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A Review Article of Monitoring of Interconnecting Transformer using Ann

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Abstract **- Interconnecting transformer is an important asset in interconnecting network. Its operation and control are important aspects which determine the reliability and quality of power supply. A remote condition monitoring system for interconnecting transformer is discussed here. Different parameters are acquired and processed in remote terminal unit. This communicates the data to the operator end using internet. According to parameter values, health index of a transformer is found out at the operator end interface. Analysis is based on health index. This system is different from power transformer condition monitoring systems in condition monitoring techniques used and communication. A cheaper system is designed which precisely evaluates the health status of a transformer. The test results are taken from a specially designed transformer.**

Keywords**-Interconnecting transformer, condition monitoring, health index, human machine interface.**

I. INTRODUCTION

With the skyrocketing growth of power system networks and the increase in their complexity, many factors have become influential in electric power generation, demand or load management [1].Load Interconnecting Transformer in one of the critical factors for economic operation of power systems. Interconnecting Transformer of future loads is also important for network planning, infrastructure development and so on. However, power system load Interconnecting Transformer is a two dimensional concept: consumer based Interconnecting Transformer and utility based Interconnecting Transformer. Thus the significance of each forecast could be handled disjointedly.

Consumer based forecasts are used to provide some guidelines to optimize network planning and investments, better manage risk and reduce operational costs. In basic operations for a power generation plant, forecasts are needed to assist planners in making strategic decisions with regards to unit commitment, hydro-thermal co-ordination, interchange evaluation, and security assessments and so on. This type of forecast deals with the total power system loads at a given time, and is normally performed by utility companies. Nonetheless, power system load Interconnecting Transformer can be classified in three categories, namely short term, medium term and long term Interconnecting Transformer.

II.VARIOUS ALGORITHEM FOR ANALYSIS

The most popular techniques used for load Interconnecting Transformer are time series based Models, similar-day approach and intelligent system based models. Some of the conventional Interconnecting Transformer methods have major drawbacks especially their inability to map the non-linear characteristic of the load, thus a substitute of classical methods with intelligent system based models is to a great extent essential. Most Interconnecting Transformer models use statistical techniques or artificial intelligence algorithms such as regression, neural networks, fuzzy logic, and expert systems [2-7].

Amongst all other intelligent techniques, the use of ANN in MTLF-LTDT is very predominant. Most recent load Interconnecting Transformer works are based on Artificial Neural Networks, and a majority of these papers presented good estimates. Because ANNs are capable of generalization and learning non-linear relationships between variables, ANN-based approaches are often favored for LTDT problems [8-11].The other important feature of ANNs is their capability to iteratively adjust the synoptic weights between layers.

Conventional methods on the other hand require static complex mathematical equations and but still perform poorly in comparison to intelligent-based approaches. Another leading load Interconnecting Transformer method is Fuzzy logic. Its application in load Interconnecting Transformer is based on periodical similarity of electric load, where the input variables, output variables and the governing rules are the key points.

III. LOAD INTER CONNECTING TRANSFORMER

This research work focuses on a specific area of load Interconnecting Transformer, Medium-term and Long termloadInterconnecting Transformer. The forecasts are achieved by using Artificial Neural Network (ANN) based models, i.e. feed-forward and recurrent networks developed in MATLAB and Simulink environment.. The application of the models to factual data is done merely as case study to validate the approach. Figure 1.1 below attempts to clarify the focus of this research.

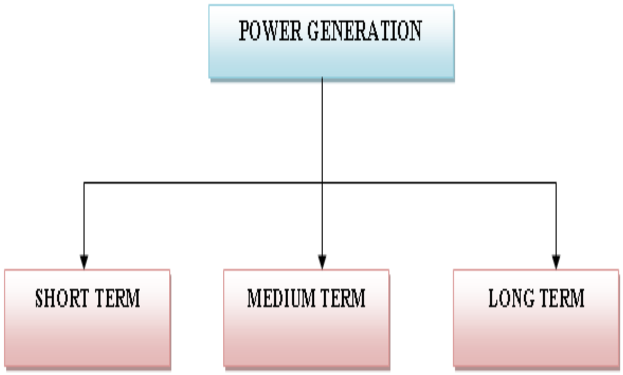

Fig.1.Types of load Interconnecting Transformer and focus of the research.

A great deal of effort is required to maintain an electric power supply within the requirements of the various types of customers served. Some of the requirements for power supply are readily recognized by most consumers, such as proper voltage, availability of power on demand, reliability and reasonable cost. By availability of power on demand, we mean to say that power must be available to the consumer in any amount that he may require from time to time.

Stated yet in another way, motors may be started or shut down, fans and lights may be turned on or off, without giving any advance warning or notice to the electric power supply company. It is this random behavior of consumers coupled with nature-controlled demographic and weather factors alongside econometric factors that has posed the greatest challenges like the amount of energy to generate, the load (circuits) to switch on or off at a point in time on the part of power utility company. Hence, a power system must be well planned so as to ensure adequate and reliable power supply to meet the estimated load demand in both near and distant future.

