



Optimization of hybridization of artificial neuron with chaotic genetic algorithm in prediction process/with the application

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Abstract

Interest in the subject of prediction has increased in recent years, and modern and advanced methods have emerged, including neural network models, chaotic algorithms, hybrid algorithms, and others. All of these methods are able to learn and self-adapt to any model and do not need assumptions for the nature of the time series. Taking more than one method may lead to an increase in the accuracy of future estimates, so a neural network and chaotic genetic algorithms are used, so a model combines the strengths of two techniques to develop a hybrid CGANN model to obtain more accurate prediction results and reduce prediction errors. The aim of this study is to shed light on some of the statistical methods used in predicting the future demand for electric power in the southern region, as well as pointing to the most accurate methods in predicting the future of energy. The annual electrical energy consumption data for the southern region were used to make a comparison through practical application, and it was found that the three methods are very high accuracy and suitable for use in the prediction process, but the most accurate models are the hybrid algorithm consisting of neural networks and the chaotic genetic algorithm CGANN that gives better and more results efficient and thus, was used to predict the electrical load of the southern region up to 2032.

Keywords Chaotic genetic algorithm · Artificial neural network · Activation functions · Chaotic map operator · Hybrid network

1 Introduction

The electricity sector is one of the important sectors as it constitutes the lifeblood of citizens and directly affects many facilities related to the standard of living and economic development. This sector in Iraq has been devastated, which made it fall short of meeting the important needs of the citizen. As the decline in electricity power due

to the shortage in energy production as a result of the great damages suffered by the stations as a result of the wars that the country has gone through, and the subsequent acts of sabotage, as well as the old stations of the existing, all these reasons led to an imbalance between the supply of electrical energy and the volume of demand for it, which has led to frequent power outages, which negatively affect most of the daily activities of the citizen, as well as a significant increase in the rate of energy consumption in recent years in Iraq in general and the southern region in particular, attention increased to confront these problems that this sector suffers from, and it was necessary to establish new power plants, but the establishment of these plants required large investments that Iraq was unable to provide to fill the production deficit. This study deals with the demand for electric power in the southern region, which includes four the governorates are Basra, Maysan, Dhi Qar and Muthanna, and the most important factors affecting the consumption of electrical energy and the use of several statistical methods in predicting the consumption

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