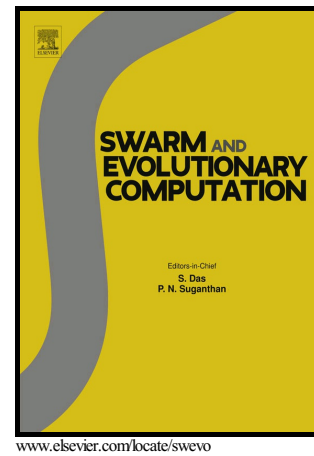


Author's Accepted Manuscript

Evolutionary Multi-Objective Fault Diagnosis of Power Transformers

Abdolrahman Peimankar, Stephen John Waddell, Thahirah Jalal, Andrew Craig Laphorn



PII: S2210-6502(16)30169-9
DOI: <http://dx.doi.org/10.1016/j.swevo.2017.03.005>
Reference: SWEVO264

To appear in: *Swarm and Evolutionary Computation*

Received date: 1 August 2016
Revised date: 7 February 2017
Accepted date: 21 March 2017

Cite this article as: Abdolrahman Peimankar, Stephen John Waddell, Thahirah Jalal and Andrew Craig Laphorn, Evolutionary Multi-Objective Fault Diagnosis of Power Transformers, *Swarm and Evolutionary Computation*, <http://dx.doi.org/10.1016/j.swevo.2017.03.005>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Evolutionary Multi-Objective Fault Diagnosis of Power Transformers

Abstract

This paper introduces a two step algorithm for fault diagnosis of power transformers (2-ADOPT) using a binary version of the multi-objective particle swarm optimization (MOPSO) algorithm. Feature subset selection and ensemble classifier selection are implemented to improve the diagnosing accuracy for dissolved gas analysis (DGA) of power transformers. First, the proposed method selects the most effective features in a multi objective framework and the optimum number of features, simultaneously, which are used as inputs to train classifiers in the next step. The input features are composed of DGA performed on the oil of power transformers along with the various ratios of these gases. In the second step, the most accurate and diverse classifiers are selected to create a classifier ensemble. Finally, the outputs of selected classifiers are combined using the Dempster-Shafer combination rule in order to determine the actual faults of power transformers. In addition, the obtained results of the proposed method are compared to three other scenarios: 1) multi-objective ensemble classifier selection without any feature selection step which takes all the features to train classifiers and then applies MOPSO algorithm to find the best ensemble of classifiers, 2) a well-known classifier ensemble technique called random forests, and 3) another powerful decision tree ensemble which is called oblique random forests. The comparison results were favourable to the proposed method and showed the high reliability of this method for power transformers fault classification.

Keywords:

Multi-objective optimization, feature selection, ensemble classifiers, power transformers, fault diagnosis, dissolved gas analysis

1. Introduction

Today power companies can deliver higher quality of services to their clients by performing intelligent asset management activities and reducing operating costs. One of the most critical asset classes to deliver electric power is power and distribution transformers whose risk of failure

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات