Supporting Documents

3.4.6 **Number of books and chapters in edited volumes published per teacher during 2023-24**

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Sreekantha B. Jonnalagadda and Bubun Banerjee (Eds.)
Solvent-Free Synthesis
Green Bioactive Heterocycles

Green Bioactive Heterocycles

Series Editor
Bubun Banerjee

Volume 4

Solvent-Free Synthesis

Bioactive Heterocycles

Edited by
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4 Synthesis of nitrogen-containing heterocyclic rings using grinding approach

From the book Solvent-Free Synthesis

Simranpreet K. Wahan, Gaurav Bhargava and Pooja A. Chawla

https://doi.org/10.1515/9783110985467-004

Citations 1

Simranpreet K. Wahan, Gaurav Bhargava, and Pooja A. Chawla*

4 Synthesis of nitrogen-containing heterocyclic rings using grinding approach

4.1 Introduction

Given the importance of nitrogen-containing heterocycles in natural and synthesized essential molecules [1–3], the development of their synthetic methods has been an area of research interest for scientists for many years. The most common technique for preparing heterocyclic compounds involves the cyclization reaction of reacting substrates [4–6]. Nitrogen-containing heterocycles have been designed using various techniques involving high temperatures, an excess of environmentally hazardous organic solvents and catalysts, lengthier reaction durations, poor yields, and onerous product isolation methods, notwithstanding their potential utility [7–15]. Also, many of these methods use expensive chemicals and metal triflates and take a long time to complete [16–21]. They also generate a lot of toxic, corrosive waste products and require additional energy sources, including high-powered microwave irradiation [22–24] or ultrasound [25–28]. However, the development of economically straightforward and ecologically safe synthetic organic chemistry processes is generating more interest than ever at the turn of the new century. The expansion of "green chemistry" is becoming an area of great interest. Green chemistry techniques can significantly reduce energy use, waste production, and by-products while also opening up new avenues for synthesizing previously unattainable materials [29–34]. Solvent-free organic reactions from grinding have gained a lot of attention in recent years due to their numerous benefits, which include high efficiency and selectivity, simplicity in separation and purification, milder reaction conditions, and waste reduction. These are advantageous to the environment and the industry [35–38]. Due to the proximity of the reactants, solvent-free organic reactions, based on grinding the macroscopic particles, typically entail the creation of a liquid phase before the reaction; specifically, a uniformly distributed eutectic melt resulted in increased reactivity and shorter reaction duration [39–41]. Therefore, there is still a need for milder, safer, recyclable, and environmentally friendly approaches for the synthesis of nitrogen-containing heterocycles playing a vital role. The present chapter fo-

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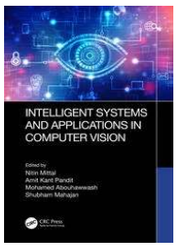

Corrected components of Zernike Moments for improved content based image retrieval

A comprehensive study

By Pooja Sharma (/search?contributorName=Pooja Sharma&contributorRole=author&redirectFromPDP=true&context=ubx) (https://orcid.org/0000-0001-7492-2436)

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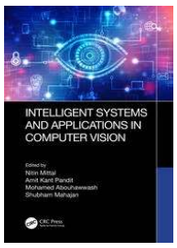

Discriminative features selection from Zernike moments for shape based image retrieval system

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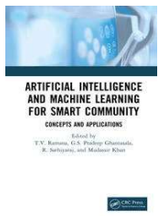

Artificial Intelligence and Machine Learning for Smart Community

Concepts and Applications

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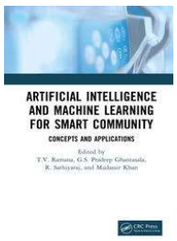

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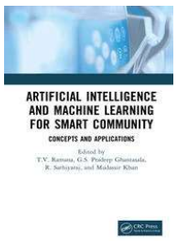

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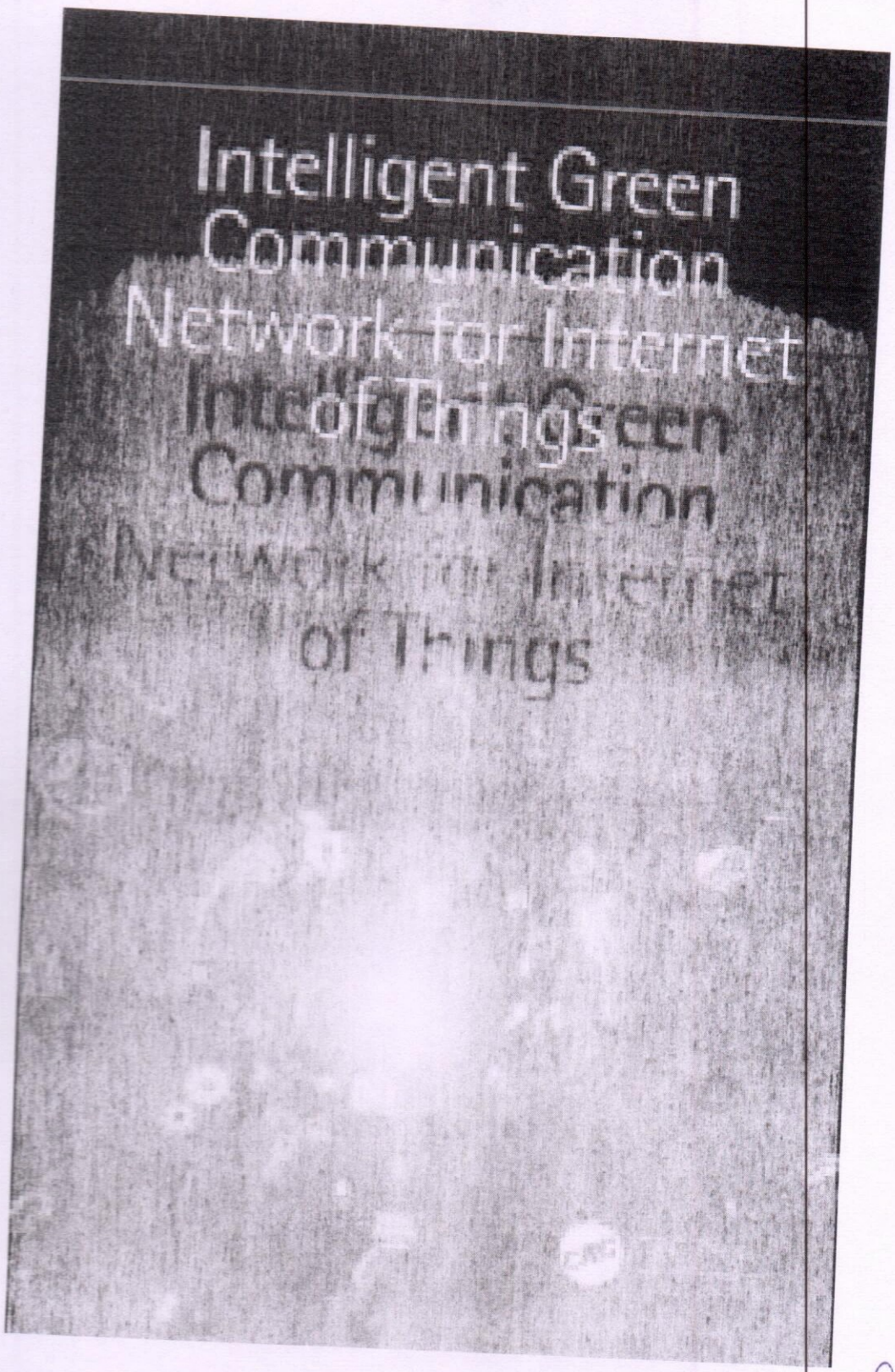

