ANN Based Load Forecasting Model for Short Term Planning: A Case Study of Ota Community in Nigeria

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V.

Conclusion

Abstract:
Load forecasting is fundamentally crucial to the efficient and effective operations of power systems, as accurate load forecast results aid in keeping risks incurred during decision-making processes to a minimum, and also lead to reductions in costs associated with power plant operations. Hence, this paper focuses on short-term load forecasting for a 33/11-kV transmission sub-station in Ota, Ogun State, Nigeria, using an artificial neural network (ANN). The study uses five neural network input parameters, such as days of the week, time of the day in hours, working days, weekends, and total daily load data from two previous weeks. The resulting output parameters after several training (using the Bayesian Regularization (BR) algorithm in the MATLAB ANN toolbox), validation, and testing sessions are the load data for the next two weeks. The performance of the developed model is evaluated using regression plots and the mean absolute deviation (MAD) as well as mean squared error (MSE) indices. Values of 0.993, 0.025, and 0.0025 for regression, MAD, and MSE, respectively, are obtained.

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I. Introduction

Lack of adequate supply of electricity is still a major problem around the globe that is prevalent in developing and underdeveloped countries. Around the globe, 25% don't have access to electricity, and many who do also experience its epileptic supply. [1]. Lack of a stable supply of electricity hinders sustainable development and any form of economic growth [2]. Due to its inherent characteristics, electricity differs from other commercial products. For instance, it is not easily stored; therefore, it is most times generated as required, especially in centralized electrical power systems. Globally, electrical power companies come up with detailed objectives in other to ensure consumer satisfaction and

retain the patronage of consumers, and this all boils down to providing consumers with high-quality stable electricity. In developing nations, and Nigeria in particular, these electricity and transmission companies are faced with a lot of challenges that have given rise to stability and power quality issues. These challenges are often associated with the fact that there is little information or data available for the utility companies to make informed decisions and propose plans towards achieving set goals.

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