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Air Quality Prediction System for Smart Cities

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Abstract: *As air pollution is a complex mixture of toxic components with considerable impact on humans, forecasting air pollution concentration emerges as a priority for improving life quality. With the rapid development of urbanization, air pollution is becoming a severe environmental and societal issue for all developing countries around the world. Air pollution consists of a mixture of particulate matter and gaseous species (i.e. NO2, CO, O3 and SO2), which have both acute and chronic effects on human health, especially for young and elderly. Machine learning, as one of the most popular techniques, is able to efficiently train a model on big data by using large-scale optimization algorithms. Although there exist some works applying machine learning to air quality prediction, most of the prior studies are restricted to several-year data and simply train standard regression models (linear or nonlinear) to predict the hourly air pollution concentration. Machine learning algorithms become complex because of time and computational complexity. To overcome the drawbacks in existing system, we propose XGBoost deep learning based approach, which consists of a spatial transformation component and a deep distributed fusion network. Considering air pollutants' spatial correlations, the former component converts the spatial sparse air quality data into a consistent input to simulate the pollutant sources to predict the air quality index. We can evaluate the performance of the systems in terms of accuracy for analyzing each and every attributes in Air Datasets.*

Keywords: Air Pollution, Particulate Matter(PM2.5)