Supporting Documents

3.4.6 Number of books and chapters in edited volumes published per teacher during 2021-22

Sr. No.	Department	Supporting Documents
1.	Physical Sciences	**E-copy of cover page, content page & first page of publication**
2.	Mathematical Sciences	
3.	Civil Engineering	
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10.	IKGPTU Hoshiarpur Campus	
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3.4.6

Bulletin of the American Physical Society

Depatment of Physical Sciences

APS April Meeting 2021
Volume 66, Number 5
Saturday–Tuesday, April 17–20, 2021; Virtual; Time Zone: Central Daylight Time, USA

Session Y11: Nuclear Reactions: Heavy-Ions/Rare Isotope Beams I
1:30 PM–2:54 PM, Tuesday, April 20, 2021

Sponsoring Unit: DNP
Chair: Cody Parker, Texas A&M

Abstract: Y11.00001 : Effect of neutron-excess on above-barrier fusion cross-sections in $^{12-15}$C + ^{12}C: Evidence for increasing neutron dynamics*
1:30 PM–1:42 PM Live

Preview Abstract *Abstract*

Authors:
Romualdo Desouza
(Indiana Univ - Bloomington)

Varinderjit Singh
(Indiana Univ - Bloomington)

Sylvie Hudan
(Indiana Univ - Bloomington)

Zidu Lin
(Arizona State University - Tempe)

Charles Horowitz
(Indiana Univ - Bloomington)

Examination of the average fusion cross-section at energies above the fusion barrier for ^{12,13,14,15}C + ^{12}C reveals that the fusion cross-section increases more rapidly than can be simply attributed to the increased size. Comparison with static barrier penetration models suggests that dynamics are the origin of this increased cross-section. Calculations with a time-dependent Hartree-Fock model also fail to describe the observed trend suggesting that for neutron-rich nuclei, neutron dynamics may play a larger role than is presently accounted for.

*This work was supported by the U.S. Department of Energy under Grant No. DE-FG02-88ER-40404 (Indiana University). CJH is supported in part by U.S. DOE grants DE-FG02- 87ER40365 and DE-SC0018083. ZL gratefully acknowl- edges support from National Science Foundation under PHY-1613708 and DOE grant DE-SC0019470 (Arizona State University)

U.S

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APS April Meeting 2021
Volume 66, Number 5
Saturday–Tuesday, April 17–20, 2021; Virtual; Time Zone: Central Daylight Time, USA

Session Y11: Nuclear Reactions: Heavy-Ions/Rare Isotope Beams I
1:30 PM–2:54 PM, Tuesday, April 20, 2021

Sponsoring Unit: DNP
Chair: Cody Parker, Texas A&M

Abstract: Y11.00002 : Assessing the impact of valence sd neutrons and protons on fusion*
1:42 PM–1:54 PM Live

Preview Abstract ← Abstract →

Authors:
Rohit Kumar
(Indiana University Bloomington)

Varinderjit Singh
(Indiana University Bloomington)

J. Vadas
(Indiana University Bloomington)

T.K. Steinbach
(Indiana University Bloomington)

B.B. Wiggins
(Indiana University Bloomington)

S. Hudan
(Indiana University Bloomington)

R.T. deSouza
(Indiana University Bloomington)

Assessing the impact of valence sd neutrons and protons on fusion Experimental near-barrier fusion cross-sections for $^{17}F + ^{12}C$ are compared to the fusion excitation functions for $^{16,18}O$, ^{19}F, and ^{20}Ne ions on a carbon target. Comparison of the reduced fusion cross-section for the different systems accounts for the differing static size of the incident ions and changes in fusion barrier. Remaining trends of the fusion cross-section above the barrier are observed. These trends are interpreted as the interplay of the sd protons and neutrons. The experimental data are also compared to a widely-used analytic model of near-barrier fusion, a time-dependent Hartree-Fock model, and coupled channels calculations.

*This work was supported by the U.S. Department of Energy under Grant Nos. DE-FG02-88ER-40404 (Indiana University), and the National Science Foundation under Grant No PHY- 1491574 (Florida State University). J.V. acknowledges the support of a NSF Graduate Research Fellowship under Grant No. 1342962.

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V.S.

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APS April Meeting 2021
Volume 66, Number 5
Saturday–Tuesday, April 17–20, 2021; Virtual; Time Zone: Central Daylight Time, USA

Session Y11: Nuclear Reactions: Heavy-Ions/Rare Isotope Beams I
1:30 PM–2:54 PM, Tuesday, April 20, 2021

Sponsoring Unit: DNP
Chair: Cody Parker, Texas A&M

Abstract: Y11.00003 : Fusion of neutron-rich nuclei around the N=20 and N=28 shell closure.*
1:54 PM–2:06 PM Live

Preview Abstract ← Abstract →

Authors:
Sylvie Hudan
(Indiana University)

James Johnstone
(Indiana University)

Varinderjit Singh
(Indiana University)

Rekam Giri
(Indiana University)

Romualdo deSouza
(Indiana University)

Dieter Ackermann
(GANIL)

Abdelouahad Chbihi
(GANIL)

Quentin Hourdille
(GANIL)

Austin Abbott
(Texas A&M University)

Catherine Balhoff
(Texas A&M University)

Andy Hannaman
(Texas A&M University)

Alan McIntosh
(Texas A&M University)

Maxwell Sorensen
(Texas A&M University)

Zach Tobin
(Texas A&M University)

Adi Wakhle
(Texas A&M University)

Sherry Yennello
(Texas A&M University)

Fusion in neutron-rich environments is presently a topic of considerable interest. Experiments for an isotopic chain allow systematic exploration of the dependence of fusion on neutron number. To study fusion away from the closed N=20 and N=28 shells and explore the role of the unpaired proton, experiments were conducted at NSCL's ReA3 facility for ^{39,45,47}K+^{16}O, ^{28}Si and ^{36,44}Ar+^{16}O, ^{28}Si at near-barrier energies. Details of the E-TOF experimental technique utilized will be discussed. Preliminary results yielding the experimental fusion excitation functions and comparison to theoretical models will also be presented.

