

A New Anomaly Detection Approach for Monitoring PM2.5 in New Taipei City

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Abstract:

Air pollution monitoring is a critical issue in environmental science, with fine particulate matter (PM2.5) being one of the most important indicators of air quality. Continuous monitoring of PM2.5 concentration variations is essential for assessing pollution levels and protecting public health. According to the Air Quality Index provided by the Ministry of Health and Welfare, hourly PM2.5 measurements are classified into three categories: (1) no harm to health, (2) harmful to individuals with allergies, and (3) harmful to the general population. To effectively detect abnormal variations across these categories, we propose a new multiple-proportion control chart for PM2.5 concentration monitoring. The proposed method is applied to PM2.5 data collected in New Taipei City from 2017 to 2023. The analysis results demonstrate that the proposed chart provides effective and timely detection of abnormal concentration changes, offering a useful tool for air pollution prevention and environmental quality management.

Keywords:

Air pollution, PM 2.5, control chart, anomaly detection.