CLASSIFICATION OF DISTRIBUTION TRANSFORMER USING CLUSTER ANALYSIS

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ABSTRACT

This paper presents a methodology for classification transformer using Euclidean distance and cluster analysis. A number of transformers and are stored together with the corresponding load profiles in a database of patterns. The classification of a transformer not included in the database is obtained by comparing the transformer's actual load profile to the ones stored in the database. The purpose of 6 other transformers that were not included in the database is to evaluate the efficiency of each technique employed for classifying the group of transformers.

This paper describes how this can be done when using the Euclidean distance. A supervised classifier using cluster and Euclidean distance in MATLAB provides an efficient and accurate classification method to separate load data into clusters base on their properties. Therefore, features are extracted from the data set, and these features are formed into feature clusters in order to identify patterns in signals as they are related to various physical behaviors of the system. The classifier curves are classes of data being separated into groups based on their characteristics and behaviors.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

Transformers are some of the most efficient electrical machines, with some large units able to transfer 99.75% of their input power to their output. Transformers come in a range of sizes. All operate with the same basic principles, though a variety of designs exist to perform specialized roles throughout home and industry.

In general, a transformer's performance is not affected by the type of loads they serve. However, in recent years, advances in the design of power supplies for various types of office equipment (particularly the personal computer) and SCR drives has presented some unusual problems.

Transformers convert AC electrical energy at one voltage level into AC electrical energy at another voltage level. They are essential for the operation of a modern power system, since transformers allow power to be transmitted with minimal losses over long distance [!]•

The procedure used in Malaysia for distribution transformer loading management is based on the expected loss of life .The loss of life is computed using forecasted demand (kVA) values that are obtained from a statistical correlation between demand and energy (statistical kVA, or kVA's function). Instead of the kVA's function the proposed approach used the transformer daily load profile [2], [3].

Distribution transformers are widely dispersed with each transformer serving relatively few customers; typically one or twelve residential customers, or often a single commercial customer, per transformer. Thus, the transformer loads are not very diversified and can vary widely in magnitude over a relatively short period of time.