*U.S. Department of Energy under Grant Nos. DE-FG02-88ER-40404, DE-FG02-93ER40773 and DE-NA0003841

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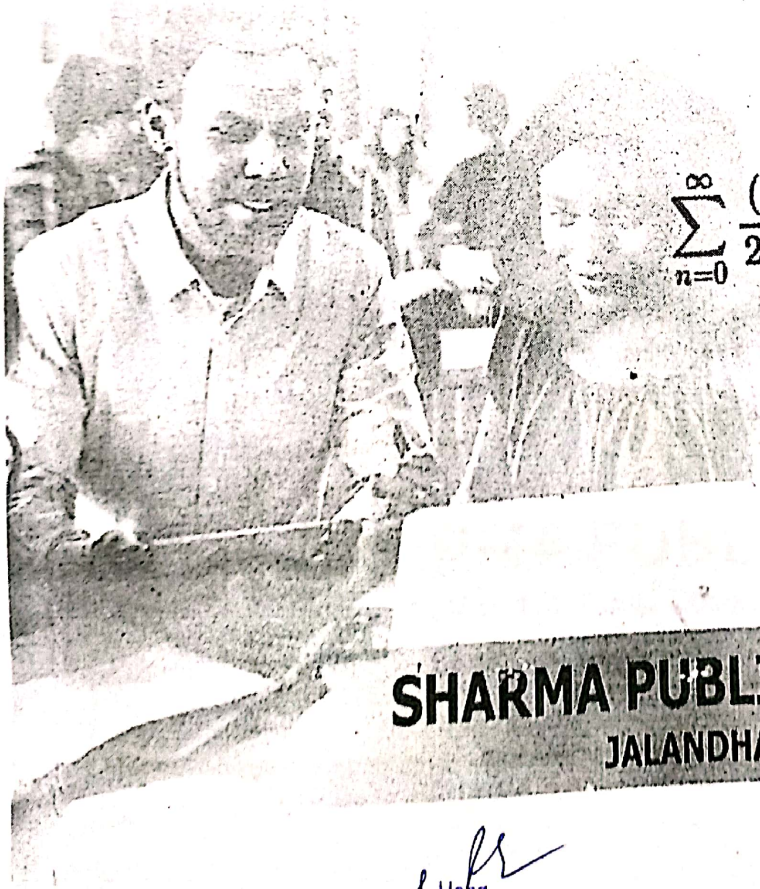

$$\sum_{n=1}^{k} \frac{1}{n} \succ \int_1^{k+1} \frac{1}{x}\,dx = \ln(k+$$

$$\sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} +$$

$$\int_a^b f(x)\,dx = F(b) - F(a)$$

$$f'(a) = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h}$$

$$\overline{(z/w)} = \bar{z}/\bar{w}$$

$$r = |z| = \sqrt{x^2 + y^2}$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 0 & 3 \end{bmatrix}$$

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for

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$$\sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \cdot$$

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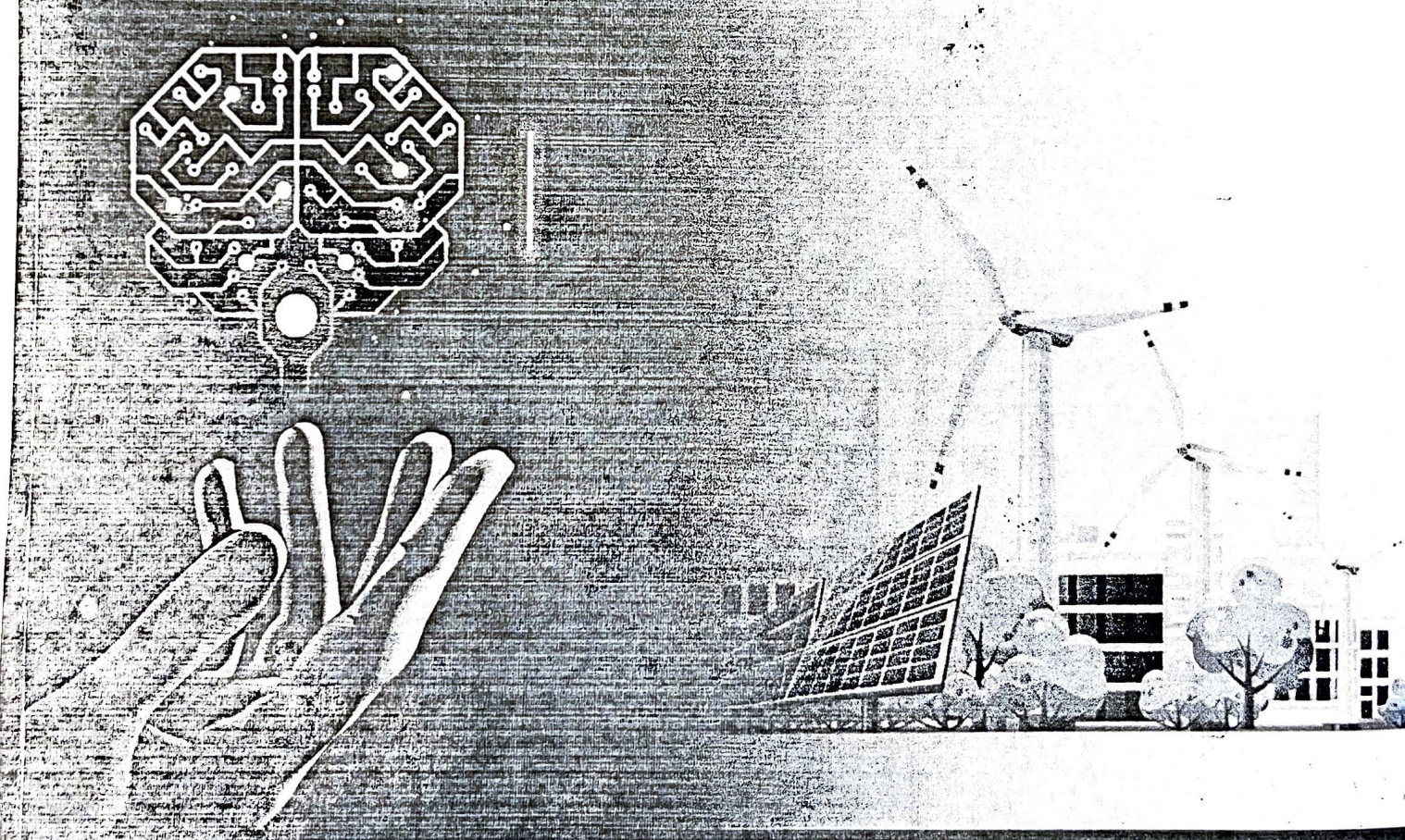

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Contents

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Static and Dynamic Analysis of Multi-Story Building with Floating Column & their Buckling Behaviour

Gurpal Singh[1*], Rajiv Chauhan[2], Rinku Walia[3]

[1,2,3]*Assistant Professor, Department of Civil Engineering, IKGPTUHoshiarpur Campus, Punjab-146111. India.*

Email: [1*]gurplsingh083@gmail.com, .[2]dr.rajivchauhan@ptu.ac.in, [3]Waliarinks@gmail.com

***Abstract*—Floating column is that type of column which is constructed without rigid foundation on a beam. Now a day, floating columns is a typical feature in the modern multi- storied buildings. The structural members fail due to buckling when they are subjected to heavy loads. Columns are the main elements in resisting lateral load moment and also play vital role in seismic performance of the building. In this study seismic performance of multistoried building with and without floating column and buckling analysis of column has been carried out. To analyze five and ten stories structure models were created considering zone IV parameters. Static and dynamic analysis of all models wascarried outby STADD- PRO software. The structural response for parameters like floor displacement, base shear, shear force, bending moment, elastic critical load corresponding to member strength for the columns were also studied.**

Keywords: Floating Column, Earthquake, Buckling.

