ELECTRICITY PRICES FORECASTING USING MULTILAYERED PERCEPTRON NETWORK WITH LEVENBERG-MARQUARDT

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ABSTRACT

In competitive electricity markets in most country, price forecasting is becoming increasingly relevant to power producers and consumers. Price forecasts provide crucial information for power producers and consumers to develop bidding strategies in order to maximize benefit. In this paper, a Multi-layer Perceptron (MLP) based neural network model to forecast price profile in electricity market has been presented. Publicly available data acquired from the Australia electricity market were used for training and testing the Artificial Neural Network (ANN). The results obtained through the simulation show that the proposed algorithm is efficient, accurate and can be used to forecast electricity prices.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Nowadays in electricity markets, forecasting becomes more and more important. Accurate estimating price is the most essential task and the basis for any decision making and developing biding strategies [1]. All over the world, the electricity industry is converging toward a competitive framework and a market environment is replacing the traditional monopolistic scenery for the electricity industry. In this competitive electricity industry, forecasting electricity prices is an important problem. In particular, accuracy in forecasting these electricity prices is very critical, since more accuracy in forecasting reduces the risk of under/over estimating the revenue from the generators for the power companies and provides better risk management [2].

The structure of the Australian National Electricity Market (NEM) has generators offering energy to buyers (retailers) via a wholesale spot market. They are required to submit generation supply curves to a system operator twenty-four hours ahead of dispatch. A supply curve is created for each of the forty-eight half-hours in a day. This indicates how much energy each generator is willing to generate from each generating unit as the pool price varies. The system operator decides which generators should be dispatched when the spot price exceeds their offer price and determines the price every five minutes. Expected load (demand) is matched with the industry supply curve for a particular half-hour, with the price offered by the last generator dispatched forming the five-minute price. A time-weighted average of the five-minute prices sets the half-hour pool price [3].

Electricity prices depend on factors such as load, distribution networks, status of generators, market policies and etc. The uncertainties in these factors introduce high volatility into the prices and cause difficulties in forecasting. Yet, being able to