An Intelligent Bayesian Optimization with Stacked BiLSTM Model for Air Quality Index Prediction

K. Manikandan ; R. Rajkumar ; P. Jayanthi ; S. Jothimani ; R. Venkatesh ; S. Govinda Rao All Authors

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Abstract:
Rapid urbanization and industrialization can quickly deteriorate surrounding quality of the air, particularly in evolving countries. Pollution in air carry out a major problem to public health and damage the atmosphere. Previous analysis is utilized Machine Learning (ML) and arithmetic modeling for classifying and forecasting pollution in air. But these techniques undergo the difficulty of air pollution databases giving an outcome in the absence of effectual classification and prediction of air pollutions. The research developed a Bayesian Optimization with Stacked Deep Learning-based Air Quality Index Prediction (BOSDL-AQIP) approach. The goal of the BOSDL-AQIP approach lies in the effectual identification and classification of Air Quality (AQ) into multiple class labels. To attain this, the presented BOSDL-AQIP technique employs min-max normalization for data scaling purposes. Next, the BOSDL-AQIP system utilizes Stacked Bidirectional Long Short-Term Memory (SBiLSTM) technique for prediction process. Moreover, BO technique was utilized for adjusting the hyperparameter values of the SBiLSTM technique and thereby improve the predictive outputs. The simulation outcome of the BOSDL-AQIP algorithm was tested on air quality dataset and the outputs implied the enhanced efficacy of the BOSDL-AQIP technique over other approaches.

Published in: 2023 5th International Conference on Inventive Research in Computing Applications (ICIRCA)

Date of Conference: 03-05 August 2023

INSPEC Accession Number: 23683249

Date Added to IEEE *Xplore*: 28 August 2023

DOI: 10.1109/ICIRCA57980.2023.10220650

ISBN Information:

Electronic ISBN:979-8-3503-2142-5
DVD ISBN:979-8-3503-2141-8
Print on Demand(PoD) ISBN:979-8-3503-2143-2

Publisher: IEEE

Conference Location: Coimbatore, India

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Contents

Air pollution has become a stern ecological problem It is accountable for hundreds of mortalities every year and it also stances a stern challenge to human atmosphere and wellbeing [1]. It paves way for greenhouse effect, and global heating, and it also causes breathing is sues like pulmonary cancer, as thma, etc. It is crucial to anticipate the air quality to adjust air pollution. Air Quality Index (AQI) is a quantity of AQ that specifies the level of air pollution [2]. AQ can be measured by implementing several ML protocols. Several nations and their ecological organizations around the globe employ the AQI for the real-time distribution of the data on the AQ [3]. Though the principal ideas of AQ are identical, the hands-on employment of each can be diverse [4]. Implementing AQIs on a prevalent set of information can demonstrate huge discrepancies in the values of the index and concentration of contaminants [5].

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