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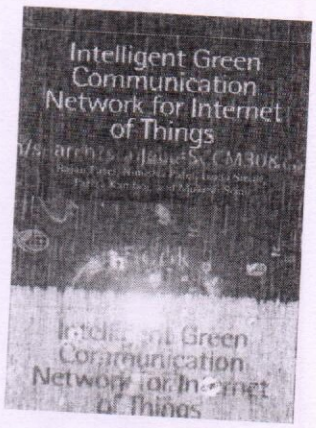

Intelligent Green Communication Network for Internet of Things

Edited By Rajan Patel (/search?contributorName=Rajan Patel&contributorRole=editor&redirectFromPDP=true&context=ubx), Nimisha Patel (/search?contributorName=Nimisha Patel&contributorRole=editor&redirectFromPDP=true&context=ubx), Linda Smail (/search?contributorName=Linda Smail&contributorRole=editor&redirectFromPDP=true&context=ubx), Pariza Kamboj (/search?contributorName=Pariza Kamboj&contributorRole=editor&redirectFromPDP=true&context=ubx), Mukesh Soni (/search?contributorName=Mukesh Soni&contributorRole=editor&redirectFromPDP=true&context=ubx)

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ABSTRACT

The text covers the advanced and innovative concept of green communication networks using the Internet of Things in different fields including cloud technology, agriculture, the automobile sector, and robotics. It will also help readers in learning the efficient use of sensors and devices in the Internet of Things networks. The text covers 5G communication and its application for intelligent and green network-enabled Internet of Things.

This book

• Discusses intelligent and green networking-enabled Internet of Things

• Covers architectures and models for intelligent and green communication networks-enabled Internet of Things

• Discusses designing Internet of Things devices that help in reducing the emissions of CO2 in the environment and energy consumption

• Highlights green computing approach and green communication network designs and implementations for Internet of Things ecosystem

• Includes studies on energy-aware systems, technologies, and green communication

This book comprehensively discusses recent advances and applications in the area of green Internet of Things communication in a single volume. It will serve as an ideal reference text for senior undergraduate and graduate students, and academic researchers in the fields of electrical engineering, electronics and communication engineering, computer engineering, and information technology.

Chapter 1 | 12 pages

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Need, architecture, applications, challenges, and future scope

By Dulari Bhatt, Madhuri Chopade, Alpa Oza, Rajan Patel, Nimisha Patel

Abstract

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Future direction and open challenges

By Menka Patel, Rajan Patel, Nimisha Patel

Abstract

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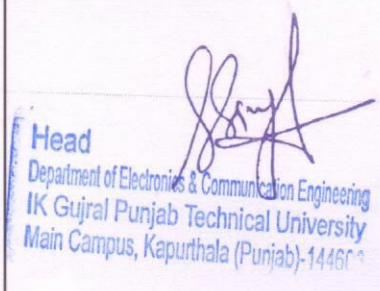

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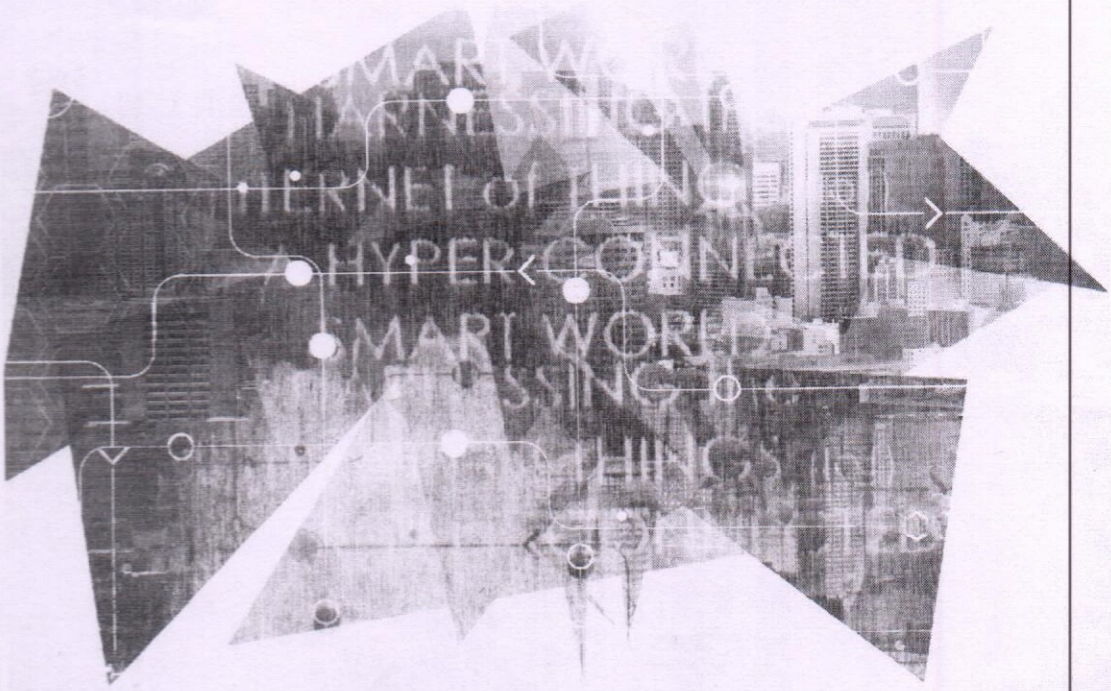
HARNESSING the INTERNET of THINGS (IoT) For A HYPER-CONNECTED SMART WORLD



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3.4.6

Chapter 9
Navigating the Metaverse: A Comprehensive Guide to Marketing, Branding, and Innovation

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ABSTRACT

Delving into the dynamic intersections of augmented reality, artificial intelligence, blockchain, and spatial computing, this chapter offers strategic insights for brands seeking to establish a meaningful presence. From the evolution of brands in virtual environments to future trends, technological predictions and challenges, this chapter acts as a strategic roadmap. It addresses the needs of academic researchers, students, executives, and practitioners by synthesizing current research, offering practical applications, and proposing solutions. The chapter bridges the gap between theory and application, fostering a deeper understanding of the metaverse's impact on marketing, branding, and innovation. Aiming to be a valuable resource, the chapter equips a diverse audience with insights into the evolving metaverse landscape, providing a foundation for academic exploration and practical application.