I. INTRODUCTION

Earthquake proves to be most disastrous for Civil Engineering infrastructure, if not considered properly during design. There are number of factors or conditions which make the structure unstable and lead to failure of structure. The structure fails, when the stress in the building due to some external forces reached the yield or ultimate strength of the member, exceed a specific maximum deflection. Buckling is a broad term which describes the mechanical behavior and generally defined as the deformation which occurs due to increase in the small magnitude of load, causing the change in member shape. The elastic buckling of the member is generally analyzing by long slender compression member. With the advancement in research, it is observed that discontinuitiesare crucial in the load transfer mechanism. Due to discontinuities, in the path of load transfer at different floor level, the earthquake effects are different for each floor level in the buildings which leads to poor performance of the building.

The floating column-Now a days with change in design technology around the world, complex structures are being constructed efficiently giving due consideration to seismic phenomenon. The floating column in buildi works as large function space for storage purpose some cases, floating column may be provided econon structure.Floating column in multi-storied resident building has been studied by various researchers (2,34,(and 10).

Avinash P. et al (9) investigated the seisn performance of the building with and without t floating column in terms of various parameters such displacement, storey drift, maximum column forces tir period of vibration etc. with various location of floati column and compare it with normal building. In this t building are modeled by using the finite element softwa ETABS. They conclude that floating columns are n suitable in high seismic zone.Gaurav K. et al (7) studi the dynamic structural behavior of simple configurati multi storey building with floating column. The analys was done by using the ETABS software. Dynamic acti is caused by the both wind and earthquake so wi different level of forces along the height of the buildin Pramod G. et al (5)analyzed the multi-stored ste structure building in zone 'II' and find the behavior soft-storey at different floor level of building under tl seismic load action. Sameer et al (1) analyzed the floatir column in multistoried building. They developed FEl codes for the 2D multi storey frames with and witho floating column under different earthquake excitatic having different frequency content keeping the PG and time duration factor constant. The study conclude that with increase in ground floor column the maximu displacement, inter storey drift values are reduced an base shear and overturning moment vary with the chang in column dimension.

Different types of software's are available for modelin and validations. In the present study, STADD-PR(was usedforanalyzingthe buckling behavior of floatin column in RCC framed structure.STADD-PRO was als used for comparing analysisof Multi-storiedstructur with and without floating column.Various parameter

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Utilization of Sunflower Husk Ash in Concrete: A Sustainable Option

Sunita Kumari[1*], Rinku Walia[2], Rajiv Chauhan[3]
[1]*Civil Engineering Department, Deenbandhu Chhotu Ram University of Science and Technology, Murthal Sonepat, Haryana, India*
[2,3]*Civil Engineering Department, IKG Punjab Technical University, Kapurthala, Jalandhar, Punjab, India*
*Email: [*1]sunitakumari.civil@dcrustm.org, [2]waliarinks@gmail.com*
[3]dr.rajivchauhan@ptu.ac.in

***Abstract*—The present paper aims to review the utilization of sunflower husk ash in a sustainable manner. The concurrent study was carried out in order to find the suitability of agro waste ashes as an alternate substitute of cement in concrete. For the present project, six concrete mixes with cement were replaced with varied amounts of sunflower husk ash ranging from (2% to 12%) in M20 grade concrete. The optimum replacement level has been evaluated corresponding with 28 days of compressive strength of concrete. In order to study the effects of these additions, workability, density, and compressive strength properties test of concretes have been conducted. The result indicated that sunflower husk ash at 10% replacement level can be effectively used without compressive strength.**

Keywords: Sunflower Husk Ash,Agriculture Waste, Compressive Strength, Cement.

I. Introduction

In India, Sunflower or Surjmukhi is one of the short-duration crops of the Zaid season, introduced in 1969. . The scientific name is Helianthus is the combination of "Hellos" means Sun and "Anthons" which means the flower is originated in North America. In 2020-2021, According to United States Department of Agriculture, the production of sunflower was 50.04 million metric ton out of which 26.8 million metric ton was used for sunflower oil. This crop had gained popularity worldwide due to its good quality of oil, photo–insensitive property, different crop duration, high-energy husk, higher seed multiplication ratio, high-quality oil, and less water demand [1].

In India, the total production is 100 thousand metric tons, at some time the total consumption is 1.7 million metric tons, the remaining is imported. It has less production due to inaccessibility of good quality seeds, rain during the flowering period, damage by the birds, and less involvement of private companies [2].

According to the Oilseed Department of Agriculture, India (2017), its immature seed is used as feed for poultry, latex from leaves is a good source of rubber. The flower is an abundant source of nectar and pollen for honey. The fully grown seed contained 40 -53% of edible oil used in various types of cooking purposes. Its vegetable is light yellow contains a high percentage of linoleic acid which is good for heart patients. It has lecithin, tocopherols, and furfural, nutritious for birds also [3]. Agricultural waste ash is an end product, which is produced from those industries which use agricultural waste as fuel. Such types of ashes are not useful and most of the time are dumped near the water bodies to get moisture. Because of its lightweight, it can fly with wind from one place to another. The disposal of these ashes may become a major issue for the environment and society. The efficient use of these ashes can solve the environmental problem and may also affect the economic production of concrete.

Sunflower husk is the exterior cover of sunflower seeds. The husk is a waste generated during the sunflower seed and non – oil sunflower seeds de-husking process to get kernels. The husk contains 220 – 280 g per kg of the total weight of sunflower seeds.

