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3.3.2 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

3.3.2.1. Total number of books and chapters in edited volumes/books published and papers in national/ international conference proceedings year wise during last five years

Year	2022-23	2021-22	2020-21	2019-20	2018-19
Number	07	06	03	02	01

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Cover Page / First Ppage of the Publication

Security threats in Fog computing environment: Enhancing Multimodal Biometric Authentication by Feature Level Optimization in Edge and Fog Paradigm

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Abstract

The widespread adoption of Fog computing has ushered in new possibilities for efficient data processing and reduced latency at the network edge. However, the integration of edge and fog devices into the computing ecosystem introduces security challenges that demand comprehensive solutions. In this research, we address security threats in the Fog computing environment and propose an enhanced multimodal biometric authentication system (MBAS) that leverages face, ear, and hand vein images. Feature extraction techniques using Independent Component Analysis (ICA) and Linear Discriminant Analysis (LDA) are applied to enhance the discriminative power of the biometric traits. To further improve the accuracy of authentication, we employ a feature fusion mechanism based on Grade Level. Multi-Objective Mode Optimization Genetic Algorithm (MOMGA) feature selection is used to select the most relevant and discriminative features for classification. The authentication process is performed using the K-Nearest Neighbors (KNN) classifier. The effectiveness of the proposed method is evaluated using a real-world dataset comprising face, ear, and hand vein images collected from a diverse set of individuals. Experimental results demonstrate that the proposed approach achieves superior authentication accuracy compared to conventional biometric systems. Additionally, the use of MOMGA feature selection enhances the model's generalization capability and improves the system's resistance to attacks.

Keywords: Fog computing, multimodal biometric authentication, Independent Component Analysis, Linear Discriminant Analysis, Grade Level fusion, Multi-Objective Mode Optimization Genetic Algorithm.

1. Introduction

Fog computing has emerged as a promising paradigm that extends the capabilities of cloud computing closer to the edge of the network, thereby enabling faster data processing and reduced latency for applications and services [1]. However, the integration of edge and fog devices into the computing ecosystem introduces new security challenges that need to be addressed to ensure the confidentiality, integrity, and availability of data and services. Various researches [2] aims to explore security threats in the fog computing environment and propose an enhanced MBAS using feature-level optimization within the edge and fog paradigm. The rapid growth of Internet of things (IoT) [3] devices and the increasing demand for real-time data processing has led to the adoption of fog computing as a viable solution. Fog computing's ability to handle data at the network edge has shown promising benefits, such as improved response times and reduced data transfer to the cloud. Nevertheless, this shift also opens new attack vectors, as edge and fog devices may lack robust security measures compared to traditional centralized cloud data

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Enhancing Resource Utilization and Performance in IoT with Fog Computing: A Novel Data Migration Approach Using SCCSO and SCPSO

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Abstract

Recently, the rapid growth of data in Internet of Things (IoT) environments has led to significant advancements in fog and mobile edge computing. However, these technologies face challenges in terms of inefficient scheduling, which can result in larger delays compared to traditional cloud computing. Moreover, security and privacy concerns arise due to the diverse range of services offered in the consumption areas of IoT devices. To address these issues, a data migration procedure is proposed in the fog computing paradigm to optimize metrics such as latency, response time, and effective resource utilization. In this approach, Sequence Cover Cat Swarm Optimization (SCCSO) and Sequence Cover Particle Swarm Optimization (SCPSO) are employed in the data migration process to efficiently allocate resources in the fog environment. The main goal is to minimize the replication and integration of data present in the cloud communication storage environment. Using these optimization protocols, the data migration process aims to achieve better performance compared to other scheduling algorithms. To evaluate the effectiveness of the proposed approach, extensive testing is conducted in the iFogsim environment. The results demonstrate that the SCCSO and SCPSO protocols outperform other scheduling algorithms in terms of energy usage, execution time, and average response time. This implies that the data migration procedure contributes to improved resource utilization and overall system performance in fog computing scenarios.

Keywords: Internet of Things, Fog computing, Mobile edge computing, Data migration, Scheduling algorithms, Latency, Response time, Resource utilization, Security, Privacy.