INTRODUCTION

The late 1990s saw a significant disruption and radical transformation of strategic and operational practices due to the advent of the internet (Buhalis, 2003). Additionally, social media has reshaped how conventional marketing mix components are employed to engage with customers (Upadhyay et al., 2022). Nowadays, the metaverse combines advanced tech, changing consumer behavior and industry impacts. This chapter seeks to illuminate the intricate tapestry of these elements, offering a strategic compass for professionals, scholars and enthusiasts navigating the expansive landscape of the meta-

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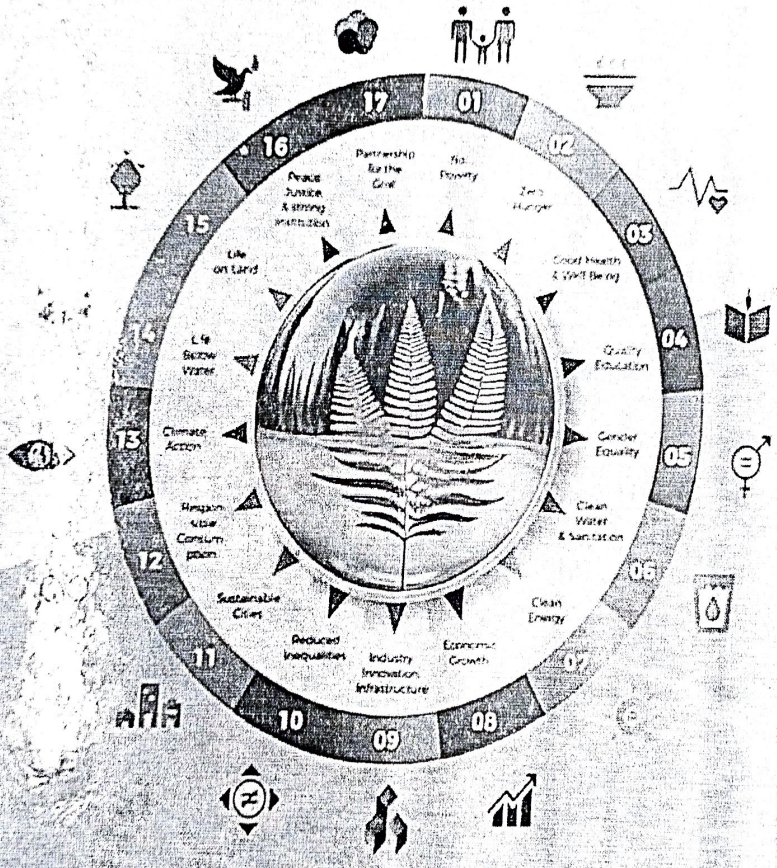
SUSTAINABLE DEVELOPMENT GOALS

A Managerial Perspective



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Navigating the Dynamic Workplace: Strategies for Building Sustainable Careers

Dr. Rajpreet Kaur[1], Dr. R. K. Gupta[2] & Rupesh Kumar[3]
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1. INTRODUCTION

In the rapidly evolving landscape of work, the concept of a traditional career path has shifted towards a more dynamic and flexible approach. The Sustainable Careers delves into the essential strategies and skills required for individuals to navigate this dynamic workplace successfully. As highlighted in the document, the future of work is already here, emphasizing the need for continuous learning, adaptability, and a proactive mindset to thrive in today's job market. Employers are increasingly seeking individuals with a diverse skill set that goes beyond technical expertise. Soft skills such as communication, problem-solving, and emotional intelligence are becoming equally crucial for career sustainability. Moreover, the document stresses the importance of aligning personal growth with environmental and social responsibility, reflecting the changing values in modern workplaces. Sustainable careers are described as the series of diverse career experiences an individual undergoes, manifested through various patterns of consistency over time, spanning multiple social contexts, and defined by individual empowerment, thereby attributing significance to the individual (Van der Heijden & De Vos, 2015, p. 7). This definition encapsulates four key aspects of sustainable careers: duration, social environment, empowerment, and significance (De Vos et al., 2016). A sustainable career viewpoint focuses on the interplay between individuals' career development and organizational dynamics. It aims to challenge the overly self-directed and impermanent notions of boundaryless and protean career perspectives, specifically the idea that individuals shape their careers without considering employers' requirements (e.g., Arthur

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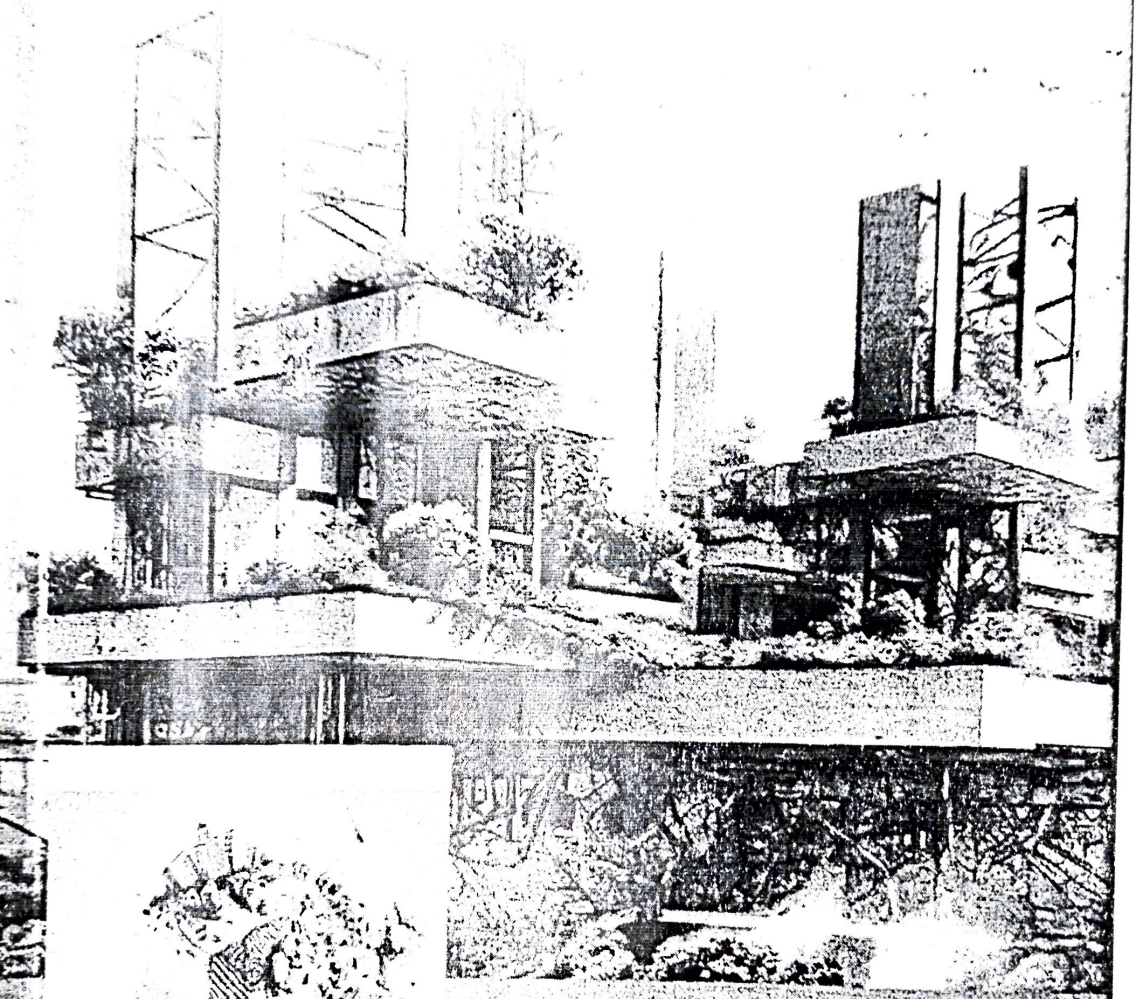
Sustainable Development in Engineering

