An adaptive neural network approach to one-week ahead load forecasting

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A neural network approach is proposed for one-week ahead load forecasting. This approach uses a linear adaptive neuron or adaptive linear combiner called Adaline. An energy spectrum is used to analyze the periodic components in a load sequence. The load sequence mainly consists of three components: base load component, and low and high frequency load components. Each load component has a unique frequency range. A load decomposition is made for the load sequence using digital filters with different passband frequencies. After load decomposition, each load component can be forecasted by an Adaline. Each Adaline has an input sequence, an output sequence, and a desired response-signal sequence. It also has a set of adjustable parameters called the weight vector. In load forecasting, the weight vector is designed to make the output sequence, the forecasted load, follow the actual load sequence; it also has a minimized least mean square error. This approach is useful in forecasting unit scheduling commitments. Mean absolute percentage errors of less than 3.4% are presented from five months of utility data, thus demonstrating the high degree of accuracy that can be obtained without dependence on weather forecasts

Published in:
Power Systems, IEEE Transactions on (Volume:8 , Issue: 3)

Date of Publication:
Aug 1993

Page(s):
1195 - 1203

ISSN :
0885-8950

INSPEC Accession Number:
4581922

Digital Object Identifier :
10.1109/59.260877

Date of Current Version :
06 August 2002

Issue Date :
Aug 1993

Sponsored by :
IEEE Power & Energy Society

Publisher:
IEEE