VERY SHORT TERM LOAD FORECASTING USING ARTIFICIAL INTELLIGENCE TECHNIQUES

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I, **Prateek Jain**, Roll No. 2K13/PSY/10 student of M. Tech. (Power System), hereby declare that the dissertation titled "**Very Short Term Load Forecasting Using Artificial Intelligence Techniques**" under the supervision of **Dr. Suman Bhowmick** of Electrical Engineering Department, Delhi Technological University in partial fulfilment of the requirement for the award of the degree of Master of Technology has not been submitted elsewhere for the award of any Degree.

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ABSTRACT

Electrical load forecasting plays an important role in the Energy Management System (EMS), which has great influence on the operation, controlling and planning of electric power systems. A precise short term load forecasting will result in cost saving and improvement in system security. With deregulation of electric power systems, the method of short term load forecasting with high accuracy is becoming more and more important. A key component of the daily operation and planning activities of an electric utility is short-term load forecasting, i.e., the prediction of hourly loads (demand) for the next hour to several days out. The accuracy of such forecasts has significant economic impact for the utility.

In order to improve the precision of short term load forecasting, a new load forecasting model is put forward. ANN is used to learn the relationship among past and current peak loads. In order to provide the forecasted load, ANN interpolates among the previous load data in a training set. This project presents load forecasting using Artificial Neural Network (ANN), Fuzzy Logic and wavelet neural network. Artificial Neural Networks (ANN) have recently been receiving considerable attention. A large number of publications concerning ANN-based load forecasting (LF) have appeared in the literature. In conjunction with ANN, Fuzzy Logic is also known to result in accurate predictions of the load. In this project, a model using Fuzzy Logic and ANN is used to predict the load. There are a number of factors which affect the load, among which temperature plays a vital role. Here, we have analyzed very short term forecasting of load without the inclusion of parameters such as temperature and humidity which predicts data within 15 min and 5 min based on load of previous days.

A wavelet neural network approach is also presented for pre-filtering of load forecast data to achieve removal of data spikes which makes the forecasting more accurate.

List of Abbreviations

VSTLF – Very short term load forecasting

LF – Load forecasting

ANN – Artificial neural network

FL – Fuzzy logic

WNN – Wavelet neural network

FIS – Fuzzy inference system

AR - Autoregressive

MA - Moving average

ARMA - Autoregressive Moving Average

SLTF - Short term load forecasting

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