NEURAL NETWORK MODEL FOR ESTIMATING THE EMISSION OF GREENHOUSE GASES IN ECHOSYSTEM WITH SOIL FACTORS

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ABSTRACT

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The instantaneous classification and estimation of environmental data as well as the prediction of future events based on them has become an essential feature in modern ecosystem analysis. This study tries to develop a technique based on Artificial Neural Networks (ANN), which is capable of estimating the emission of Greenhouse Gases (GHS). GHS emission depends on many soil factors and in this research, properties of the soil such as the soil temperature, pH value, air filled porosity and Electrical Conductivity (EC) have been considered as input variables while the gases, Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_2O), have been considered as the output variables.

ANNs attempt to mimic a neuron in a human brain, with each link described as a processing unit (PE). Neural networks learn from experience and are useful in detecting unknown relationships between a set of input data and an outcome. Like other approaches, Neural Networks detect patterns in data, generalize relationships found in the data, and predict outcomes. Neural Networks have been especially noted for their ability to predict complex processes better than statistical packages.

This study makes use of the Feed Forward Network, the Radial Basis Function and the Multiple Regression models. The results show that the ANN model estimates have a significantly higher accuracy when compared with the Multiple Regression model. Further it demonstrates, out of the ANN based techniques tested, the Radial Basis Function is comparatively better than the Feed Forward ANN model.