

عنوان مقاله:

Application of ensemble learning techniques to model the atmospheric concentration of SO₂

محل انتشار:

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خلاصه مقاله:

In view of pollution prediction modeling, the study adopts homogenous (random forest, bagging, and additive regression) and heterogeneous (voting) ensemble classifiers to predict the atmospheric concentration of Sulphur dioxide. For model validation, results were compared against widely known single base classifiers such as support vector machine, multilayer perceptron, linear regression and regression tree using M5 algorithm. The prediction of Sulphur dioxide was based on atmospheric pollutants and meteorological parameters. While, the model performance was assessed by using four evaluation measures namely Correlation coefficient, mean absolute error, root mean squared error and relative absolute error. The results obtained suggest that 1) homogenous ensemble classifier random forest performs better than single base statistical and machine learning algorithms; 2) employing single base classifiers within bagging as base classifier improves their prediction accuracy; and 3) heterogeneous ensemble algorithm voting have the capability to match or perform better than homogenous classifiers (random forest and bagging). In general, it demonstrates that the performance of ensemble classifiers random forest, bagging and voting can outperform single base traditional statistical and machine learning algorithms such as linear regression, support .vector machine for regression and multilayer perceptron to model the atmospheric concentration of sulphur dioxide

کلمات کلیدی:

Air pollution modeling, Ensemble learning techniques, Multilayer Perceptron (MLP), Random Forest, Bagging, Sulphur dioxide (SO₂), Support Vector Machine (SVM), Voting

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