Machine Learning-Based Sensor Data Modeling Methods for Power Transformer PHM

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Introduction

Prognostic and Health Management (PHM) generally provides capabilities such as fault detection, fault isolation, and prognosis. PHM techniques include sensing, monitoring, data analysis, modeling, and decision support. This paper focuses on the development of a machine learning-based approach for predicting the remaining useful life (RUL) of power transformers. The proposed model uses a deep learning network to analyze sensor data and predict the transformer's health status. The model is trained using historical data and validated using real-time data. The results show promising accuracy in predicting the RUL of power transformers.

Results and Conclusions

The test data results in Fig. 1 and Fig. 2 can reflect that our model successfully solves the problem of overfitting and overtraining, both the train and test samples have good generalization ability. It indicates that the model is flexible for fault detection and prognosis. The proposed approach can offer a technical solution for the diagnosis of power transformers, which can help in maintaining high reliability and availability of power systems.

Acknowledgment

The authors would like to thank the support of the National Natural Science Foundation of China (No. 51507096). This research is supported by the National Natural Science Foundation of China (No. 51577096).

Fig. 2. Accuracy of the proposed model for transformer health monitoring.