변형 RNN모델기반 지하 공간의 초미세먼지 (PM2.5) 농도 예측모델 개발

허성구, Loy-Benitez Jorge, Li Qian, 남기전, 유창규†
경희대학교
(ckyoo@khu.ac.kr†)

Particulate matter (PM) in public spaces has been considered a threat to public human health due to its variant sizes, unique composition and retention time. Important tool for the protection of human health is forecasting of the pollutant concentration. However, due to the stochastic nature of PM, several predictive methods have failed to forecast long-term dependencies in effective way. This study considered PM with aerodynamic size less than 2.5 μm (PM2.5) dataset from a subway line in Seoul throughout 2009 on hourly resolution. Then, variant recurrent neural networks (RNN) architectures were utilized. Standard RNN (SRNN), long short-term memory (LSTM) and gated recurrent unit (GRU) structures were applied due to their capability of processing sequential and time-dependent data. Implementation of RNN structures was conducted using a point-by-point schema, and several performance metrics were used for comparison. The results demonstrated that GRU structure outperforms the other RNN structures (RMSE=21.04 μg/m3, MAPE=32.92%, R2=0.65).

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