Shaping Tomorrow's Solutions



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Harnessing Renewable Energy Technologies for Sustainable Power Generation

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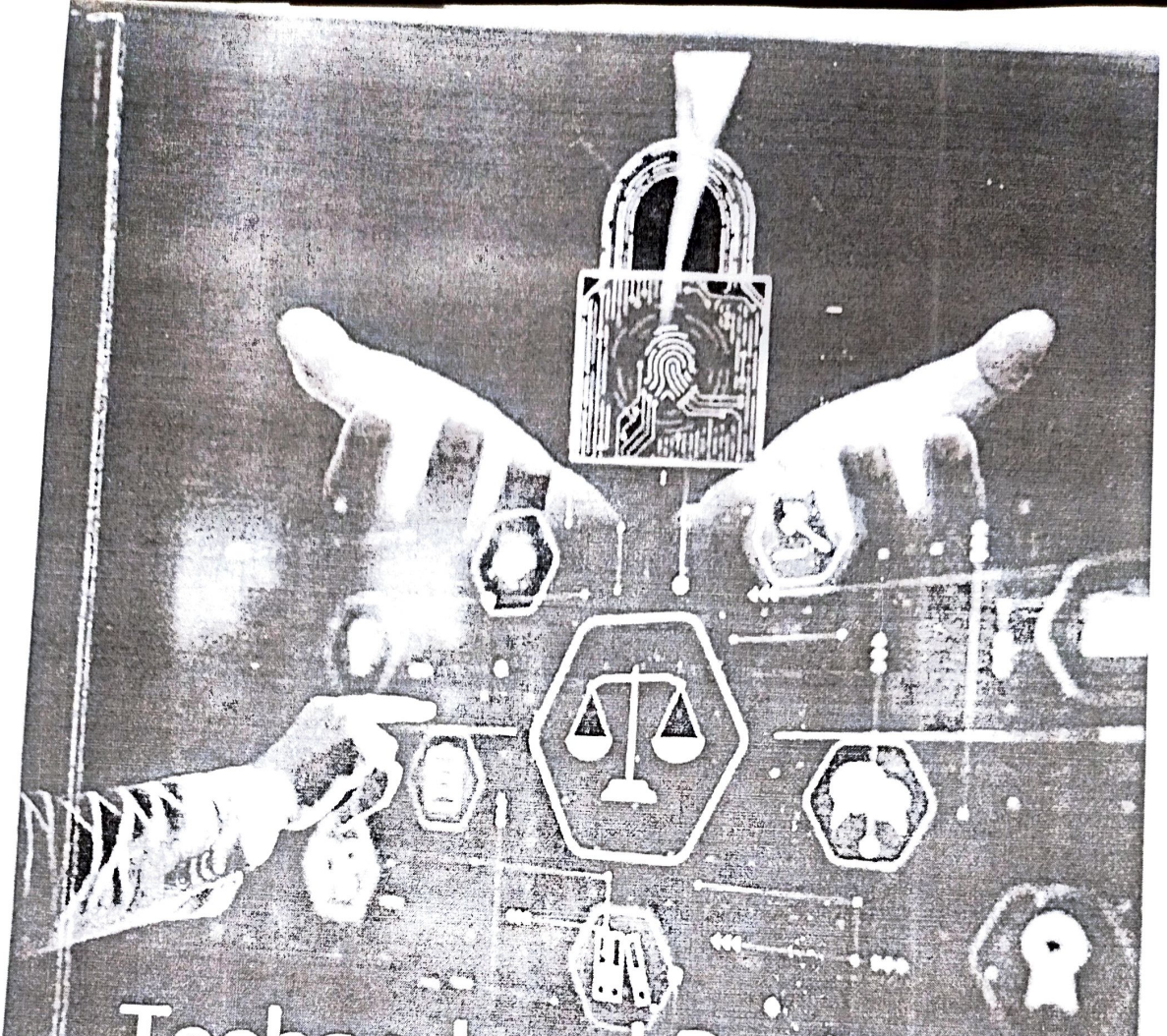
Abstract

In the face of environmental degradation, geopolitical tensions, and socioeconomic disparities resulting from the reliance on fossil fuels, this paper explores the imperative shift towards sustainable power generation through the exploration and implementation of renewable energy technologies. The interconnected and dynamic nature of today's world demands a proactive approach to address the pressing need for alternative energy sources. This abstract outline the key components of the paper, including an introduction to the current energy landscape, the challenges posed by fossil fuel dependency, and the significance of embracing renewable energy technologies for a more sustainable future.

Introduction

In today's dynamic and interconnected world, the quest for sustainable energy sources has become imperative. The reliance on fossil fuels, while providing energy security for decades, has also engendered detrimental consequences, including environmental degradation, geopolitical tensions, and socioeconomic disparities. In response to these challenges, the exploration and implementation of renewable energy technologies have emerged as pivotal pathways towards sustainable power generation.



Techno-Legal Business Environment in India

Issues and Challenges

Prof. Pardeep Singh Walia
Dr. Pankaj Nanglia
Prof. (Dr.) Nitin Lasta
Dr. Sunil Thakur

VB

CHAPTER 1

"Navigating the Nexus: Exploring Issues and Challenges in India's Techno-Legal Business Landscape"

Dr. Rajpreet Kaur[1], Er. Kiranjit Kaur[2], & Dr. R. K. Gupta[3]

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Introduction

In the dynamic landscape of India's business environment, the intersection of technology and legal frameworks has given rise to a distinctive paradigm known as the Techno-legal business environment. This confluence reflects the growing influence of technological advancements on the legal landscape, shaping the way businesses operate, interact, and navigate the complex regulatory terrain in the country. As India strives to position itself as a global economic powerhouse, the interplay between technology and legal frameworks has become a critical factor influencing the trajectory of businesses across diverse sectors.

This intricate relationship between technology and law brings forth a myriad of issues and challenges that businesses operating in India must grapple with. From the rapid digitization of processes to the evolving cyber threats, and the complexities arising from legal compliance, the Techno-legal business environment demands a nuanced understanding to thrive in an era where innovation and legal adherence are inextricably linked. This introduction delves into the key issues and challenges faced by businesses in navigating the Techno-legal landscape in India, shedding light on the intricacies that define this dynamic intersection and influence the strategic decisions of enterprises in the country.