1. Introduction

Fog computing is a decentralized network computing approach that brings memory and computational resources closer to the endpoints, utilizing units among datacenters and IoT devices in various architectures [1]. It employs networking tools such as gateways, exchanges, configuration packages, ground stations, and tunnels, each with dedicated networking, storage, and compute services. The term "fog computing" was first coined by Linksys to address the limitations of cloud computing [2]. Fog computing has become a powerful solution in industries like healthcare, smart glasses, and entertainment. It works in conjunction with cloud environment components to reduce processing times, speed up computations, and lower costs [3]. There are two types of edge devices: resource-rich cloudlets, which act as covered cloud data centers and offer mobile devices substantial processing power with low latency, and energy-efficient devices like access points, preconfigured boxes, and base stations. The growing interconnection of IoT-based smart solutions [4], such as home automation, sustainable cities, transportation, monitoring devices, and wearable computing, has captured the interest of academia and businesses. However, the

Recent Trends in Product Design and Intelligent Manufacturing Systems pp 303–313

Analytical Hierarchy Process Strategy for Assessment of Overall Equipment Effectiveness

Dillip Kumar Biswal ✉, Kamalakanta Muduli & Jitendra Narayana Biswal

Conference paper | First Online: 06 October 2022

Part of the book series: Lecture Notes in Mechanical Engineering ((LNME))

Abstract

Overall Equipment Effectiveness is a widely used and customary indicator for evaluating industrial performance. Overall Equipment Effectiveness (OEE) of a system is a metric that integrates availability, performance, and quality into a single dimension to

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Recent Trends in Product Design and Intelligent Manufacturing Systems pp 315–326

Plant Layout Improvement Using CRAFT: A Case of Food Packaging Unit

Dillip Kumar Biswal, Kamalakanta Muduli ✉ & Jitendra Narayan Biswal

Conference paper | First Online: 06 October 2022

601 Accesses | **1** Citations

Part of the book series: Lecture Notes in Mechanical Engineering ((LNME))

Abstract

The focus of the study was to improve the existing layout of food packaging unit of an Agri-product industry. In the packing section, there are four packing processes in four different workstations where two workstations are comprised of three vertical packing machines (VPMs) each, one

