Long-Term Electrical Demand forecasting Using

Artificial Neural Networks

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ABSTRACT

This Master Thesis is concerned with the application of Artificial Neural Networks (ANN) to long-term electricity load forecasting. The ANN is used to predict the peak load for Saudi Electricity Company (SEC) in the Western Region using some economic and demographic factors that play an important role in the future loads such as The Peak Load of the Previous Year, Total Number of Subscribers, Energy Consumption, Industrial Energy Consumption, No. of Electrified Cities and Villages, Gross Domestic Product (GDP), Gross National Product (GNP), Per Capita Income and Population. The main contribution of this study is the development of ANN model by using a three-layer feed forward ANN with Sigmoid Function and Back-Propagation Algorithm based upon the application of NeuroForecaster 2001 package. Five Neural Networks models are developed using different number of neuron in the hidden layer to obtain a suitable model which is used to forecast the annual peak load for the Saudi Electricity Company in the Western Region. The developed ANN model was compared to a Multiple Regression model and SEC-Western Region in-house forecasts. The comparison reveals that ANN produces the most accurate results. Finally, the ANN model is used to forecast
the peak load for Saudi Electricity Company in the Western Region up to the year 2011.