IV.LITERATURE REVIEW

KaisIbraheem: In this paper, they proposed a hybrid algorithm to forecast enrolment based on fuzzy time series and genetic algorithms, the proposed algorithms presents a good Interconnecting Transformer result with higher accuracy rate. Historical enrolment of the University of Alabama from year 1948 to 2017 is used in this study to illustrate the Interconnecting Transformer process. They proposed a hybrid algorithm to forecast enrolment of the University of Alabama based on fuzzy time series and genetic algorithms. The Interconnecting Transformer method consists of two ways; the first way is used to determine the best interval with less fitness function.

SimanekaAmakali: Optimal daily operation of electric power generating plants is very essential for any power utility organization to reduce input costs and possibly the prices of electricity in general. For a fossil fuel – fired power plant for example, the benefits of power generation optimization (i.e. generate what is reasonably required) extends even to environmental issues such as the subsequent reduction in air pollution. Now to generate "what is reasonably required" one needs forecast the future electricity demands. Because power generation relies heavily on the electricity demand, the consumers are also practically speaking required to wisely manage their loads to consolidate the power utility's optimal power generation efforts. Thus, for both cases, accurate and reliable electric load Interconnecting Transformer systems are absolutely required. To date, there are numerous Interconnecting Transformer methods developed primarily for electric load Interconnecting Transformer.

The viewed papers illustrate a variety of solutions for load Interconnecting Transformer related problems using Different methods, particularly for short-term load Interconnecting Transformer, thus a universal distinction regarding shortcomings of various techniques have been drawn and the proposed approach could be a superior attempt. Literature shows that different researchers use different methods to address a load Interconnecting Transformer.

Sharif: Presented a multi-layer feed-forward neural network model with the aim to compare the Interconnecting Transformer accuracy of a time-series and an GA-based model. The GA-based model gave reasonable results.

Chen: The impact of electricity prices in a load Interconnecting Transformer model. This assessment would typically be suitable for areas where sudden electricity tariff increases are experienced as it greatly affects the Interconnecting Transformer accuracy.

Adepoju: have used a supervised neural network –based model to forecast the load in the Nigerian power system. The study however did not consider the influences due to weather conditions, thus the accuracy could be improved.

Satish: have discussed the effect of the temperature on the load trend using an integrated GA -based method. The study concluded that the integrated model resulted in less error of prediction. Among other weather variables, only the temperature was incorporated in the model, thus a consideration of other factors would greatly improve the result.

Rashid: Presented a feed forward and feedback multi-context artificial neural network (FFFB –MCANN) as a practical approach for load Interconnecting Transformer. They have proposed the use of the rate values rather than the absolute to produce better accuracy.

Al-Saba: Illustrated the application of the GA to long-term load Interconnecting Transformer. The model forecasted the annual peak demand of a Middle Eastern utility and repeated the process using a time-series approach. The study established that theGA -based model produces better forecast rather classical methods (ARMA etc).

Ganzalez: have used a feedback GA -based model to predict energy consumption in buildings with high precision. The model was train by means of hybrid algorithm. The optimal network structure was not evidently achieved.

Srinivasan: has used a dominant back propagation GA -based model and genetic algorithm as an attempt to evolve the optimal neural network structure. This approach is powerful despites the fact that the model is unable to detect sudden load changes, thus the approach still needs further development.

Madal: Presented a comparison of a classical load Interconnecting Transformer technique with an GA -based model using actual load data. The models were used to forecast the load one-to-six hours ahead and again the MAPE showed that the GA -based model provides reliable forecasts. Again, the optimal network structure for better forecast was never achieved.

Topalli: A recurrent neural network method using hybrid learning scheme to offline learning with real-time to forecast Turkey's total load one day in advance. The study reported an average error of 1.6%. The Interconnecting Transformer accuracy could be achieved by employing good network training.

Kandil: Explored the GA capability to predict the load without necessary using the historical load trend, but only temperature instead. The study reports that using estimated load values may lead to a great degree of inaccuracy in the forecast, thus only the temperature was used as an input. Because of the ANN's input-output mapping ability, this approach could be efficient. However, the better results could be achieved by selecting other importance input variables and better network training parameters.

Xiao: Introduced the rough set and its ability to study and remember the relationship between the inputs and outputs. A multi-layer back propagation neural network was used in the study and momentum method was also applied to decrease the sensitivity of local parts of error curve surface. This approach requires further development to attribute deduction threshold.

Lauret: Used a model called Bayesian neural network as an attempt to design an optimal network for short-term load Interconnecting Transformer. The Bayesian GA model is a new proposed methodology but also requires derivation of better noise models and uncertainties consideration.

V. CONCLUSION

The research presented in this research focused on validation and implementation of the neuro-fuzzy fault detection engine on large substation transformers. This validation was accomplished through the design of a diagnostic module, which could non-invasively collect data that has been shown to provide diagnostic information about the health of transformers. This data was then transferred to the neuro-fuzzy detection engine via a modem. From this point in the research, there are several areas for possible future work. The major areas of study are given below. This research focused on the implementation of the diagnostic module on three single-phase transformers of the same age and type. However, in order for the neural network to provide more accurate identification for many different types of transformers, a larger database with data from many different models and years of operation is required. For this reason, one area of possible future research is to implement the system described in this thesis on many more transformers. Through this, it is hoped that the system will actually witness different failures and be able to train itself to different types of behavior, normal and abnormal.

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