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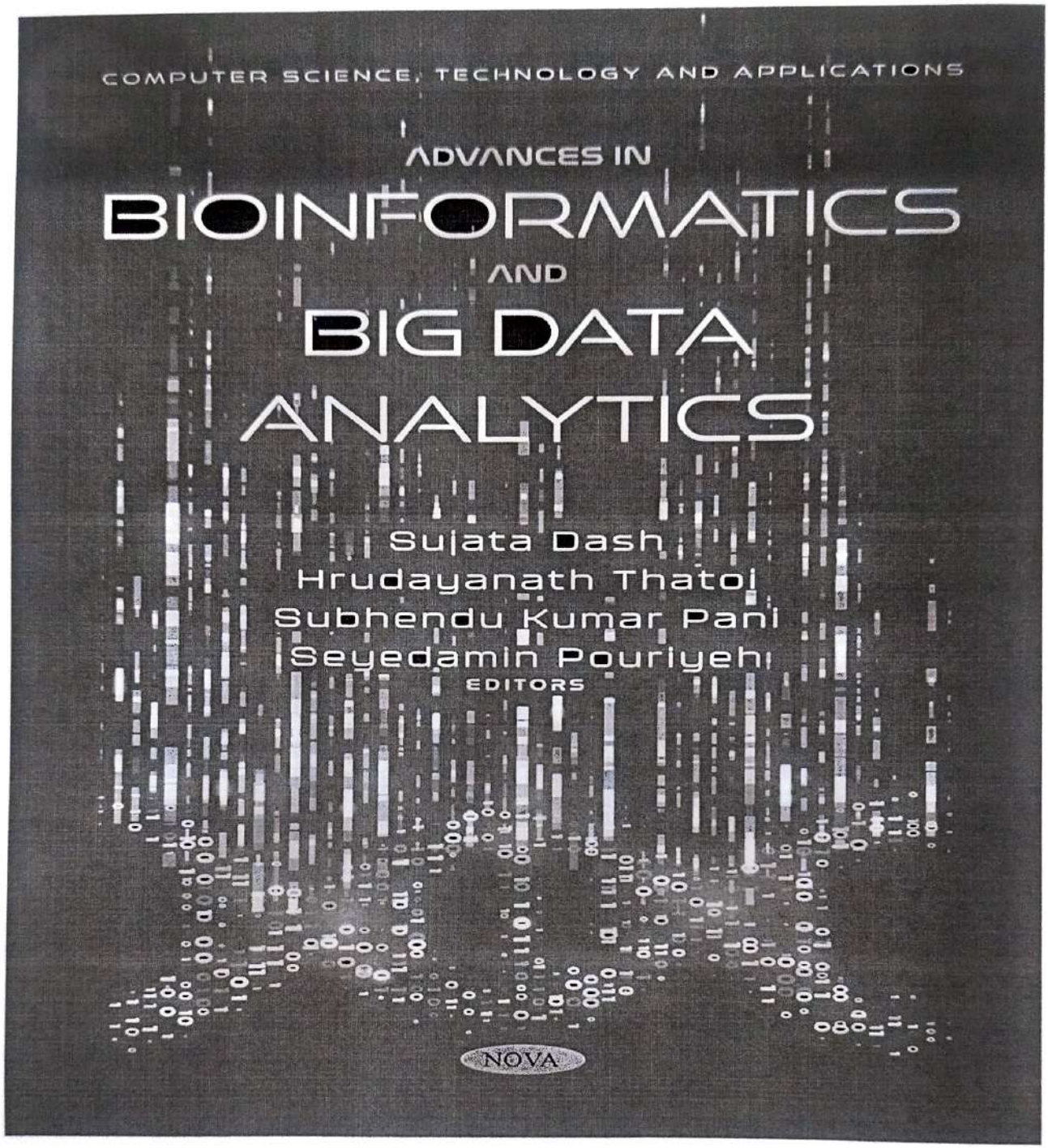
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Organised by Indian Institute of Information Technology Pune
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December 29-30, 2022

E-CERTIFICATE OF PARTICIPATION

Biswaranjan Sarangi

presented the paper titled "**Deep learning based approach for outlier detection in Wireless Sensor Network**" authored by **Biswaranjan Sarangi, Biswajit Tripathy** in the 3rd International Conference on Computational Intelligence held during December 29-30, 2022.

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Outlier detection in Wireless Sensor Network for Health Care: A statistical approach

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Abstract— **A wireless sensor network in the healthcare system collects data from remotely observed patients using contemporary medical sensors and a reliable network. The sensors used to generate a large amount of data. Two types of unusual events that may occur during data generation are anomaly data from malfunctioning sensors that causes a false alarm or data from a reliable sensor that reports abnormal values that causes a medical emergency in the patient's health condition. To improve remote patient monitoring systems and provide better healthcare, researchers must find out how to distinguish between a genuine medical emergency and a false alarm. This study recommends utilizing Spearman's rank correlation and simple linear regression to detect outliers in medical wireless sensor networks. The outliers are identified using regression with high detection accuracy and a low false alarm rate.**

Keywords—Outlier ,Wireless Sensor Network, Correlation, Regression analysis

I. INTRODUCTION

Sensor nodes in wireless sensor networks (WSNs) are likely to function remotely without human intervention and are therefore prone to failure. An outlier is a sensor reading that deviates considerably from the normal pattern, resulting in abnormal data [1]. Sensor nodes face a variety of limitations, including poor processing speed, limited memory, limited energy resources, and low transmitter power. Numerous medical sensors, such as MICAZ, TelosB, and IRIS, are used to remotely monitor a patient's health by recording the values of various physiological parameters [2]. Heart rate, blood pressure, pulse rate, respiration rate, and oxygen saturation in the blood are all highly correlated, which means that when blood pressure rises, so does pulse rate. The pulse oximeter monitors the pulse and blood oxygenation ratio, which is greater than 95 percent with a typical pulse rate ranging from 80 to 120 beats per minute. If this ratio or range changes, a medical emergency arises, indicating a lung issue. Data provided by faulty sensor nodes may result in incorrect diagnoses, potentially leading in life-threatening complications for patients. Outliers must be identified immediately and precisely in order to reduce false alarms. Outlier detection is therefore important to real-time decision-making and vigilance.