Review of Literature:

The definition of technology often lacks clarity in scholarly studies, possibly because

CHAPTER 14

Artificial Intelligence and Its Applications in Human Resource Management

Megha Dabhade[1], Dr. Rajpreet Kaur[2], Dr. R. K. Gupta[3]

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Introduction:

Applications of artificial intelligence (AI) in everyday life and work are no longer part of the distant future but the current reality. Machine learning (ML) algorithms already work extensively on the Internet, analysing big data and providing knowledge of user preferences to predict their future behaviours [1].

Furthermore, AI encompasses various areas, such as robotics, natural language processing (NLP), ML algorithms, computer vision, expert systems and others [2]. Since most of these elements (e.g. NLP. ML algorithms, etc) are nowadays harnessed and integrated in one robotic system, the broader term the system of artificial intelligence is being used [3]. Human capital is a vital resource in contemporary organization and the only asset that organization cannot legally possess [4]. Utilizing human capital requires not only the administrative function (i.e. employee records, attendance, vacations, sick leave, regulation of legal issues, etc.) but also knowledge of psychology (e.g. to recognize job saturation, the appropriate position for the employee, etc.), leadership skills and other so-called hard and soft skills [5]. With the advent of artificial intelligence applications, human resources are gaining a new dimension, where the traditional is slowly moving to an intelligent (cognitive) approach.

1. Artificial Intelligence and Machine Algorithms:

Artificial Intelligence is a field of computing that deals with the development of machine intelligence, i.e. the systems that mimic the cognitive functions of the human

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MANAGEMENT METAMORPHOSIS: NAVIGATING THE CHANGING LANDSCAPE

JAI KUMAR SHARMA
KULDEEP SINGH
PRERNA MALHOTRA

EMPLOYEES' PERCEPTION ABOUT HR ACTIVITIES IN THE BANKING SECTOR

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ABSTRACT

Banking constitutes the fundamental basis of economic growth. In banking, HR activities encompass a wide range of functions crucial for maintaining a motivated and efficient workforce. It plays a pivotal role in fostering a positive organizational culture and ensuring adherence to ethical standards and industry best practices. This study investigates employees' perceptions regarding HR activities at Kotak Mahindra Bank in Mohali. It aims to achieve several objectives, including assessing the satisfaction process of recruitment, evaluating management's response to complaints, identifying the main causes of disputes, and gauging the interaction level between HR and employees. This paper employs a descriptive research design utilizing both primary and secondary data sources, with a structured questionnaire containing 17 closed-ended questions as the primary research instrument. The study samples 50 employees from Chandigarh and Mohali cities, employing a descriptive sampling technique, and focuses on assessing the effectiveness of employees' perceptions towards HR activities within the bank.

Keywords: Employee Rewards, Job Satisfaction, Working Conditions; Employees' perceptions; HR Activities and Banking sector

1. INTRODUCTION

The banking industry is a fundamental component of any country's financial ecosystem, serving as the backbone of economic growth and stability. It encompasses a wide range of financial institutions, including commercial banks, investment banks, credit unions, and other entities, all of which play pivotal roles in managing and facilitating the flow of money within an economy. Banking institutions provide a variety of services to individuals, businesses, and governments, such as safeguarding deposits, offering loans and credit, facilitating payments and transactions, and even assisting with wealth management and investment opportunities.

In the context of the banking industry, Human Resources (HR) activities are of paramount importance. HR functions within banks are responsible for managing the workforce, ensuring that the right talent is recruited, developed, and retained to support the institution's objectives. HR professionals in the banking sector are tasked with several critical functions:

1. **Talent Acquisition:** HR departments in banks are responsible for recruiting and selecting qualified candidates to fill various positions within the organization. They engage in strategic workforce planning to ensure that the bank has the necessary skills and expertise to meet its operational and growth objectives.
2. **Training and Development:** Banking is an industry that requires employees to stay updated on industry regulations, technological advancements, and financial products and services. HR teams design and implement training programs to enhance the skills and knowledge of bank employees, ensuring that they can serve customers effectively and adapt to changes in the industry.
3. **Compensation and Benefits:** HR professionals in banks manage compensation structures, ensuring that employees are fairly compensated for their work. This includes salary structures, bonuses, and benefits packages that attract and retain top talent.

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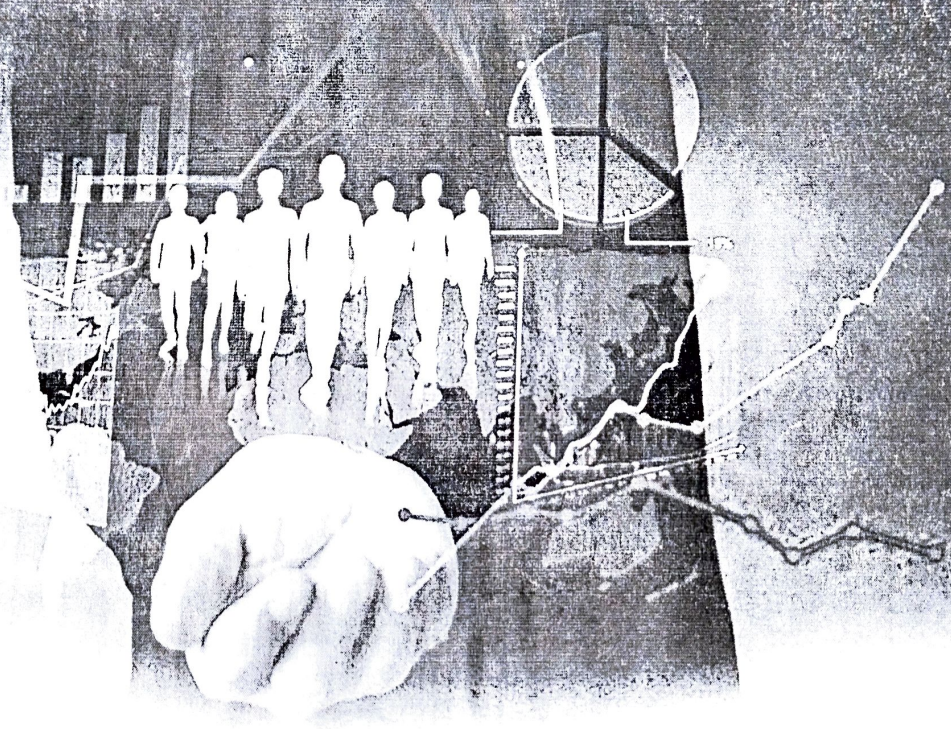

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CHAPTER 8

E-Recruitment: Opportunities and Challenges

Dr. Rajpreet Kaur and Prof. R. K. Gupta

Assistant Professor, Department of Management, I K Gujral Punjab Technical University, Jalandhar, Punjab

Vice Chancellor, Maharaja Agrasen University, Baddi

E-Recruitment is a new technological means for selecting one of the companies' most crucial resources, i.e., human resource. Recruitment has become an important process in the highly competitive labour market. The traditional methods of recruitment have been revolutionized by the wave of internet. E-recruitment is the latest trend and it has been adopted by large and small-sized organizations. Many companies use e-recruitment to post jobs and accept resumes on the internet, and correspond with the applicants by e-mail. The main success factors of e-recruitment are the value-added services provided by the job sites cost effectiveness, speed, providing customised solutions, helping to establish relationship with HR managers and facilitates brand building of the companies. Despite the inherent benefits, certain challenges are also associated with the e-recruitment process. The emerging trend in technology and process or globalization suggests that the process will continue to expand, and consequently organizations should key in into the process to enhance the quality of their staff recruitment functions. The main objective of this study is to analyse the overall trends in e-recruitment use and practice and to list the opportunities and challenges faced by job seekers and employers.

