Manuscript ID : 00000-60896

Source ID : 00000005

International Journal of Computer Engineering and Technology

Volume 4, Issue 3, May-June 2013, Pages 491-502, Page Count - 12

ARTIFICIAL NEURAL NETWORK BASED NITROGEN OXIDES EMISSION PREDICTION AND OPTIMIZATION IN THERMAL POWER PLANT

Preeti Manke [1] Sharad Tembhurne [2]

[1] Computer Science and Engineering, Institute of Technology-Korba, Korba, India.
[2] Operation and Maintenance, National Thermal Power Corporation Limited, Maharashtra, India.

Abstract
Currently, emission monitoring is done via analytical instruments which are very expensive to install and maintain. The power generating industry is undergoing an unprecedented reform. This paper describes an efficient approach to predict nitrogen oxides emission from a 500 MW coal fired thermal power plant with optimized combustion parameters. The oxygen concentration in flue gas, coal properties, coal flow, boiler load, air distribution scheme, flue gas outlet temperature and nozzle tilt were studied. Artificial neural networks (ANNs) have been used in a broad range of applications including: pattern recognition, optimization, prediction and automatic control. The parametric field experiment data were used to build artificial neural network (ANN). The coal combustion parameters were used as inputs and nitrogen oxides as output of the model. The predicted values of the model for full load condition were verified with the actual values. The predicted values are 94% closer to actual operating values with lowest Root mean square error (RMSE) 0.4908 and highest correlation factor 0.9627. The optimum level of input operating conditions for low nitrogen oxides emission was determined by simulated annealing (SA) approach. These optimum operating parameters can help us to ensure complete combustion, less emission with increased boiler life.

Author Keywords
Boiler, Neural network, NOx emission, Thermal Power plant

Acknowledgement
Heartfelt gratitude to National Thermal Power Corporation Limited, India for providing operational information of Power Plant to carry out this work successfully.

ISSN Print: 0976-6367
ISSN Online: 0976-6375
Source Type: Journals
Document Type: Journal Article
Publication Language: English
DOI:
Abbreviated Journal Title: IJCET
Access Type: Open Access
Publisher Name: IAEME Publication
Resource Licence: CC BY-NC
Major Subject: Physical Sciences
Subject Area classification: Computer Science
Subject area: Computer Networks and Communications
Source: SCOPEDATABASE