To the best of our knowledge, most traditional outlier detection algorithms do not detect outliers in real time and are unconcerned with the correlation between different sensors connected for a specific purpose. To establish correlation between sensor nodes, the data provided by the sensor nodes must be consistent; otherwise, if one is reporting the correct value while the other is reporting an abnormal value with regard to another, it may be a sensor malfunction or a medical emergency. Here the context of a sensor is to be considered and contextual outlier detection is a less focused area in WSN. Outlier detection is a challenging task for big data as scalability is a major issue.

The main motivation of this paper is to decrease false alarms by considering correlation among different sensors thereby increasing the reliability of the system. The contributions of this paper can be summarized as follows:

- To detect outlier in WSN by obtaining data from standard publicly available MIMIC dataset.
- Spearman rank correlation coefficient and basic linear regression model are used to detect the outliers in real-time.
- The suitability of the proposed outlier detection model is validated using simulation results.

II. RELATED WORK

Researchers have proposed many techniques for detecting outliers in medical sensor data, such as decision trees, support vector machines, majority voting, PCA (principal component analysis), and so on. Multiple attributes of a dataset are related to each other on some context in the contextual outlier identification approach. Generally, different sensors are attached to a patient to record physiological data, and if one sensor value changes, the other sensor value must change as well. The data collected by these sensors every second amounts to large data, which must be managed properly.

Salem et al. [3] employed a decision tree to discover and classify outliers, as well as linear regression as a prediction tool. The difference between the current and estimated values is computed and compared with a threshold value; if found to be more than the threshold value, it is a medical alarm; otherwise, the record is faulty. Because physiological signals are correlated, this technique was not always effective. However, Salem et al. [4] presented a different technique in which anomalous occurrences are recognised using a support vector machine rather than a decision tree. It was based on a set threshold value, but the predefined threshold presented a significant challenge. Salem et al. [5] also presented an alternative method based on the Discrete Wavelet Transform. For timing analysis, Holt-winters and Hample filters were used to detect outliers with Boxplot; however identification of multiple errors was a big concern. However, none of the techniques were adequate for dealing with large amounts of data.

Hayes et al. [6] suggested a method for detecting contextual outliers in large sensor data, however the methodology was confined to only one type of data, tall datasets. The method proved adaptable to large data. Haque

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Advances in Renewable Energy Engineering

This book helps graduate and post graduate students, research scholars, faculty members, academicians, researchers, practical persons and experts to understand the basic and recent advances in the field of renewable energy engineering. It has been designed to meet the needs of these diverse groups. A comprehensive overview, advancements in renewable energy engineering explores how we can use the sun, wind, biomass, geothermal resources and water to generate more sustainable energy. The renewable energy technologies discussed in this book include solar photovoltaic, designing of solar photovoltaic system, solar thermal systems, solar water pumping system, solar energy collection, fuel cell technology, hydro power, wind energy technology, bioenergy, geothermal energy, etc. The book is designed to fulfil the much-awaited need for a handy, scientific, and easy-to-understand comprehensive handbook for design professionals and students of renewable energy engineering courses.

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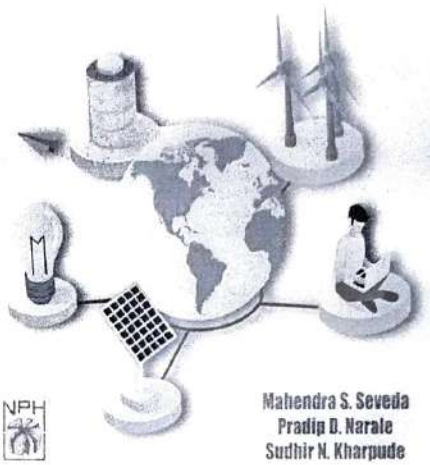
Advances in Renewable Energy Engineering



