

Real-Time Air Quality Monitoring Optimization Using Neural Network-Based Machine Learning and IoT Systems

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Abstract:

The growing concern over deteriorating air quality in urban environments necessitates the development of accurate and efficient real-time monitoring systems. This study introduces an optimized framework that combines neural network-based machine learning models with Internet of Things (IoT) infrastructures for continuous air quality assessment. IoT-enabled sensors collect data on pollutants, meteorological factors, and environmental conditions, which are processed by advanced neural networks—including deep feedforward and recurrent architectures—for precise prediction and anomaly detection. The integration of adaptive learning mechanisms allows the system to dynamically adjust to changing atmospheric patterns, improving long-term reliability and responsiveness. Experimental evaluation across various urban settings reveals enhanced predictive accuracy, minimal latency, and scalability, making this approach suitable for deployment in smart city air quality management initiatives.

Keywords:

Air quality monitoring, neural networks, machine learning, IoT systems, real-time prediction, smart cities.

REQUEST FOR FULL TEXT

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