Havrysh et al. (2020) suggested, sunflower husk is a good source of energy in oil mils. It is a biofuel of the combustion-based power plant, curtailed 200 – 300% CO_2, user can meet their demand and sell surplus electricity, get benefited with income up to 24.7 -65.7% [4]. Sunflower seed used in the incineration process and boiler and emits Carbon mono-oxide (18 – 23) mg/m^3, sulfur trioxide (2031 – 2105)mg/m^3, and Oxide of Nitrogen (240 – 293)mg/m^3 during the production of sunflower oil. Sunflower seed husk has 2500 – 2700 Kcal/Kg calorific values. [5,6]. In some countries, it has highest energy content is 15.4 MJ/Kg. because its carbon content is neutral, its energy generation could mitigate climate change [4].

The concurrent study was carried out in order to find the suitability of sunflower seed husk ash as an alternate substitute of cement in concrete. As the utilization of cement as building material becomes costly, it is a cheap material and can save water, energy and reduce the emission of greenhouse gases. These ashes can be easily available or produced and can be used in construction

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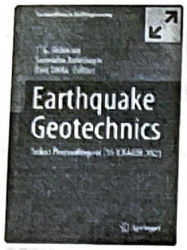

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Analysis of Lightweight Cryptography Algorithms for IoT Communication

Navdeep Lata and Raman Kumar

Abstract Ubiquitous sensing enabled networks have transformed the living chores into a modern living standard in which each move is automated. The dependency of humans on IoT is increasing every day, so the IoT networks must be efficient and secure. Secure communication in the Internet of Things (IoT) networks is a hotly debated research issue. Cryptography is one of the solutions for secure data transmission. In IoT networks, designing a cryptography algorithm is a major challenge for resource constraint environment. So, when we talk about cryptography in IoT, this term transforms into "lightweight cryptography." This paper presents a review of lightweight cryptography algorithms in the form of a stream cipher, block cipher, symmetric encryption, and asymmetric encryption.

Keywords Encryption · Stream cipher · Block cipher · Cryptography · IoT

1 Introduction

Achieving security in the Internet of Things (IoT) is becoming a hotly debated research issue. IoT is a kind of network model which changes the ordinary devices into smart devices with the use of sensor and Internet technology. These smart objects sense and communicate with other devices by connecting with the Internet. So IoT allows people to connect anything at anywhere any time. As the cost of Internet accessibility has reduced so the number of devices connecting with the Internet has been increasing. This ease of accessibility is changing the lifestyle of people in every field. So, the world is moving towards a digital world where people get services like e-health, e-books, and smart cities. The dependency of humans on IoT is increasing every day, so the IoT network must be efficient and secure. Thus, the lack of security techniques can influence the growth of IoT. Thus, this digital world needs security in terms of privacy and data protection. To achieve confidentiality, various cryptography

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Contents

Efficient Pattern Mining Algorithms: A Study

Amit Verma[1], Raman Kumar[2]
[1]Department of Computer Science and Engineering,
IKGPTU, Kapurthala, Punjab, India
E-mail: [1]verma0152@gmail.com, [2]er.ramankumar@aol.in

***Abstract*—Data mining is a process of discovering usable data/information from the set of huge raw databases. By using data mining usable patterns are extracted from large batches of data which helps the business to learn more about which helps in developing more efficient business strategies. In this paper we will study some of the techniques of extracting patterns from transactional database. Frequent itemsets helps to find the items which are bought frequently and together by the customers. It helps to understand the customer's choices more. Utility Mining associates a utility value which refers to some quantitative representation of the customer preference. The process of mining the high utility item sets from some transactional database is basically a process of extracting new patterns based on some utility like profit. Diverse pattern mining discovers itemsets on the bases of their categories from the transactional database. The itemsets are low diverse if they belong to same category for e.g items milk and butter belongs to category diary items. We will study all these methods with suitable examples and present a review of our study.**

Keywords: Data Mining, Frequent Patterns, Utility Mining, High Utility Mining, Diverse Pattern Mining.

I. Introduction

The term pollution as Data Mining is an activity that derives some new non superficial information from huge databases [2]. Earlier data mining methods concentrate mainly on finding the relations (fluctuations in sales) among the items having good frequency in the transaction databases. It is normally known as frequent data mining [4], such techniques are based on the logic that items or item set which have high frequency are of high interest for the user as it can be taken as a good parameter for business. However, frequency is one notion of interestingness, there has been defined other notions such as high-utility [3,6], diversity etc. In this paper we throw light upon integration of existing interesting measures in different ways to derive new meaningful measures. High-utility item set considers both factors together, the frequency of the item sets as well as the utility related with every item [10]. On the other hand, notion of diversity tries to capture the relevance of pattern in terms of a category set coverage, i.e., how many categories from a category set do the items of an item set cover? An item set with large coverage would be considered as more relevant. Algorithms have been proposed for each individual interestingness measure and a very little work exist that focus on combination of different measures. We propose to study and define new interesting measures that can be derived using combinations of existing measures. We also plan to design efficient algorithms for finding patterns according to the new defined measures. The motivation of defining new measures and algorithms come from the issue of not clear understanding of the notion of relevance of a pattern, i.e., a frequent or diverse pattern [18] may not be relevant for all application domains. However, for an application domain, a frequent as well diverse pattern may be relevant.

The ultimate goal of research is to design and implementation of algorithms for new interestingness measures for pattern mining over transaction databases. No algorithm exists till date that mines diverse and high utility patterns. This section presents the literature survey about various techniques and aspects of above area such as; data mining, frequent item set mining (explain with help of example), utility mining and diverse frequent mining.

II. Data Mining

Data mining is related with filtration of data from large volume of databases and producing analytical reports which can be helpful in finding out the regularities or relationships which further can lead to provide good understanding of the present participle processes [8, 9]. The main aim of the mining process is to detect all the hidden and unexpected t patterns and trends from the database. It uses combination of various methods and techniques like data base technologies, artificial intelligence, machine learning etc.

Data mining has a great use in creating the analysis report of daily user transactions from some retail research and can be called market basket analysis. And this market basket analysis has also good application in clinical research, genetics, medicines, bioinformatics etc. We below discuss the basics of market basket algorithms such as frequent item set mining [11].

