



Intisari

Penelitian ini adalah studi tentang aplikasi jaringan syaraf tiruan untuk diagnosis gangguan permulaan pada transformator daya. Jaringan syaraf yang digunakan adalah jaringan syaraf *multi-layer perceptron* serta digabung dengan jaringan syaraf *self organizing feature map* melalui variasi metode pembelajaran *resilient backpropagation*, *scaled conjugate gradient*, dan *Levenberg-Marquardt* serta pengolah awal data masukan penskalaan, pembagian dengan rerata, normalisasi rerata dan deviasi standard, dan himpunan *fuzzy*. Diagnosis gangguan permulaan berbasis *dissolved gas in oil analysis*.

Jaringan syaraf tiruan yang digunakan mempunyai enam masukan dengan tiga keluaran. Pembelajaran dilakukan dengan data gangguan permulaan transformator dari suatu penelitian. Penelitian dilakukan dengan membandingkan jaringan syaraf tiruan dalam topologi, metode pembelajaran, pengolah awal data masukan divariasi untuk mendapat yang terbaik dari sisi kebenaran diagnosis, rerata kebenaran, waktu yang dibutuhkan, kemampuan mencapai target untuk beberapa pembelajaran dengan inisialisasi *Nguyen-Widrow* yang bersifat acak.

Hasil penelitian menunjukkan bahwa jaringan syaraf tiruan topologi gabungan *multi layer perceptron* dengan *self organizing feature map* dengan pengolah awal data masukan himpunan *fuzzy* serta metode pembelajaran *resilient backpropagation* adalah pilihan terbaik. Hasil penelitian didapatkan dengan membandingkan dengan topologi lain yang diteliti dalam penelitian ini. Jaringan syaraf tiruan juga lebih baik dari metode konvensional gas kunci dan perbandingan gas, metode MVG, metode sistem pakar maupun fuzifikasi metode Roger yang dikembangkan Wong (2000) untuk kasus transformator yang diteliti dalam penelitian ini sehingga metode jaringan syaraf tiruan ini diharapkan dapat menggantikan pakar diagnosis.



Abstract

This research is study of application artificial neural network for diagnosis of power transformer incipient faults. Applied neural network was multi-layer perceptron neural network and also was joined with self organizing feature map neural network through learning method variation of resilient backpropagation, scaled conjugate gradient, and Levenberg-Marquardt and also data preprocessing of input scaling, division by average, normalization of average and standard deviation, and fuzzy membership. Incipient faults diagnosis was based on dissolved gas in oil analysis.

Applied artificial neural network has six inputs with three outputs. The learning process has been done by incipient faults data from some research. Research has been done by comparing the ability artificial neural network in variation of topology, learning method, and input data preprocessing. The objective is to get the best of diagnosis truth, truth average, required time, ability to reach the target for some learning processes by Nguyen-Widrow initialization that has random character.

The Results of this research indicate that multi layer perceptron that was joined by self organizing feature map with fuzzy preprocessor and also resilient backpropagation learning method artificial neural network topology is the best choice. The results were obtained by comparing with other investigated topology in this research. The artificial neural network is also better than conventional method of keygas and gas ratio, MVG method, expert system and Roger fuzzification were developed by Wong (2000) for cases of investigated transformer in this research so that this artificial neural network method can be expected to replace diagnosis expert.