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Characterizing Temporal Patterns of Urban Air Pollution and AQI Variability in Delhi

This study examines how concentrations of six key air pollutants ($PM_{2.5}$, PM_{10}, NO_2, SO_2, CO, and O_3) and their temporal variation and how they influence the Air Quality Index (AQI) across Delhi. Daily measurements of these pollutants from 2021 to 2024 were analyzed to capture seasonal, monthly and weekly variations. Visualization techniques such as time-series graphs, boxplots, and correlation matrices were applied to identify pollutant-specific behaviors. The analysis shows that $PM_{2.5}$ and PM_{10} have the most significant impact on AQI, with elevated levels during winter, while ozone concentrations peak in the summer. Weekly trends suggest pollutant levels are generally higher on weekdays than weekends. The outcomes provide a data-driven foundation for developing focused air quality management policies in Delhi.

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