شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

MONA MAGHRABY

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التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

DIAGNOSIS OF ROTARY MACHINES FAULTS USING ARTIFICIAL INTELLIGENCE

By

Mostafa Hussien Metwally Ahmed

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
In
Mechanical Design and Production Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Under the Supervision of

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Title of Thesis:

Diagnosis of Rotary Machines Faults Using Artificial Intelligence

Key Words:
Fault diagnosis for bearings, Artificial Neural Networks (ANNs), Adaptive Neuro-Fuzzy Inference System (ANFIS), Time Domain Features, and Auto-Regressive (AR) Model.

Summary:

This thesis employs three methods for diagnosing the bearing faults based on Fast Fourier Transform (FFT), Artificial Neural Networks (ANNs) and Adaptive Neuro-Fuzzy Inference System (ANFIS) models. The obtained data was classified into four main conditions: Healthy, Outer Faulty, Inner Faulty, and Ball Faulty. The four conditions were imported to ANN and ANFIS models. The input data was preprocessed before entering to ANN and ANFIS models by using three techniques: the normalized data in range (0-1), the time domain features, and finally the Auto Regressive (AR) model. The accomplished outcomes of ANN and ANFIS models in case of AR model give high accuracy results in classification issue.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Mostafa Hussien Metwally Ahmed Date: / / 2020

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Acknowledgment

Glory is to Allah almighty, the lord of the world and blessings upon his beloved messenger and Prophet Muhammad (peace be upon him). Praise is to Allah for helping me to complete this work and relieving me during hard times.

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Table of Contents

List of Tables

List of Figures