A. Frequent Item Set Mining

A non-empty collection of items can be termed as an item set. A k-item set can be defined as item set

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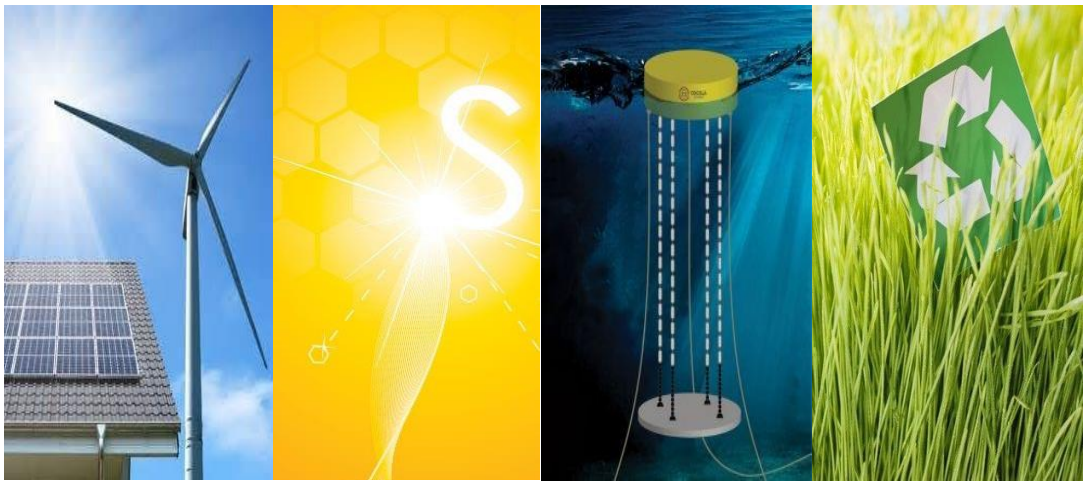

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03.02.2022 **Thursday** **11.30 AM–01.30 PM**	**Session - 2** **Optimization/ Adaptive/ ML/ IOT/Computational Techniques**
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1	4		Optimization of Two Stage Operational Amplifier Using Firefly Algorithm
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7	59		Analysis of Image Types, Compression Techniques And Performance Assessment Metrics: A Review
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Analysis of image types, compression techniques and performance assessment metrics : A review

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Abstract

The rapid advancement of digital technology has created a demand for improved compression methods. Image compression is data compression applied to digital images. The goal is to eliminate picture data redundancy in order to store or transfer data efficiently. When a picture is compressed at low bitrates, the image fidelity is lost. Images can be compressed in several ways. This paper reviews image kinds and compression strategies. All type of images and the factors by which one can identify the performance assessment of images are described in this paper.

Subject Classification: *?*

Keywords: *Image Compression, Types of images, Performance assessment metrics, Compression techniques*

1. Introduction

Image compression has become an essential research subject as the demand for data transfer and storage grows. The image compression goal is to reduce the amount of data necessary to represent a digital image. It's a method for producing a compact representation of an image. It decreases the amount of data that must be stored and transmitted [1]. Compression does not simply refer to shrinking the size of an image. It also leads to the

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Analysis of Different Image Compression Techniques: A Review

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Abstract: The availability of images in a wide variety of applications has expanded due to technological developments that have not to influence the variety of image operations, the availability of advanced image modification software, or image management. Despite technological breakthroughs in storage and transmission, demand for storage capacity and communication bandwidth exceeds available capacity. As a result, image compression has proven to be a helpful technique. When it comes to image compression, we don't just focus on lowering size; we also focus without sacrificing image quality or information. The survey outlines the primary image compression algorithms, both lossy and lossless, and their benefits, drawbacks, and research opportunities. This examination of several compression techniques aids in the identification of advantageous qualities and the selection of the proper compression method. We suggested some general criteria for choosing the optimum compression algorithm for an image based on the review.

Keywords: Image Compression, types of images, performance assessment metrics, compression techniques.

1. Introduction

An image is a two-dimensional communication processed by the human visual system. The impulses that depict images are usually analog. Computer applications convert them from analog to digital for processing, storage, and transmission [1]. A digital image is a 2D pixel array. Image compression reduces the amount of storage space required for photos and movies, hence improving storage and transmission performance. Lossy or lossless image compression is possible. Lossless compression entails compressing data so that it may be decompressed into an identical reproduction of the original [2-4]. However, in lossy compression techniques, some of the image's finer details can be sacrificed in order to save a little more bandwidth or storage space.

Working procedure of image compression techniques:

The most common processes in compressing an image are [2]:

- Specifying the Rate (available bits) and Distortion (tolerable error) parameters for the target image.
- Classifying the visual data according to their relevance.
- Distributing the available bit budget across these classes in such a way that distortion is minimized.
- Using the bit allocation information acquired in step 3, quantify each class independently.
- Using an entropy coder, encode each class independently and save to a file. It is frequently faster to reconstruct an image from compressed data than it is to compress it. The procedures are as follows:
- Using the entropy decoder, read the quantized data from the file. (Step 5 is reversed.)
- Reduce the number of variables in the data. (Step 4 is reversed.)
- Re-create the image. (Step 2 is reversed.)

The following sections comprise this paper: section II explains the related work of researchers, section III defines the types of the different image compression techniques, and section IV concludes the paper by summarizing the conclusion.

2. Literature Review

Gharavi and Tabatabai (1988) proposed utilizing QMF to encode digital images. Using a 2-D separable QMF bank, the input signal spectrum is decomposed into numerous narrowband images [5]. To reduce redundant bits in data or images, Patel et al. (2016) introduced the Huffman coding technique, which analyses multiple features or specifications such as "Peak Signal to Noise Ratio (PSNR), Mean Square Error (MSE), Bits Per Pixel (BPP), and Compression Ratio (CR)" [6]. Kekre et al. (2016) proposed vector quantization for image compression. VQ is a multi-dimensional version of Scalar Quantization [7].

Zhang et al. (2020) proposed a multi-scale progressive statistical model-based lossless image compression system. The suggested statistical model effectively balances pixel-wise model accuracy and multi-scale model speed [8]. Mohammed and Abou-Chadi (2011) investigated picture compression techniques based on block truncation coding. For comparison purposes, the original block truncation coding (BTC) and the Absolute Moment block truncation coding (AMBTC) were used [9]. BTC breaks the original image into n × n sub-blocks, reducing the number of grey levels within each block. Sarkar et al. (2018) proposed a hybrid lossy image compression model using run-length encoding and Huffman coding by taking an example of two images i.e., clock.tiff and man.tiff. The other parameters like PSNR, MSE, and structural similarity remain almost the same while the storage size is reduced [10]. Table 1 summarizes the numerous image compression approaches that researchers in the past have used.