Introduction

"The Internet Will Help Achieve 'friction free capitalism' by putting Buyers & Sellers in Direct Contact and Providing more Information to Both Each Other"- Bill Gates. Today's world is technology-based world and we can feel its presence in each sphere of our lives. Conception of internet has changed our lives tremendously and it has also changed the perception of people towards their work (Bhupendra & Swati, 2015). Now whole world is just a click away from us and we can connect with individuals from all over the world. Today acquiring and retaining the employees is the biggest

ORGANISATIONAL MANAGEMENT

Dr Ravi Kant
Dr Naib Singh

Chapter 14

RECENT TRENDS IN RECRUITMENT AND SELECTION

Ramanpreet Kaur

Dr. Rajpreet Kaur

ABSTRACT

Any business's success hinges largely on the quality of its workforce, which in turn, is contingent on efficient recruitment and selection procedures. The changing landscape of recruitment and selection elucidats in this paper, highlighting its crucial role in gaining a competitive edge. Conventional recruitment techniques, like newspaper promotions and employee references, are giving way to a computerized space driven by mechanical progressions and creative strategic policies. With over portion of India's populace younger than 25, and a larger part dynamic on the web, enrolment organizations and bosses are progressively going to computerized stages to take advantage of this educated ability pool. The Coronavirus pandemic has likewise sped up the reception of remote work, provoking a re-assessment of enrolment cycles to line up with this change in perspective. Mechanical headways are pervading each feature of enrolment, affecting fascination, screening, choice, and on-boarding. From asynchronous interviews and gamification

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CURRENT ISSUES AND CHALLENGES IN BUSINESS WORLD

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Teachers Education in the 21st Century: Issues and Challenges

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ABSTRACT

The major challenge faced by teacher education in an increasingly global society is to prepare teachers who can function effectively in a standards and accountability environment while modeling and inspiring their students to be internationally minded, creative citizens. However, the demographic changes taking place throughout the world, specifically in the India, have forced schools to focus on the development of minimum competencies and basic skills among large segments of the population. Thus, teacher education programs must figure out how they will produce teachers who can function effectively within the standards and testing environment of No Child Left Behind (NCLB) Act to foster the cultural awareness, knowledge, curiosity, critical thinking, communication, and problem-solving skills that students will need for global citizenship and creative innovation. The greatest challenge for teacher education in the India, then, will be to implement promising reform models in a policy environment that is increasingly prescriptive and critical of the entire educational system, from preschool through college (including teacher education).

Keywords: *Role of Education, Global Education, Teacher Qualifications Interpersonal Communication, Problem Solving, Skill Development, Educational Policy*

INTRODUCTION

Teaching is a versatile field that requires at all times the correct identification of indices of developments in the society. This responsibility

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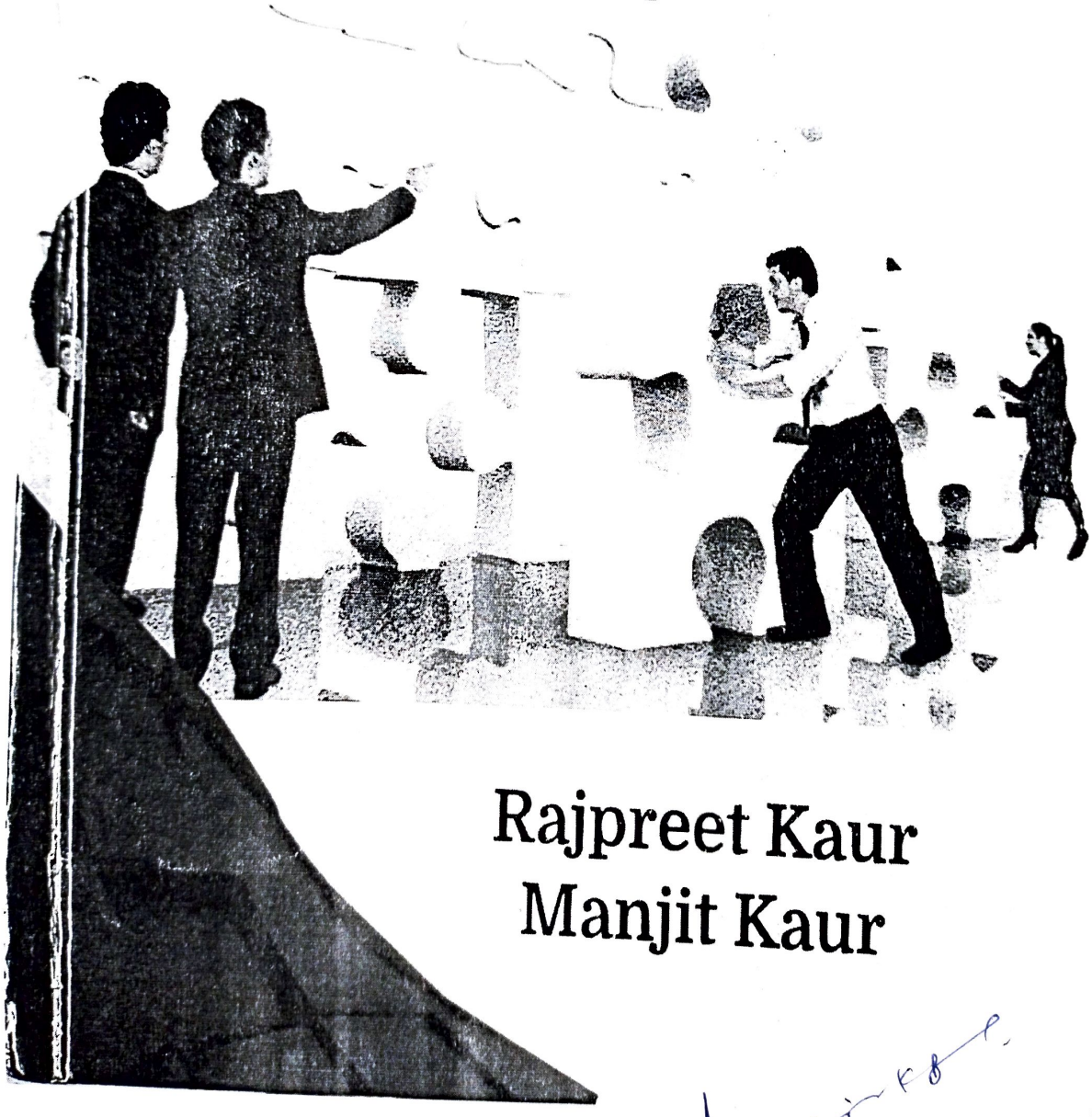