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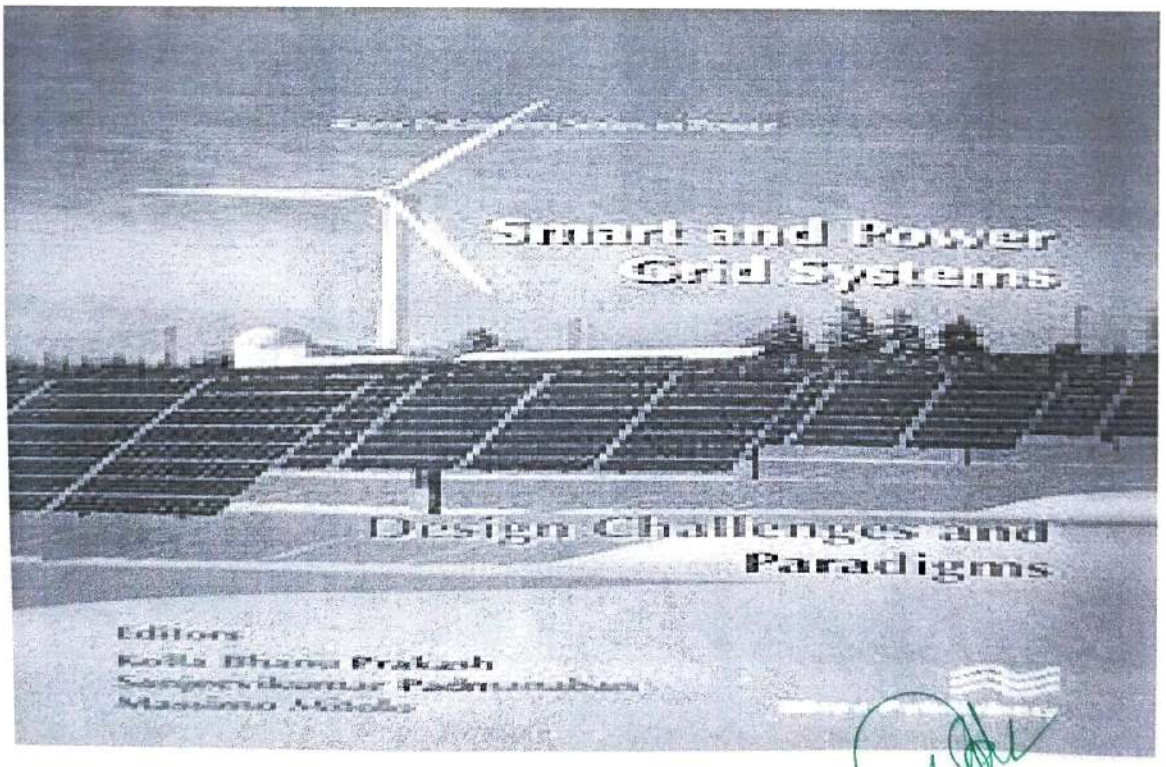