Table 1: Detailed Summary of various image compression techniques used by researchers

Author Name	Year	Title of Paper	Compression Technique used	Reference
Gharavi and Tabatabai	1988	"Sub-band coding of monochrome and color images"	Sub-band Coding (SBC)	[5]
Patel et al.	2016	"A fast and improved Image Compression technique using Huffman coding"	Huffman Encoding	[6]
Kekre et al.	2016	"Color image compression using vector quantization and hybrid wavelet transform"	Vector Quantization (VQ)	[7]
Zhang et al.	2020	"Lossless image compression using a multi-scale progressive statistical model"	Statistical Coding	[8]
Mohammed and Abou-Chadi	2011	"Image compression using block truncation coding	Block Truncation Coding (BTC)	[9]
Sarkar et al.	2018	"Novel Hybrid Lossy Image Compression Model using Run-Length Coding and Huffman Coding"	Run Length Encoding (RLE)	[10]

Simulative Analysis and Performance Evaluation of various computations– Using Elliptic Curve Cryptography

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Abstract. In today's era Information Security plays vital role in daily life. We use various information security tools and techniques like ATM PIN, e-commerce portal and various PDA security related issues. In this research paper we may use ECC. As ECC provides more security as compared to earlier authentication algorithms. ECC provides more security for all kind of prime numbers. We may apply multiserver authentication scheme using ECC. We have tested and analyze the performance for the guessing attack, reply attack, insider attack, DoS attack and dictionary attack. The proposed scheme is impractical against various attacks.

Keywords: Security, ECC (Elliptic Curve Cryptography), Authentication and Authorization.

1. INTRODUCTION

In a network security area, whenever end user request to access server's service, end user must have to pass network authentication. In this altered security schemes are used to check if the user has exact access rights to use authentication and authorization services. When user try to access services on the server, message transmission between server and user must kept safe and secure. To secure the communications between user and server they use a session key agreement.

To secure the network communication remote user authentication scheme proposed and also other schemes proposed to increase network security, functionality and network capacity.

TABLE I. RECORD OF ELLIPTIC CURVE CRYPTOGRAPHY

Sr. No	References	Availability	Confidentiality	Data Integrity	Identity and Access Management (IAM)	Control	Audit
1.	[12]	×	×	×	×	×	×
2.	[11]	×	×	×	×	×	×

Enactment Analysis of Classification Method for Voting in Traffic Prediction

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I K Gujral Punjab Technical University Kapurthala, Punjab, India
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Abstract. Prediction analysis is a data mining method used to predict future possibilities based on current information. The traffic prediction techniques have 3 steps which are preprocessing, feature extraction & classification. In pre-processing data set is assembled which is used to distant missing and unwanted values. In the feature extraction phase, the relationship between attribute and target set is settled. This study has been influenced by the different possibilities. The proposed method is a combination of Logistic Regression and KNN classifier compiled laidback by means of a voting classifier intended to predict traffic. The hybrid model gives good results as compared to linear regression model in terms of MSE. When the MSE value get reduced then accuracy get improved for the Traffic prediction.

Keywords: Traffic prediction; classification; optimization and algorithm.

1. INTRODUCTION

The severity of urban traffic congestion is increasing with each day over recent years due to the increase in numbers of motor vehicles on roads. Thus, developing economic and social stability is important. However, achieving satisfactory mileage for road construction is impossible due to the land and economic constraints [1]. So, along with the intelligent transportation technology, the intellectual transportation theory has been developed with time. For predicting the traffic flow before it arrives with the traffic prediction plays major role in intelligent transportation system (ITS). For analyzing and predicting the short-term traffic flow that is based on different traffic status, it is important to achieve the most effective and feasible prediction outcomes. To do so, it is important to select appropriate models among the various existing traffic flow prediction models [2]. It helps to eliminate a few parameters like route navigation planning and other mobility services are required for traffic predictions [3]. The potential traffic circumstances are forecasted using the data traffic models which include real world information. The traffic flow needs to be monitored along with the application of loop detectors, traffic cameras and radars for speed identification due to which infrastructures are designed. The maintenance and deployment cost are high for such infrastructures. These high-cost infrastructures can cover only a small range. The vehicle can be tracked within less amount of time using the smart phones, sensors and GPS devices [4]. For entering the major commuting roads during peak hours, the tolls are introduced which also help in promoting public transportation and improving the infrastructure. Based on the solutions, the government has tried to promote the usage of public transportation so that the traffic congestion and airborne pollution of big cities can be reduced. However, very few citizens have adopted such kind of methods and these strategies have not succeeded to an appropriate extent. For identifying the prediction in transportation field, data mining algorithms are used in modern technologies [5]. There will be decline in performance level of data mining algorithms with the increase in data. Thus, for predicting the data in optimized manner, the machine learning and deep learning techniques are applied. Usage of traffic policemen for regulating

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Content-Based Image Retrieval: Feature Extraction Techniques and Similarity Metrics

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***Abstract*: The method which is used here for the purpose of feature extraction keep visible qualities of the picture in mind. In this paper, various feature extraction techniques based on color, shape, texture etc. are discussed. In addition to the color bar chart and its correlogram, CCV, CCM and tamura, wavelet transform, DWT, GLCM, DCD, SCD, CSD etc. comes under feature extraction methods. Firstly, feature extraction procedure is discussed in the paper then various techniques for feature extraction is discussed. After that an algorithm is proposed to retrieve images depending on various features. Then results of different similarity metrics are shown.**

Keywords:-CBIR, Wavelet transforms, Histograms, color correlogram, tamura feature

I. INTRODUCTION

Images are very rich in the visible asset. The form of a picture, its complexion and surface are considered as the picture assets which are able to exonerate the drawbacks of the pictures removal system which is derived on the basis of contents. So the parcel of extension for limiting computational intricacy, rearrangements and nonexclusive endeavours do exist for explore in CBIR [1]. In CBIR images can be retrieved depending on various visible assets. It involves the following steps:

A. Pre-processing

It is a process in which a picture gets treatment for extracting the features to describe its contents. It involves different steps like screening, scaling and object determination.

B. Feature Extraction

In this, in addition to features connected with a query picture, features connected with records can be extracted. These features describe the content of the query and database image.

C. Similarity Matching

All the information regarding a picture exists inside the feature carrier. After that, a comparison is done in the middle of feature carrier connected with the query and recorded pictures. For this purpose, various distance metrics are used.

Section I, discussed CBIR and image retrieval steps. Then in Section II, various colour feature extraction methods become the part of discussion. Then in Section III, various texture feature extraction methods are discussed. Then in Section IV, the various shape qualities removal method becomes the part of discussion. In Section V, the proposed method describes various steps in image retrieval using various similarity measures. Section VI contains Experiments & results.

