Analyzing Weather Patterns and their Impact on Air Pollution

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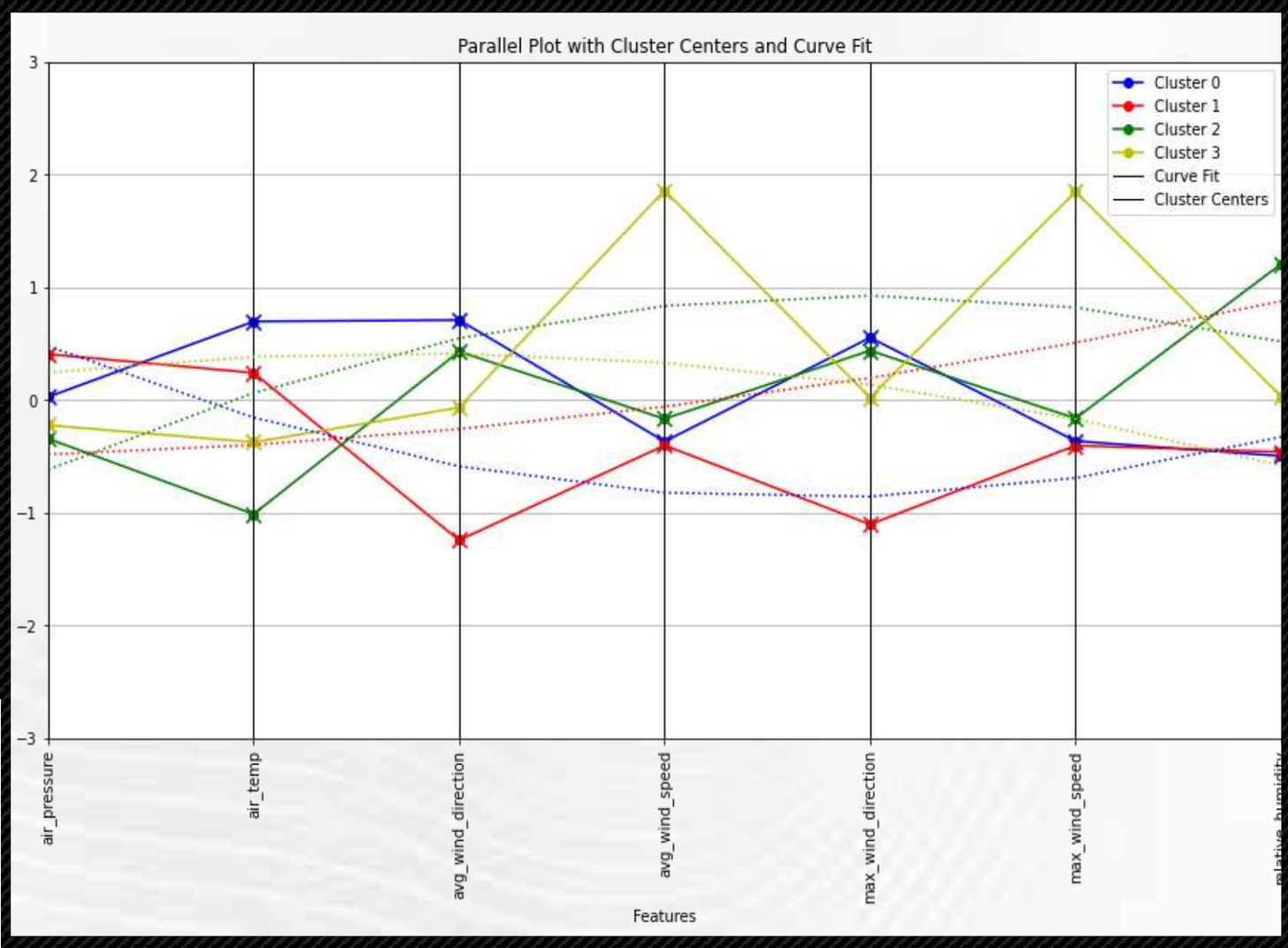
REPO LINK: https://github.com/vasanthk99/ads_assignment3

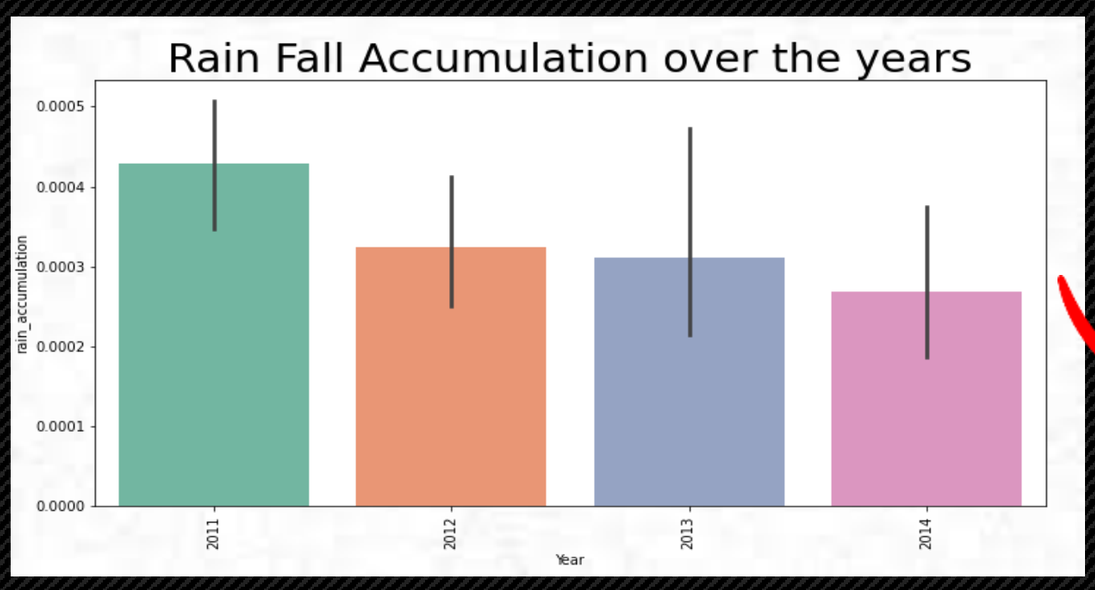
This abstract provides a summary of a Four-year weather data analysis focused on air pressure, humidity, air temperature, rain accumulation, and relative humidity. The analysis aimed to identify long-term trends, seasonal variations, and correlations among these variables. The dataset encompassed daily records over a three-year period, allowing for comprehensive insights into weather dynamics..