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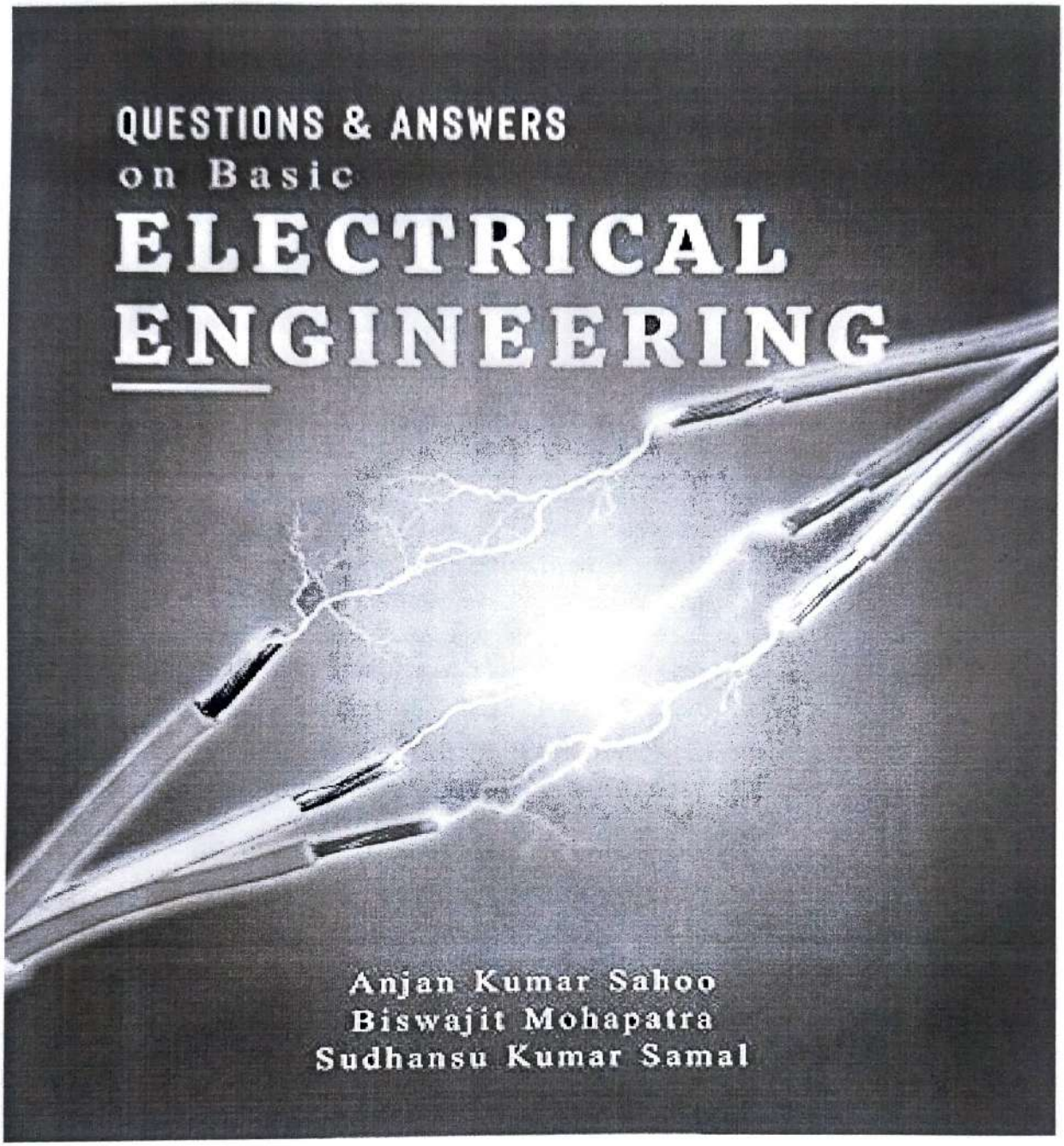

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RESEARCH ARTICLE | NOVEMBER 02 2020

Achieving by sustainable supply chain management in thermal power plants

Babuli Chandra Kar, Suchismita Satapathy, Jitendra Narayana Biswal

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Sustainability in Supply Chain Management (SSCM) is extremely popular among researchers and practitioners since decades due to its multi-approach in nature. Thermal power plants have very bad images among other power generating industries due to its main staple coal, which is that the main source of generating power. Thanks to coal the Environmental performance is diminishing simultaneously decreasing Economic and Social performance, as SSCM is that the integration of Environmental, Social and Economic performance. Since Coal based power plants are in trouble and in target of pollution control panel and facing ecological issues, by adopting SSCM most vital issues like waste management, customer satisfaction and productivity are often achieved. So, during this paper ANN is implemented to seek out the foremost negative parameters of Thermal power plant Sustainable parameter which is creating barrier for customer satisfaction.

Topics
Power plants, Energy analysis, Industry

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Review Article

A Survey on Limitations of Traditional Outlier Detection Techniques for Wireless Sensor Networks

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I N F O

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A B S T R A C T

In Wireless Sensor Networks the major deviations from the sample of sensed data are regarded as outliers which include noise, errors and malevolent attack on the network. Detection of outlier is used to filter noisy data, locate faulty nodes, and find out interesting events. Conventional outlier detection techniques are not directly related to wireless sensor networks due to the nature of sensor data which is univariate and multivariate. This paper gives an outline of traditional outlier detection techniques and their limitations. Further we also discuss about a technique-based classification with characteristics of outlier data and their limitations.

