Review on Water Quality Assessment using Statistical and Deep Learning Modeling

The main focus of the study will be to get the best fit model that can predict and forecast water quality in long run. The combine statistical and deep learning approach is new to the field of water quality assessment. This study will be one of the helping review on the statistical and deep learning approach that will benefit scientists, reviewers and environmentalist and will be helpful in water management of static and dynamic water bodies.

Methods:

Water Bodies in concern:
    Rivers:
        i) Buriganga
        ii) Dhaleshwari
        iii) Turag
        iv) Balu
        v) Shitalakkhya
    Lake:
        u) Hatirjheel

Data collection will be preliminary divided into four (4)/ three (3) sampling points putting into consideration the point of discharge close distance from industries. The distance from one sample point to another will be 20/30/40 m apart. The sampling will be focused on upstream to downstream of the river. The sampling will be done 2 days in a week. The water quality parameters will be considered in this study are:
    i) Dissolved Oxygen (DO)
    ii) Temperature
    iii) pH
    iv) Electrical Coductivity (EC)
    v) Total Dissolved Solids (TDS)
    vi) Biological Oxygen Demand (BOD)

Deep learning and Statistical Methods will be applied:
    Statistical Approach:
        i) Moving Average

    Deep Learning Approach:
        i) Perceptron
        ii) CNN (Convolutional Neural Network)
        iii) RNN (Recurrent Neural Network)
        iv) LSTM (Long Short Term Memory)
        v) GRU (Gated Recurrent Unit)
        vi) XGBoost
        vii) Autoencoder Approach
        viii) Complete Ensemble Empirical Mode Decomposition Algorithm Noise (CEEMDAN)
        ix) Combine approach of moving average and autoencoder

x) Hybrid modeling of CNN, RNN, LSTM, GRU

Instrument needed:
      i) DO meter
      ii) pH meter
      iii) EC meter
      iv) TDS meter
      v) Thermometer

Costing:
      i) Reading Meter purchase cost
      ii) Transport cost

References:

i) Wei-Bo Chen & Wen-Cheng Liu. *Artificial neural network modeling of dissolved oxygen in reservoir (*https://link.springer.com/article/10.1007/s10661-013-3450-6)

ii) J. I. Ubah, L. C. Orakwe, K. N. *Ogbu. Forecasting water quality parameters using artificial neural network for irrigation purposes.* (https://www.researchgate.net/publication/357303697_Forecasting_water_quality_parameters_using_artificial_neural_network_for_irrigation_purposes)

iii) Jian Sha, Xue Li, Man Zhang. *Comparison of Forecasting Models for Real-Time Monitoring of Water Quality Parameters Based on Hybrid Deep Learning Neural Networks* (https://www.mdpi.com/2073-4441/13/11/1547)