

# **NLP EMPOWERING AIR QUALITY MONITORING: BUILDING AN INTELLIGENT AND EFFICIENT ECOLOGICAL MONITORING SYSTEM**

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**Abstract:** With the rapid increase in air quality data, machine learning has become an important tool in the field of air quality monitoring research. To promote continuous innovation in this field, this paper briefly introduces the application of Natural Language Processing (NLP) technology in air quality monitoring and early warning systems, providing new possibilities for building intelligent and efficient ecological monitoring systems. This paper delves into the application of NLP in air quality monitoring, detailing how web crawling techniques, data analysis, storage, and data visualization (ECharts) are used, along with text classification, clustering, and NLP sentiment analysis to achieve data preprocessing, feature extraction, model training, and evaluation. By processing and analyzing air quality monitoring data and textual data such as environmental policies, regulations, and news reports, from intelligent data analysis to public opinion monitoring, we can predict air quality trends and issue timely warnings to prevent or reduce the occurrence of air pollution events. This provides strong support for environmental decision-making.

**Keywords:** NLP; Air Quality Monitoring; Ecological Monitoring System