Abstract

This paper presents the application of neural network to the electrostatic field distribution modeling using harmattan season data in Zaria, Nigeria. The data was captured through an on-line mechanism for twenty-four months by the computer using the Microsoft Office Excel Program for twenty-four months (February, 2007 - February, 2009). The focus of the analysis is determining the effect of environmental factors such as temperature, pressure and relative humidity on the static electric field during the harmattan season. The plots of the electrostatic field against the variation of the environmental factors were used as the qualitative analytical tools and yielded a non-linear relationship. The data was analyzed using Neural Network version 3.24 Software, to establish predictive models for Harmattan outside and inside Scenarios. The result of the analyses yielded good neural statistical values of Root Mean Square Error (RMSE) of 0.09, and Pearson R value of 0.76 for outside Scenario. Similarly for Harmattan inside Scenario, gives a RMSE value of 0.14, and Pearson R value of 0.77 respectively, which are reflections of a good model. The result was further buttressed by the plot of the Neural Network based Electrostatic Fields distribution modeling of the experimental and the predicted parameters. With the insignificant values of the RMSE, Pearson R value which are reflections of the closeness of the predicted and the experimental parameters, hence the could be relied upon to predict the electrostatic fields during harmattan in Zaria, Nigeria.
References


Index Terms

Computer Science

Artificial Intelligence
Keywords
Electrostatic field  Neural network  Electrostatic fields Distribution models
environmental factors