Keywords: Outlier, Outlier Detection, WSN, Classification, Machine Learning

A Wireless Sensor Network (WSN) is basically the latest development of Moore's Law in the direction of the tininess and omnipresence of computing devices. Normally, a wireless sensor node composed of sensing, computing, communication, and power components. These components are integrated on a tiny single or multiple boards. Usually a wireless radio transceiver, a power source, a small microcontroller, and many type of sensors such as temperature, pressure, humidity, light, heat, sound, and vibration are out fitted with each node. A number of sensors used to monitor and collect information from the environment and send the information to a central location.

Wireless Sensor Networks (WSNs) have been used with success in critical application scenarios, such as remote patient health monitoring, environmental monitoring, structural monitoring of engineering structures and military surveillance, where the dependability of WSNs becomes an important factor. WSNs densely distributed over a geographically area and individual nodes autonomously communicate and interact with each other over the wireless medium. The information obtained from the WSNs has to be accurate and complete. Analysis of data collected from sensor at timely manner is of high importance. Raw data collected often suffer from inaccuracy and incompleteness due to following reasons: (i) the low cost sensor nodes having rigorous resource constraints such as battery power, computational capacity, memory and communication bandwidth; (ii) sensor nodes operations are frequently vulnerable to harsh and unattended environment effects and; (iii) sensor nodes are susceptible to malicious attacks such as dissent of eavesdropping, service attacks, and black hole attacks.[2] For making high data quality, more data reliability and effective, identification of erroneous data is essential.

In this paper we look at i) outliers in WSN, ii) desirable properties of outlier detection techniques, iii) compare the usefulness and limitations of the different techniques. The rest of paper is structured as follows: Section II describes

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A GENERAL STUDY ON FEATURE SELECTION FOR CANCER CLASSIFICATION

Santosini Bhutia (IGIT, Sarang, India), Biswajit Tripathy * (GITA, Bhubaneswar, India)

Abstract:

In the context of cancer research microarray experiments are the most powerful mechanism for the diagnosis of disease. It has the ability to identify the characteristics of gene expression pattern. But DNA microarray experiment produces a huge number of features or genes which is usually more than thousands for a few number of samples or subjects which is less than hundreds [1]. To date this problem there are various efficient classification and good feature selection methods are implemented to reduce the complexity and advance the cost. In this paper we on the methodologies for feature selection to identify important genes that improve the accuracy of classification.

Keywords:

Microarray data, Feature Selection, Classification methods

***Corresponding Author**: biswajit.cse@gita.edu.in*

I. INTRODUCTION

In the last two decades a newfangled area of research has been enlarging in Biology, Bioinformatics and Machine Learning. These fields of interest are analyzed by microarray gene expression data. It is a big challenge for the researchers to investigate from a large number of genes using traditional methods. DNA microarray is one of the popular technologies for the solution. It enables the researchers to examine and find out the condition of the growth and development of life and also analyze the genetic cause of abnormality arising in the functioning of the individual. In recent studies, one of the application DNA microarray technologies is to learn about various diseases like heart disease, mental illness, infectious disease and the study of cancer. Formerly the types of cancer are classified by the organs in which the tumors have been developed. But now it is possible in microarray technology to classify the types of cancer by observing the pattern of gene activity present in the tumor cells. Here we principally focus on tumor classification using gene expression data. In modern days it is a contemporary research area for the researchers to explore in the field of biological and medical science.

DNA microarray cancer gene expression normally brings about enormous number of features which varies from 2000 to 60000, but the datasets assign to minute no of samples that is varies from 20 to 80 [2]. For the sake of enormous number of gene expression and minute number of samples, the classification problem is a challenging work for the researchers. Hence to reduce the ramification and to enhance the efficiency, a robust model is required for feature selection and classification. The classification issue is associates with two distinct type of activity: binary classification and multiclass classification. In binary classification it analyzes the given sample is cancerous or not, and in multiclass classification it analyzes different varieties of tumors.

