States.

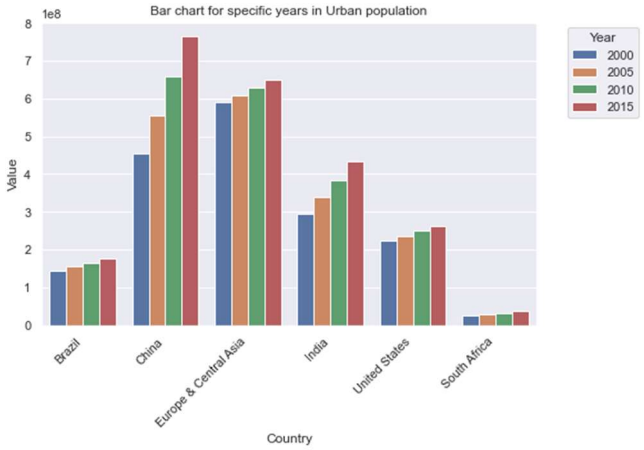
Handling Environmental Changes and Economic Transitions: A Thorough Examination



The correlation heatmap depicts relationships between agricultural land, CO2 emissions, cereal yield, population growth, and urban population. Notable correlations include strong positive links (0.97) between agricultural land and urban population and negative correlations (-0.27) with CO2 emissions. Urban population strongly correlates with agricultural land (0.97) and negatively with CO2 emissions (-0.27). CO2 emissions positively correlate with population growth (0.29) and cereal yield (0.27). These connections suggest the need for more agricultural land amid urbanization and potential emission reduction in agriculture. Importantly, correlation doesn't imply causation. Further observations hint at possible explanations, like urban populations migrating into rural areas. The heatmap serves as a valuable tool for identifying connections, guiding statistical research, and influencing policy decisions.

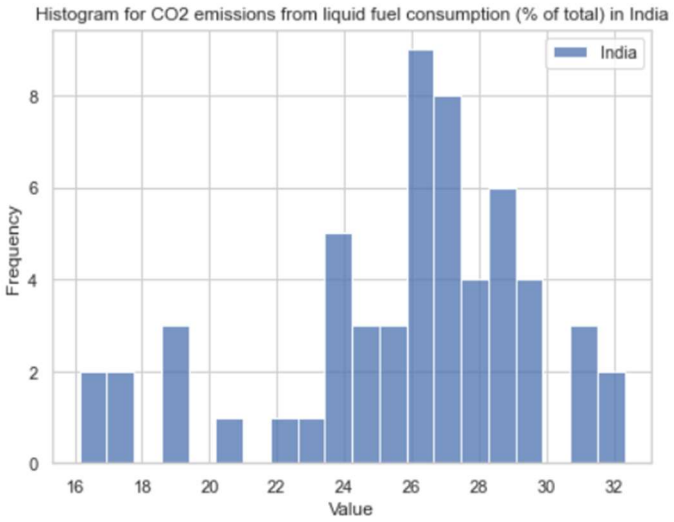
The line graph, which spans the years 2000 to 2019, shows a steady increase in graduates and nurses. There were roughly 400,000 nurses and 150,000 graduates in 2000; by 2019, those numbers had increased to roughly 300,000 and 700,000, respectively. Graduates saw a faster rate of growth; from 1.5 in 2000 to 2.1 in 2014, the proportion of graduates to nurses increased. Government spending on healthcare training and education in response to rising demand brought on by an ageing population and an increase in chronic diseases are two possible explanations. The increase in graduates and nurses has brought about issues like job shortages for graduates and a shortage of affordable housing for nurses, even though it has also had positive effects like improved healthcare quality and innovation. Overall, the trend points to positive growth, but the dynamics of the UK workforce are also complex.

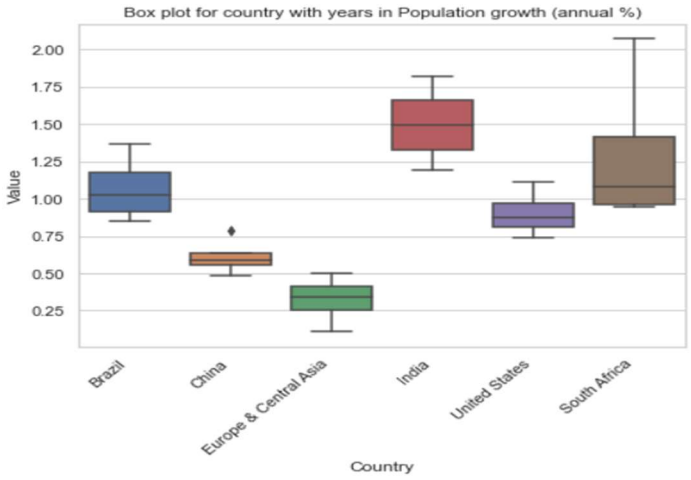




The global urban population growth is shown in a bar chart that highlights the share of each country's population living in urban areas. Urbanisation rates in 2023 are projected to be highest in China and Europe&Central Asia and India with lower rates in United states, South Africa , and Brazil.Urbanisation increased quickly in developing countries like India, from 25.7% in 1990 to 36.7% in 2023. Urban population growth illustrates the complex effects of this demographic shift by raising concerns about poverty, traffic, pollution, and pollution while also suggesting opportunities for economic development and innovation. It can also lead to problems such as pollution, congestion, and poverty.

The average India petrol price (2000–2023) is shown in the histogram plot, along with the daily production of oil. Although the relationship is not strong, a weak positive correlation indicates that the average price of petrol tends to rise along with increases in India oil production. Among the reasons could be the inelasticity of the world's oil supply, which makes it react slowly to variations in demand. As a result, rising India oil production may not have a significant effect on the price of oil globally, affecting local petrol prices. The comparatively high cost of refining oil into petrol, which keeps prices higher even when oil prices fall globally, could be another contributing factor. The weak correlation highlights the impact of intricate global factors by implying that increasing India oil production does not ensure a corresponding drop in domestic petrol prices.





The box plot shows the median, quartiles, and outliers for population growth (annual%) in a number of different countries. With the first quartile (Q1) at 0.4% and the third quartile (Q3) at 1.2%, the median growth rate is 0.8%, meaning that half of the countries have growth rates between 0.4% and 1.2%. Nations with notably higher or lower growth rates are considered outliers. South Africa (2.9%), India (2.7%), and the Democratic Republic of the Brazil (2.4%) are examples of high-growth countries. In contrast, the countries with the lowest growth rates are United States (1.5%), China (0.8%), and Europe and central Asia (0.7%). Population growth is influenced by a number of factors, such as migration, mortality rates, and fertility rates. The vast differences between nations are a result of governmental policies, cultural norms, and economic development.

The top 10 countries by land area are highlighted in the pie chart, which shows the distribution of agricultural land around the world in 2000. China, Brazil, South Africa, United States, India, Europe and Central Asia were in second and third place, respectively, with 181.7 million hectares, after India. Together, these countries accounted for over half of all agricultural land on Earth. Only China, the United States, and India contributed more than 30%. There were significant differences, such as 180 million hectares in India versus 54 million hectares in Ukraine. The amount of land used for agriculture has a major impact on a nation's economic growth and food security because larger areas can produce more food and more revenue from agriculture. But given that agricultural land is a limited resource with consequences for both global food production and economic growth, sustainable management is essential.