Rajpreet Kaur
Manjit Kaur

Organization Effectiveness and Change

Dr. Rajpreet Kaur
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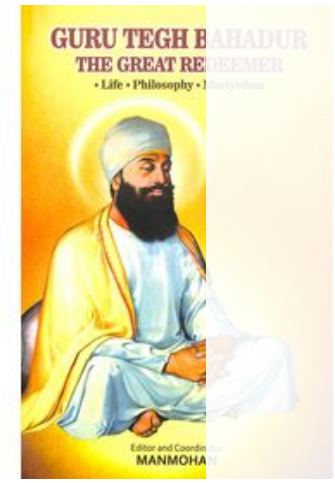

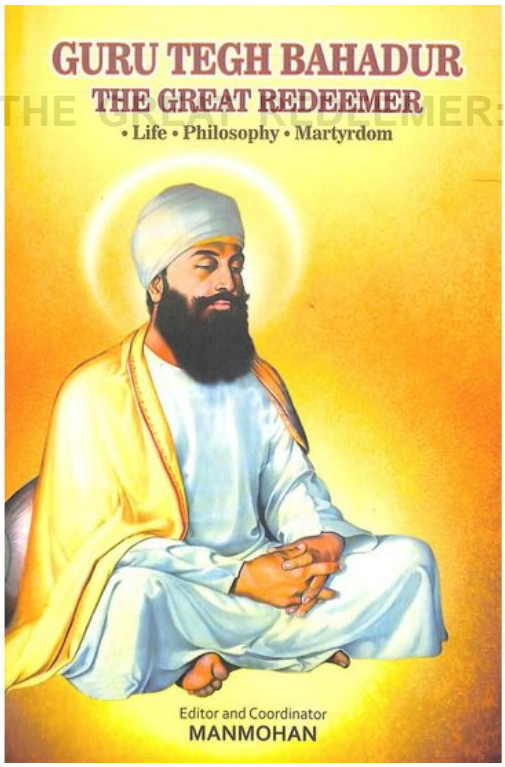

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Advancement in Solar Energy Technology and Its Future Growth

Fardeen Ahad Ansari, Abid Haleem, Shashi Bahl, Mohd Javaid, Dharam Buddhi, Chander Prakash, and Rakesh Chandmal Sharma

Abstract Due to the destructive nature and limited supply of non-renewable sources, there has been a significant shift from non-renewable to renewable energy sources in the last two decades. Various research studies are taking place to enhance the efficiency of devices that work on renewable energy sources. Solar energy is the most famous field of research in renewable sources as it is the source that is present all around the globe. Various devices and technology were created from time to time to use solar energy effectively. This research review mainly focuses on three famous solar energy technologies: solar fabric, solar thermal fuel, and solar glass panes. The construction and working methodology of such technology has been discussed in this review. Further other points like solar energy conversion efficiency and specific limitations are also discussed here. The future growth and another challenge to the discussed technology are also considered.

Keywords Photovoltaic cell (PVC) · Power consumption efficiency (PEC) · Dye-sensitized solar cell

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Future Scope and Developments on Nano Refrigerants in the Refrigeration System: A Review

Aniruddh Tiwari, Abid Haleem, Shashi Bahl, Mohd Javaid, Siddharth Sharma, Chander Prakash, and Dharam Buddhi

Abstract Effective use of refrigerant is a vast part of our day-to-day life in the field of Heating, ventilation and air conditioning systems. A wide range of refrigerants plays a vital role in the heat exchange process in this particular field. Since the first invented Air Conditioner in 1902, refrigerants have been modified consistently. Various nano-particles are dispersed into the base refrigerants to form nano refrigerants. Various data researchers had suggested from their experimental analysis to enhance nano-particle-based refrigerants. Nano Lubricants have extraordinary capabilities to enhance their refrigerative properties. This paper has reviewed research on conventional refrigerants and their harmful impacts and discussed the necessity to move towards advanced technology. We have done an extensive analysis of the development of refrigerants in the field of efficiency, environmental effects, heat transfer enhancements and pressure drop capacities. We have briefly discussed the effects of dispersion of nano-particles like Al_2O_3, CuO, TiO_2 etc. into the base refrigerants in the paper. We can quickly identify a better refrigerant for the near future from the study.

Keywords Refrigerants · Chlorofluorocarbon · Ventilation · Nanolubricants

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Screw-Based Extruder Design for 3D Printing of Food Using Food Layered Technology

Moin Khan, Abid Haleem, Mohd Javaid, Shashi Bahl, Chander Prakash, Rajesh Singh, and Ashok Kumar Bagha

Abstract Additive food manufacturing can help provide fast-paced customised food with specified nutritional values. This advanced process can be used to manufacture food items with predetermined quality. 3D food printing technology development requires unique extruder designs for fluid food ingredient deposition. The study of the rheological properties of food material is critical for determining the various factors that influence food printing. This research aims to develop an extruder that can print various food materials. For this, various rheological properties of food have been studied. A literature-based review is done on the correlations between the parameters affecting the printability of the formulations and the rheological properties of the end product. The results thus obtained show the various components of the screw-based extruder for 3D printing of food and the correlations between various rheological properties of food. A non-Newtonian, non-isothermal viscosity model has been used to describe the material's rheology. The nozzle diameters required for printing various types of food were also studied. The screw-based 3D printer was constructed using SOLIDWORKS 2021, and simulation was done using COMSOL Multiphysics V.6.0.0.318 for velocity profile and pressure contour using wheat flour as the ink material.

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Development of a Machine Learning Based Low-Cost Real Time Non-Contact Health Monitoring System for Rotary Machinery

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ABSTRACT

Condition based maintenance of equipment can be considered as one of the critical enablers for diagnostics and prognostics. There is a gradual shift towards employing low-cost, low-risk, rapid development and deployment of sensors, especially in the context of small and medium enterprises. In this article, an economical indigenously non-contact type vibration measurement system has been proposed to capture the real-time vibration data for monitoring the health of rotary machinery. The results of the devised system match quite well with the accelerometer data. The low-cost solution established will assist the Indian industry in improving productivity, especially in micro small and medium-scale industries.

Keywords: Machine learning, Health monitoring, remote Monitoring

1. INTRODUCTION

Rolling element bearings are commonly used rotating machinery components that contribute up to 30-50% of total maintenance costs in some industrial systems. When a bearing fails, the equipment's performance suffers significantly and sometimes it leads to extreme catastrophic failure. The covid-19 pandemic has changed the economic and social infrastructure globally, but worst hit the Micro, Small and Medium Enterprise (MSME) sector in India. The world is now standing at the verge of a heavy economical breakdown. In the era of pandemonium, the government led a true Swadeshi movement by starting the "Atmanirbhar Bharat Abhiyan" campaign. However, in the quest to attain a self-reliant India, it is necessary to develop a low-cost solution for monitoring the health of the machine that can help MSMEs enhance productivity.

