SHORT LOAD FORECASTING BY USING A HYBRID MODEL OF ADAPTIVE NEURO-FUZZY SYSTEM FOR ELECTRIC LOAD

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ABSTRACT

Short Load forecasting is vitally necessary for the electric for any power system and real- life difficulty in industry in the deregulated economy. It has various applications including energy purchasing and generation, contract evaluation, load switching, infrastructure development and to forecast the load demand from the customers by rising or declining the power generated and to lessen the operating costs of producing electricity. Besides, the conventional traditional models, some models based on artificial intelligence have been purposed in the literature, specifically, neural network for their good performance. Other non-parametric approaches of artificial intelligence have also been applied. However, all these models are imprecise when used in real time operation. The need for accurate load forecasting will increase in the future because of the dramatic change occurring in the structure of the utility industry due to deregulation and competition. This environment compels the utilities to operate at the highest possible efficiency. However, mush effort has been devoted over the past decades to develop and improve the short term electric load and its corresponding price forecasting models in order to make an appropriate market decision. Various types of load forecasting methodologies that have been reported in have their own advantages. The purpose of this research is to present an electric system load forecasting model using an adaptive Neuro-Fuzzy interface system (ANFIS) and discuss in detail how ANFIS is effectively applied to weekly, short term load forecasting with respect to different day types. This project present a study if short term hourly forecasting using Adaptive Neuro-Fuzzy system (ANFIS). To demonstrate the effectiveness of the proposed approach, publicly available data from the New England national electricity market web site has been taken to forecast the hourly load for the Victorian power system. It has been predicted the hourly load demand for a full week with a high degree of accuracy. The data obtained was divided into several where part where half of them are used for training and the other half is used for testing the Neuro-Fuzzy. The inputs used were the hour daily temperature, dry bulb, and dew points. The outputs obtained were predicted electric load in Mwh unit. The outcome and forecasting performance obtained reveal the effectiveness of the proposed approach and shows that it has potential to build a high accurateness model with less historical data using a hybrid of neural network and fuzzy logic which can be used in real time.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Numerous advances have been made in developing intelligence systems, some inspired by biological neural network, fuzzy system and combination of them. Many researchers from variety of scientific disciplines are designing Artificial Neural Network (ANNs) to mitigate a various problems in pattern recognition, prediction, optimization, associative memory and control [1]. Conventional approaches have been proposed for solving these problems. Although successful applications can be found in certain well constrained environments, none is flexible enough to perform well outside its domain. Artificial Neural Network has been replacing traditional methods in many applications offering, besides a better performance, a number of advantages: no need for system model, tolerance bizarre patterns, notable adaptive capability and etc.

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Substantially, its corresponding price forecasting models on order to make an appropriate market decision. A variety of types of load forecasting methodologies as it has being stated in advantages view. Thus, load forecasting can be performed using many techniques such as statistical methods, artificial neural network, genetic algorithm, fuzzy logic, Neuro-Fuzzy system and so on [2]. Load forecasting is the most successful applications of ANN in power systems data. Neuro-Fuzzy (NF) computing is a famous framework for solving complicated (complex) problems.