A Neural Network-Based Tracking Method for the Estimation of Hazardous Gas
Release Rate Using Sensor Network Data

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Abstract

In this research, we propose a new method for tracking the release rate using the concentration data obtained from the sensor. We used a sensor network that has already been set surrounding the area where hazardous gas releases can occur. From the real-time sensor data, we detected and analyzed releases of harmful materials and their concentrations. Based on the results, the release rate is estimated using the neural network. This model consists of 14 input variables (sensor data, material properties, process information, meteorological conditions) and one output (release rate). The dispersion model then performs the simulation of the expected dispersion consequence by combining the sensor data, GIS data and the diagnostic result of the source term. The result of this study will improve the safety-concerns of residents living next to storage facilities containing hazardous materials by providing the enhanced emergency response plan and monitoring system for toxic gas releases.