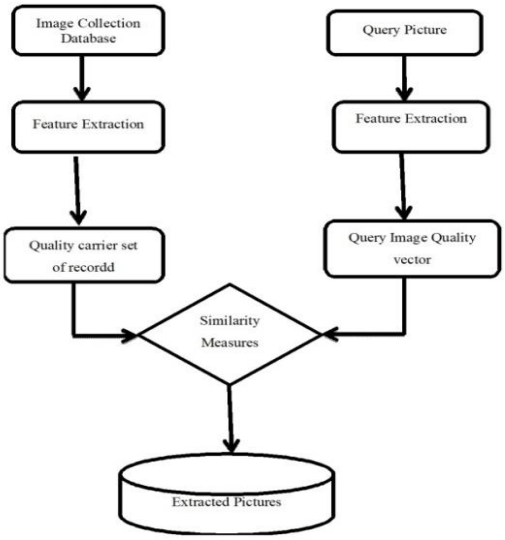

Fig. 1. Feature extraction in CBIR

II. COLOR

A. Color Histogram

A CH depicted variation of color within an image. Color histogram can be created for any type of color model. It can represent pixel number of colors in a defined color range and has been include model for the color of an image and collection of different colors. [2,3]. It is very useful in situations where the distribution of picture color is done globally. Fuzzy color histogram [4] is an improved form of the color histogram that represents dissimilarity of colors that belongs to same bin.

B. Color correlogram

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Contents

Anshu Bhasin, Ankita Sharma

Understanding and implementation of machine learning using support vector machine for efficient DDoS attack detection

Abstract: Excessive communication over the Internet in the present era has made our privacy vulnerable. With zoomed technology and engineering, it has in turn given wider opportunity to the attackers to penetrate the network just like that of normal users. When attacker's purpose is to make any specific server or network fail to normal services, it is called network denial-of-service (DoS) attack. Further, distributed DoS (DDoS) attacks are launched through Zombies, which are compromised machines. Recently, for attack detection strategies, most of the researchers and organizations are opting for machine learning (ML) techniques, as these are cost-efficient than humans, when it is about analyzing a huge amount of data. ML in cybersecurity holds the potential to handle areas of prediction, detection, and continuous monitoring. This chapter explores detailed contemporary research and presents meliorated detection mechanism for DDoS attack, based on one-class support vector machine (OC-SVM), an efficient ML technique. More specifically, it focuses on identification of high relevance feature extraction that can exploit the classification capability of OC-SVM for attack detection. The proposed technique includes supervised learning, using NSL-KDD dataset and works adroitly for DDoS attack detection. The empirical results on accuracy and detection rate are compared with other existing methods. False alarm rate and training speed are recorded to project the efficacy of the proposed system.

Keyword: cybersecurity, DDoS attacks, machine learning, one-class support vector machine (OC-SVM)

1 Introduction

Computer network technology has new-fangled through Internet in the present era. Organizational and personal daily activities such as e-commerce, email, social networking, online transactions include billions of users per second to depend heavily on computer network. This excessive dependence on the Internet leads to underlying security issues toward our activities and make privacy vulnerable. Centre for Deliberate and

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International Studies in 2014 evaluated global annual loss to wealth between $375 billion and $575 billion caused by cybercrimes. Therefore, cybersecurity enlarges the attention. Such infringement could not only cause large economic losses but even priceless personal damage.

Denial-of-service attack is a cyberattack whose purpose is to make any specific server or network fail to normal services. DoS attack includes bandwidth and connectivity attacks. This is done by cropping hardware like CPU, memory, and network resources, namely, bandwidth. Recently, distributed DoS (DDoS) attacks are launched through Zombies, which are compromised machines. It is a well-organized attack, in which simultaneous in-genuine traffic is made to a target from remotely controlled distributed network. Consequently, the target system begins to react slowly or may even fully crash sometimes. DDoS attacks are launched in the following distinct ways. First is the *malformed packet attack* in which abnormal packets are directed to the target machine to peculate the applications running on it or disproportionate the protocols on the target node. Second is the *network layer attack*, which is designed for draining of bandwidth through compromised router processing algorithms, causing the disturbed connectivity to the target user.

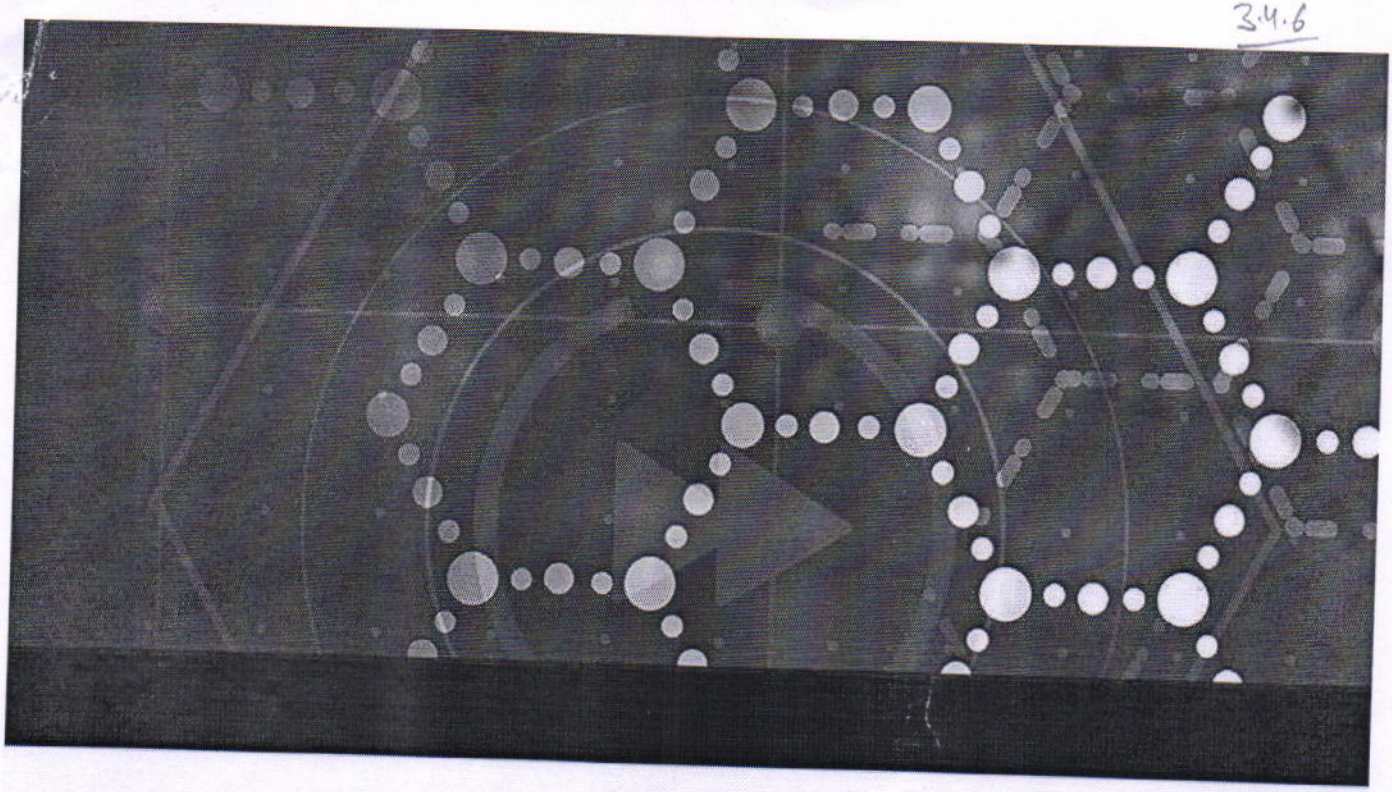
DDoS can further be classified in reference with standard network model as *network/transport-level* and *application-level attacks*. The former DDoS attack exploits partially open sockets of transport-layer ports such as transmission control protocol (TCP), user datagram protocol (UDP), and internet control message protocol (ICMP), whereas the latter DDoS attack overloads the server by pushing in search requests or malicious login requests or any other application-based query. Thus, application-layer DDoS attacks cost less on resources of the attacker and are stealthier in nature. They are tougher to detect as they work on already established connections; hence, the requests seem as if they are from legitimate users. The impact of these attacks on services like HTTP (Hypertext Transfer Protocol), File Transfer Protocol, SMTP (Simple Mail Transfer Protocol), Domain Name Server, and Voice over Internet Protocol (IP) is well known. According to the Imperva report, application-layer DDoS attack has become more common due to its less cost for attackers to execute and effective penetration in the defense mechanism, if any is used [2].

