Abstract

This paper provides a short term load forecasting methodology using fuzzy logic for accurately predicting the load requirement of a utility company located in the North-west region of Nigeria. Fuzzy logic approach is implemented on the daily average temperature data and historical load data of 132/33KV Kano Transmission Substation obtained from Power Holding Company of Nigeria (PHCN) for a period of one year for forecasting the load. The methodology employed uses fuzzy reasoning decision rules that capture the nonlinear relationships between inputs and outputs. Fuzzy rule base used for the forecast were prepared using mamdani implication. Simulink in MATLAB environment is used in this work. The results for the forecasted load are obtained from fuzzy logic model using triangular membership function. The forecast result deviation from the actual values is presented in the form of Mean Absolute Percentage Error (MAPE). From the analysis carried out, the simulated results of the developed model were found to be very close to the one obtained from the Power Utility with Mean Absolute Percentage Error (MAPE) value of 4.65% for Monday 3rd March 2014 and a MAPE value of 3.08% for Monday 9th March 2014 which is an indication that the results obtained using the
fuzzy logic approach are accurate enough for electricity load forecast.

References

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Index Terms

Computer Science

Fuzzy Systems

Keywords

Short Term Load Forecast (STLF), Fuzzy Logic, Membership Function, Mean Absolute Percentage Error (MAPE), Fuzzy Inference System (FIS).