By analyzing the three-year dataset, we can identify long-term trends in the weather variables. We examine changes in air pressure, humidity, air temperature, rain accumulation, and relative humidity over the course of the three years. We used K-means clustering to find the cluster centroids and fitting the model the model we used curve fit.

Introduction

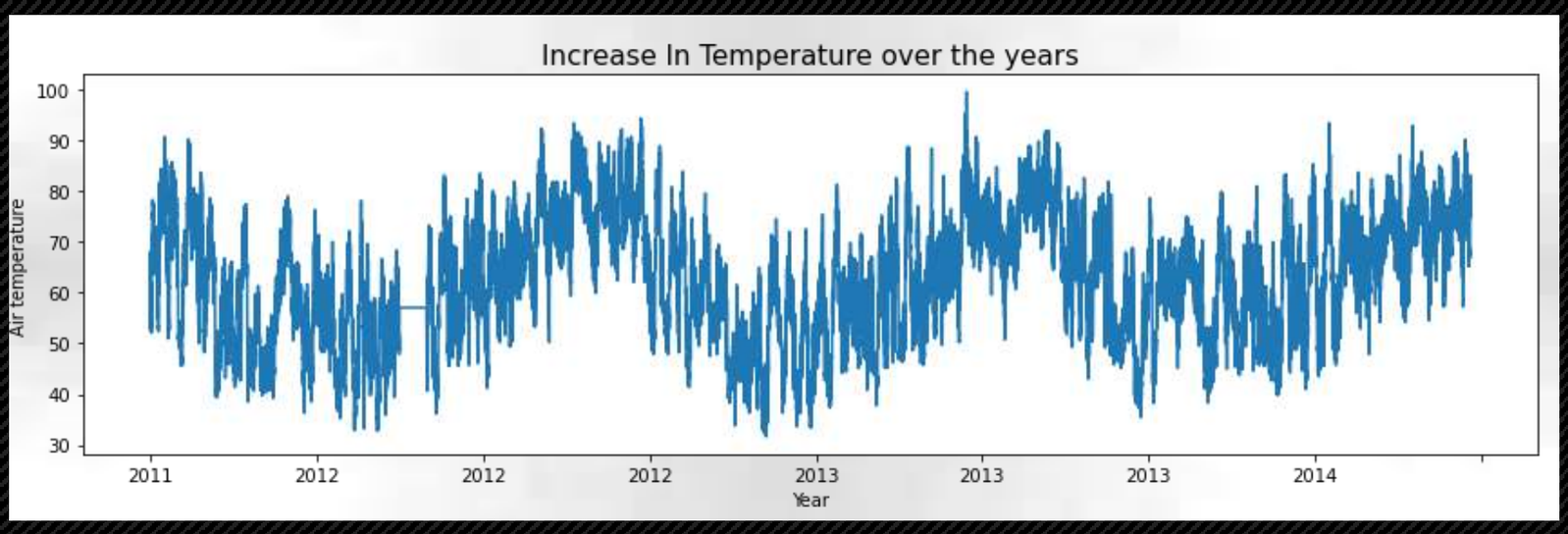
Temperature plays a significant role in air pollution. Warmer temperatures can increase the chemical reactions involved in the formation of pollutants, particularly those associated with photochemical smog. This occurs when sunlight reacts with pollutants, with this data we find patterns between various factors that changes the climate and the reactions caused by them.





We can see a gradual fall in the accumulation of rain fall throughout the years. increased heat absorption and altered surface characteristics, leading to changes in atmospheric circulation and reduced rainfall.

The Visualization helps in understanding the relationships between different weather variables within and across clusters. climate change by grouping similar climate data together based on their characteristics and identifying distinct patterns within the data. We can see the changes in the climate variables across different clusters.



High humidity can contribute to the formation of particulate matter (PM) through the process of hygroscopic growth. Hygroscopic particles, such as sulfates and nitrates, have the ability to absorb water vapor, increasing their size and mass. This can lead to the formation of fine particulates, which can have adverse health effects.

Conclusion: In conclusion we can see that each factor affects the others. For example, increased air pollution can lead to elevated air temperatures through the absorption of solar radiation by pollutants like black carbon. The presence of air pollutants can also modify cloud properties, affecting the distribution and intensity of rainfall, which in turn impacts humidity levels.