[Sept 29, 2020]

The Editors

*Science of the Total Environment*

Dear Editor:

I wish to submit an Article for publication in *Science of the Total Environment,* titled “**A Novel Encoder-Decoder Model based on Read-first LSTM for Air Pollutant Prediction.**” The paper was coauthored by Bo Zhang, Guojian Zou, Dongming Qin, Yunjie Lu and Yupeng Jin.

In the field of environmental sciences, the work of air pollutant prediction is essential for environment management and health protection. Meanwhile, the Artificial Intelligence based information processing approach brings more advantages for data mining. In this work, we propose an improved LSTM, named Read-first LSTM or RLSTM for short, which is a more powerful temporal feature extractor than RNN, LSTM and Gated Recurrent Unit (GRU). RLSTM has some useful properties: (1) enables better store and remember capabilities in longer time series and (2) overcomes the problem of dependency between gate units. Since RLSTM is good at long term feature extraction, it is expected to perform well in time series prediction. Therefore, we use RLSTM as the Encoder and LSTM as the Decoder to build an Encoder-Decoder model (EDSModel) for pollutant prediction in this paper. This paper studies how to improve pollutant concentration prediction, and proposes a new deep learning-based pollutant concentration prediction model, EDSModel. EDSModel is composed of an RLSTM-based Encoder and an LSTM-based Decoder.The experiments performed in this study demonstrated that, compared to traditional models, the proposed EDSModel yields higher-accuracy predictions by fully extracting data correlations, and overcomes problems such as long-term dependency. Therefore, the proposed EDSModel overcomes the weaknesses with traditional machine learning methods, single traditional networks and sequence network models based on RNN, GRU, and LSTM, and is valuable for practical applications.We believe that our study makes a significant contribution to the literature since the traditional air pollution concentration prediction model can’t make good use of the mass pollutant concentration and meteorological data and deal with sudden changes in weather. Moreover, it provides new technical means and support for the field of environmental prediction. Our experiments are based on a ***real-world air pollution and meteorological dataset*** in China.

The data sets and experimental codes used in the experiment have been uploaded to GitHub, which has been detailed in the paper. To meet the quality of language presentation, we used the professional language service to improve the proofreading of our paper.

We believe this paper is closely related to the topics (*Data science, Human health, Air quality*) of your journal, and the proposed model in this paper has been applied for the environment management application in many cities in China (e.g., Beijing, Shanghai, Nanjing).

This manuscript has not been published or presented elsewhere in part or in entirety and is not under consideration by another journal. We have read and understood your journal’s policies, and we believe that neither the manuscript nor the study violates any of these. There are no conflicts of interest to declare.

Thank you for your consideration. I look forward to hearing from you.

Sincerely,

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