

Air Quality Monitoring Using Machine Learning

Amisha Salian¹, Chethan K R², Kuladeep³, Shreya Shetty⁴, Sri Krishna Shastri C⁵

UG Students, Department of Electronics and Communication Engineering¹⁻⁴

Associate Professor, Department of Electronics and Communication Engineering⁵

Mangalore Institute of Technology & Engineering, Mangalore, India

Abstract: *The combination of Internet of Things (IoT) sensors and machine learning algorithms has revolutionized the monitoring of air quality, offering more precise and up-to-date data for better environmental management. This study examines current advancements in this field, focusing especially on the development and implementation of Internet of Things (IoT)-based air quality monitoring systems that employ a range of sensors to detect pollutants such as particulate matter, CO, NO₂, and CO₂. These systems forecast pollution levels and look at trends in air quality using machine learning models like Random Forest and Linear Regression. They also collect data in real time via sensor networks. Notable advancements include low-cost sensors and wireless networks for industrial air quality prediction, Internet of Things platforms for continuous environmental monitoring, and real-time in-car monitoring systems to ensure driver safety. The examined studies highlight some problems with power consumption, data latency, and sensor accuracy but also demonstrate how IoT and machine learning may be utilized to increase the precision and effectiveness of air quality monitoring. Future directions point towards the integration of artificial intelligence, improved sensor technologies, and renewable energy solutions to further improve air quality management and forecasting capacities. This in-depth analysis provides recommendations for developing more dependable and scalable air quality monitoring systems, as well as highlighting the potential of IoT and machine learning technologies in addressing the issues related to global air pollution.*

Keywords: Air quality, Random Forest, Real-time analysis, Machine Learning