**Dataset Description**

The dataset contains various indicators for 175 countries, including measures of population, income, democracy, health expenditure, coal rents, temperature change, and air pollution. The dataset is used to analyze relationships and distributions of these indicators across countries based on the Paris Agreement under the background of climate change.

**Histogram Descriptions**

Population

The histogram for the population shows like a normal distribution with a peak around the mid-values, specifically between 14 and 18. This indicates that most countries in the dataset have a population size within this range. There are fewer countries with extremely high or low populations, suggesting that the dataset covers a diverse set of countries but with a concentration around medium-sized populations. The spread of the population data is moderate which shows a balanced representation of countries by population size.

Income

The income histogram displays a slight right-skewed distribution, suggesting that a larger number of countries tends have high income levels, with fewer countries have low income levels. This pattern is reasonable globally due to the significant economic gap between the global south and global north. The highest frequency is observed in the brackets about 5 to 9, which represent developing countries(mid income countiries) have the most number in the data sets. The spread is wider, indicating the gap of income levels is huge across countries.

Democracy

The democracy index histogram is highly skewed towards the higher values, with a significant peak at the highest end of the scale 8 to 10. This suggests that many countries in the dataset score high on the democracy index, reflecting strong democratic institutions and practices. The low end of the scale has very few countries, indicating that most countries in the dataset maintain at least a moderate level of democratic governance. This skewness highlights a concentration of democratic countries within the dataset.

Health Expenditure

The health expenditure histogram shows a concentration around lower to mid-values, specifically between about 4 and 8, and there is a sharp drop-off after 10. This indicates that most countries have moderate levels of health expenditure, with few countries investing very high amounts in health. The data suggests that while healthcare spending varies, extreme high expenditures are less common. The peak around 5 to 7 suggests that these are common spending levels among the countries.

Coal Rents

The histogram for coal rents is heavily skewed towards the lower end, with most countries having minimal or no coal rents. This suggests that coal rent revenues are not a significant source of income for the majority of countries in the dataset. The few right tail indicates a few countries with higher coal rent values which relies more on coal industries. The low frequencies at higher values show that dependence on coal rents is not widespread.

Temperature Change

The temperature change histogram seems like a normal distribution centered around 0.5 to 1.0 degrees Celsius, indicating that most countries have experienced average changes in temperature in the range. This reflects global climate trends where moderate temperature increases are common, with fewer instances of extreme temperature changes. The spread indicates variability in how different countries experience temperature changes but tends suffer a compared average result in temperature changes.

Air Pollution

The air pollution histogram is right-skewed, showing that most countries have lower levels of air pollution, while a few countries experience very high levels. This distribution highlights significant disparities in air quality across different regions. The peak at the lower end suggests that a majority of countries maintain relatively clean air, while the long tail represents countries facing severe air pollution issues. This skewness underscores the environmental challenges faced by several specific countries.

Table 1: Descriptive Statistics

Population: The mean population value is 15.54 with a standard deviation of 2.18, indicating moderate variability in population sizes across the countries. The minimum population value is 9.33, while the maximum is 21.04. The quartiles (25%, 50%, 75%) suggest that half of the countries have populations between 14.44 and 17.02.

Income: The mean income level is 8.60 with a standard deviation of 1.48, reflecting moderate variability. The income values range from 4.21 to 12.04, indicating significant economic diversity among the countries. The quartiles show that half of the countries have income levels between 7.58 and 9.67.

Democracy: The democracy index has a mean of 6.97 and a standard deviation of 2.94, indicating high variability in democratic governance. The range is from 0 to 10, with the median value at 7.83, suggesting that many countries have relatively high democracy scores.

Health Expenditure: The mean health expenditure is 6.83 with a standard deviation of 2.83. The values range from 1.75 to 17.86, showing significant differences in healthcare investment. The median value is 6.50, with quartiles indicating that most countries spend between 4.91 and 8.29 on health.

Coal Rents: The mean coal rents value is 0.089 with a standard deviation of 0.40, and the range is from 0 to 4.36. This indicates that coal rents are a minor source of revenue for most countries, with a few exceptions showing higher values.

Temperature Change: The mean temperature change is 0.77 with a standard deviation of 0.40. The range is from -0.22 to 1.75, suggesting varying impacts of climate change across countries. The quartiles indicate that most countries experience a temperature change between 0.51 and 1.03.

Air Pollution: The mean air pollution level is 24.28 with a standard deviation of 16.49. The values range from 5.70 to 94.30, indicating significant differences in air quality. The quartiles show that most countries have air pollution levels between 12.80 and 30.85.

Table 2: Confusion Matrix

Population and Income: The correlation between population and income is -0.183, indicating a weak negative relationship. Countries with larger populations tend to have slightly lower income levels, but the relationship is not strong.

Population and Democracy: The correlation is -0.286, suggesting a moderate negative relationship. Countries with larger populations tend to have lower democracy scores.

Income and Democracy: The correlation is 0.425, indicating a moderate positive relationship. Higher income levels are associated with higher democracy scores.

Health Expenditure and Income: The correlation is 0.245, suggesting a weak positive relationship. Countries with higher income levels tend to spend more on health.

Coal Rents and Other Variables: The correlations of coal rents with other variables are generally low, indicating weak relationships. The highest correlation is with temperature change (0.184), suggesting a minor association.

Temperature Change and Other Variables: The correlations of temperature change with other variables are also low, with the highest being with population (0.268). This suggests a weak positive relationship between population size and temperature change experienced.

Air Pollution and Democracy: The correlation is -0.586, indicating a strong negative relationship. Higher democracy scores are associated with lower levels of air pollution.