A Novel Air Quality Prediction System with Long Term Storage with Hyper Parameter Tuning

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Abstract:
Air pollution is the most important contributor to a variety of serious health problems as well as weather transformation. Air quality interpreters are needed to design human activity at a particular environmental location and lessen the adverse pollution detrimental impacts. The authors have examined the problem in difficulty of forecasting the classification of pollutant concentrations in the future and have proposed a novel method based on Long Short-Term Memory (LSTM) model. This is a Deep Neural Network (DNN) model that is identified to work well with consecutive prediction difficulties. Through the data obtained, this approach produces a prediction model that reliably forecasts the Air Quality Index (AQI) from Central Pollution Control Board (CPCB) website. LS TM is experimented eight number of times to choose the best possible function using Python's LeakyRelu package to assess hyperparameter optimizations. The comparative analysis of accuracy metrics such as R Squared, Root Mean Squared Error (RMSE) and Mean Absolute Error (MAE) are measured for different models. The proposed model discovered R Squared is more than 1, indicating that the hyper parameter tuned model is the best fit model, based on the concurrent experiments. This dataset has the highest prediction accuracy and less prediction loss.

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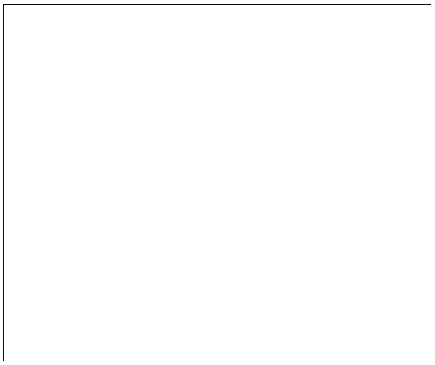
Contents

Air pollution [1] is a primary hazard for coronary heart related diseases, stroke, continual disruptive respiratory disorder, lung cancer, critical respirational contaminations, and exacerbating asthma. The great charge of boom in PM2 five (particles), predicting air pollutants is important for improving public health management. The human respiratory system may easily take in particles with a width of less than 2.0 microns (PM2.5) [2]. The existing studies show that levels of pollutants additionally depend on meteorological elements together with wind velocity, temperature, barometric pressure, and wind path. In addition, pollutant concentrations are inherently time-dependent, and future sequences of pollutant levels will depend on past pollutant readings sequences, meteorological elements, and visitors' conditions. LSTM model is a deep neural model that is recognized to work properly with sequential prediction responsibilities. This paper proposes an LSTM-based result for predicting future air impurity absorptions. It is essential to recognize earlier the fashion of the pollutant's degrees in order that important preventive actions can be occupied to save ourselves from the damaging consequences of long-time acquaintance to pollutants. Thus, the forecast of contaminant degrees is one of the maximum essential issues for municipal corporations and is likewise essential in climate change observation.



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