In the recent years many researchers focus on obtaining the relevant features to improve the classifier accuracy and present significant report to the medical science. The feature selection method selects the optimal features from a huge number of features that are available in real life application. The two basic feature selection methods are filter method and wrapper method.

There are recent studies that focus on the cancer reading through the microarray gene appearance to help the doctors in their diagnosis process. In the last decades, Support Vector Machine (SVM) attracted more attention for classification of binary microarray data from the researchers, and for multiclass microarray data there have been various proposed methods these are DAGSVM, Evolutionary SVM (ESVM), Genetic Algorithm based SVM (GASVM), and Fuzzy SVM (FSVM).

II. FEATURE SELECTION

Feature selection is a crucial matter in classification, which is the process of reducing the dimensionality of huge data to pick up the best path for concession solution. It can also reduce the complexity of the data and relevant for the microarray data. It helps in understanding the higher classification accuracy which is a major research in this area. It involves in anticipating the

Thermal Power Sector Sustainability: A Framework for Sustainable Supply Chain Management

Suchismita Satapathy (/affiliate/suchismita-satapathy/280523/), Jitendra Narayan Biswal

Source Title: Handbook of Research on Ergonomics and Product Design (/book/handbook-research-ergonomics-product-design/187130)

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Abstract

Sustainable supply chain management (SSCM) practices in thermal power plants is dependent on mostly three pillars: social factor, economic factor, and environmental factor. So, in this chapter, sustainable supply chain management of Indian thermal power sector is evaluated. Artificial neural network (ANN) method is implemented to measure whether the benefits of sustainable supply chain management are achieved after practices of sustainable supply chain management in Indian thermal power sector. This chapter also designs a framework by QFD (quality function deployment) method to find solution for some unsatisfactory measures (inputs in sustainable factors) that are not achieved against outputs. As sustainable supply chain management practices in thermal power plants are influenced by a significant number of interrelated enablers and barriers, the drivers or enablers of SSCM are taken as the design requirement to improve SSCM in thermal power industries, and the most important driver is prioritized against the unsatisfied measurands in thermal power sector.

Chapter Preview

Introduction

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Energy or power is one of the most rudiments of modern society. A life without energy is a life without accessing the opportunities by the people provided by the modern world. In a modern society indispensable social services are heavily reliant on a reliable source of energy supply known as electrical energy (Electricity). Without electricity, it is not possible to function effectively the state of health and education of a developing country. Lacking in access to electricity entails growing in problems of health hazards, diseases and improper education. Power is the major contributor and vital source for economic development of any developing country across the globe. This is why accessing energy for all in a modern developing and developed countries is the basic need and prime importance in the global scenario. However, for safe and reliable generation of power through using fossil fuels like coal, is the only way to provide electricity at affordable cost compared to other forms of energy. Being coal as cheapest, it will continue for next 2-3 decades as backbone of generating electricity in global context. With regards to this, Indian economy depends on its power sufficiency making a suitable leading position in world economy. India mostly depends on thermal power plants using coal as fuel, the only fossil fuel easily available in large quantity in the country, to maintain its energy requirement. It has been seen that, energy generated by the coal based thermal power plants is about 50% of the total electrical energy produced in the country (Rao and Kumar, 2014). Growing use of coal in thermal power plants confronts increasing in environmental issues. Thermal power plants using coal as fuel are treated as one of the major sources of environmental pollution across the globe. It causes degradation of land use, air pollution, water contamination, health hazards, greenhouse gas emission, waste generation, degradation of aquatic life, scarce of natural resources etc. (Adham et al., 2015). Increasing serious negative impacts on environmental as well as economic and societal issues by thermal power plants have been faced major challenges since one or two decades (Govindan et al., 2013). Increasing in consumption of natural resources in unsustainable manner, by the thermal power plants results consensus regarding awareness for environmental issues due to arising of incessant pressure from government, society, customers and stake-holders needs to be focused (Tyagi et al., 2015). Owing to this it needs to incorporate and implement sustainable supply chain strategy to deal with various problems and issues associated with supply chain to reduce environmental and societal hazards (Jayaram and Avittathur, 2015; Mathiyazhagan et al., 2014;

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List of Chapter/Book

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