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Non-Contact Fault Diagnosis of Bearings using Ensemble and Naïve Bayes Classifiers

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Abstract-

Condition-based maintenance involves maintaining equipment based on the real-time condition of its subsystems. Machine health monitoring typically involves analyzing signals such as vibration, temperature and acoustics, with vibration signature being the most commonly used parameter. Vibration analysis is considered to be a highly effective method for monitoring a machine's operating conditions. Its non-destructive nature makes it increasingly popular in industry, as it enables sustainable monitoring without disrupting the ongoing process. In some cases, the source of the vibration signal may be visible, allowing for corrective actions to be taken. However, in the majority of cases, components are hidden within the machine's structure, making it difficult to identify and locate the source of the signal. To address this challenge, sensors are strategically placed to detect signals produced by components that may need attention to prevent failures. In this article, non-contact fault diagnosis of bearings has been presented using Ensemble and Naïve Bayes classifiers. The findings indicate that the vibration signatures acquired from the developed non-contact sensor are consistent with the accelerometer under the same operational conditions.

Keywords- Bearings, Vibration, Condition monitoring, Time-domain analysis

I. INTRODUCTION

In industrial settings, it is imperative to incorporate machinery condition monitoring and fault diagnostics to ensure machinery functions optimally. This helps to minimize downtime, reduce economic losses, and prevent operator hazards. Reliable machinery is key to avoiding losses in profits and products. Therefore, critical maintenance activities involve monitoring and diagnosing machine conditions using vibration sensors, acoustic emission sensors and temperature sensors etc. Assessing the condition of critical rotating components like bearings, is particularly important as early detection of any issues can prevent damage and improve machine performance [1], [2].

For around four decades, vibration sensors have been extensively utilized as essential instruments for monitoring the condition of machines. The reason for using these sensors is their effectiveness in measuring and analyzing data to represent the condition of machines. Vibrations are a common occurrence in rotating machines, making it unrealistic to expect a completely vibration-free or noiseless environment in a working setting [3]–[5]. Rotary machines are essential components in various industries, and they are crucial assets in large-scale operations. These machines, which contain reciprocating or rotating parts, produce vibrations when they experience disturbances from sources like motors, engines, pulleys, gears, and bearings [6], [7]. The application of forces to create free oscillatory movements is a significant contributor to the generation of these vibrations. Machine vibrations are closely linked to the condition and performance of rotating systems and can be observed in any operational state. Therefore, information obtained from analyzing the vibrations of a machine's outer surface is valuable in monitoring the system's function and running conditions [8]. Consequently, there is a growing interest in utilizing machinery vibration data to determine the operating status of any machine. Machine structure can suffer damage and results in performance and operational issues due to unnecessary vibration. Shaft misalignment can lead to vibration, which can even occur in magnetic levitation systems where no contact exists between the actuators and levitated objects. Consequently, it is crucial to continually monitor rotating machines while they are in operation to ensure safe, reliable, and high-quality performance.

The generation of vibrations can result from various causes, with approximately 90% of vibrations attributed to shaft misalignment and unbalanced masses in different rotating machines. Despite efforts to maintain accurate alignment during operations, this can be challenging due to several factors such as structural movements, force generation resulting from pressure changes, thermal distortion of bearings, thermal expansion of machine components, and high operating temperatures. Over time, the center of mass can shift due to the unbalancing of rotating masses, leading to vibrations [9], [10]. Hence, shaft misalignment and unbalanced masses are the two main factors responsible for machinery vibration. However, balancing rotating masses completely is difficult due to the non-uniform density of rotational materials and loss of mass during operation. Misalignment and unbalanced masses are commonly found in rotating machines and occur in most practical applications while in operation, leading to vibrations. Even small disturbances or displacements caused by excessive vibration can be detected by humans, which can further destabilize the system. Thus, proper balancing of rotating masses is necessary to diminish vibration amplitudes in rotary machines [11].

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Analysing the Reduction of No-load Losses in Distribution Transformers on the Usage of Amorphous Alloy

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Abstract. The transformer constant losses are dependent on the core material. The transformer core material with reduced losses not only saves power but also extend the transformer life. About 2 to 4% of the power passing through a distribution transformer is recorded as losses. Reducing no-load losses in a distribution transformer without compromising the performance is the objective during the designing. The development of amorphous alloys and their use as a core material has been a boon to the utilities that had been relentlessly working on the reduction of operating costs and losses. Use of an amorphous alloy core in a transformer has the potential to reduce the no-load core losses. The Finite Element Method is a prominent numerical technique for dealing with complexity in a variety of ways for low-frequency magnetic circuits. In this paper, a three-phase distribution transformer 3D-CAD model is examined by the finite element method to compute and compare the no-load loss. The comparison has been done for a distribution transformer core made of amorphous alloy to that of the conventional cold-rolled grain-oriented steel. Also, the percentage reduction in each type of no-load loss is assessed.

Keywords: - Amorphous metal, Cold rolled grain-oriented steel, Distribution transformer, Finite Element Method, No-load losses

INTRODUCTION

Transformers are one of the essential aspects and most frequently utilized equipment in the power system. For the interconnected power system, the transformer has played a vital role at various voltage levels. Magnetic coupling is used in transformers to transfer electrical energy [1]. Therefore, reduction of losses and efficiency of transformer is the most essential parameter for both manufacturers and users. Distribution transformers (DTs) are connected to the efficacies that provide power to domestic and the surrounding area, where the load varies significantly during 24 hours, with maximum load being during the daytime. The maximum load only for a few hours during the day and the average load is generally much less than the rated output, thus the all-day efficiency is significant [2]. The load carried by distribution transformers changes but the capacity of these transformers is usually set to accommodate the largest load during the day. The windings of ideal transformer are devoid of ohmic resistance and magnetic leakage. However, on an actual loaded transformer losses occur. Distribution transformers are critical components of the distributed system, since they transport electric power to consumers or industry via stepping and down voltages in accordance with the power system.

The losses in a transformer that depend upon the load on it are known as the load losses and are hence variable; these are computed by the magnitude of the current flowing through the copper windings. The losses that are

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Attribution of source mobile devices is having a lot of applications in the various domain including image forensics. It aims at identifying the mobile device using which the questioned image has been taken. Mobile Device Identification (MDI) empowers the forensic investigator to fix the device model that has been used for capturing the specified image during the investigation. In this paper, a computationally effective shallow neural network learning approach is proposed for MDI. A noise pattern is present in the mobile cameras sensors which can be very well recognized by CNN architecture. The proposed solution aims at identifying the source mobile device by using its captured image. An accuracy of 98.8% is achieved for 10 model-based experimentation using the vision dataset.

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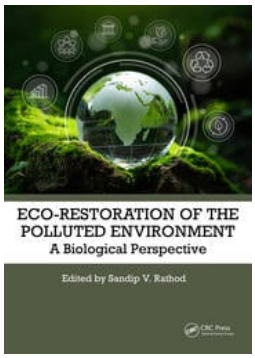

Rejuvenation of Ponds through Phytoremediation

A Sustainable Approach for Water Quality Enhancement

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