The frequency of DoS attack continues to break records. Year 2018 was marked as the worst year for DDoS in history, with attack reaching 1 TB. Some internationally important examples are: in February 2018, ceremony of winter Olympics suffered; in January 2017, the Defense Department of US repulses a flood of spam; and in the same year, Russian counterparts too had to encounter a DDoS offensive [1]. Much in news remain dull response of transaction servers through Master/Visa or any other credit/debit card supporting transaction websites during sale days put compulsions for the spot light on DDoS combat. An insight into the present status of such attack damage is articulated in [3].

3.4.6 Number of books and chapters in edited volumes published per teacher during the session 2021-22

3.4.6.1: Total number of books and chapters in edited volumes / books published, and papers in national/international conference-proceedings during session 2021-22

S. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
1	Amoljit Singh Gill	Additive Manufacturing with Medical Applications	Amalgamating Additive Manufacturing and Electrospinning for Fabrication of 3D Scaffolds	-	-	International	2022	eBook ISBN9781003301066	IKGPTU	CRC Press an imprint of Taylor & Francis Group, London
2	Amit Bansal	Advances in Microwave Processing for Engineering Materials	-	-	-	International	2022	eBook ISBN9781032164786	IKGPTU	CRC Press an imprint of Taylor & Francis Group, London



ADDITIVE MANUFACTURING WITH MEDICAL APPLICATIONS

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Parveen Kalra, Rajendra M. Belokar

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10 Amalgamating Additive Manufacturing and Electrospinning for Fabrication of 3D Scaffolds

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10.1 INTRODUCTION

A remarkable shift has been witnessed in the field of tissue engineering with the focus moving from synthetic implants and tissue grafts to the use of three-dimensional (3D), degradable, porous material scaffolds integrated with biological cells or biomolecules to regenerate tissues. Nowadays, great emphasis is made on designing, and then

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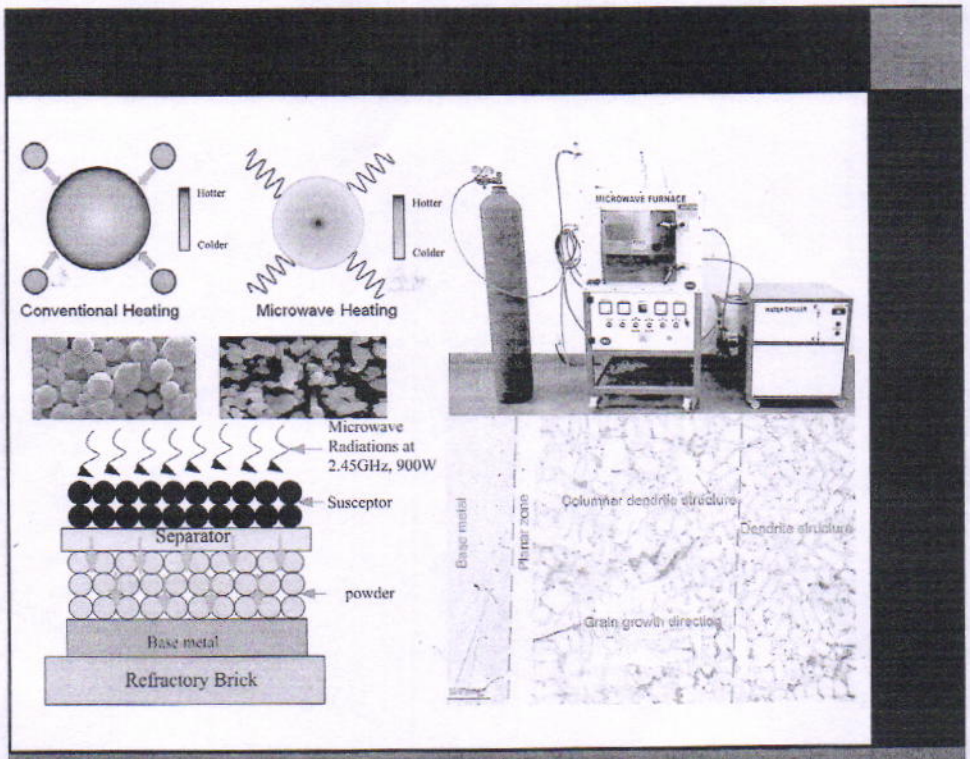

Advances in Microwave Processing for Engineering Materials

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Hitesh Vasudev

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CNRE-2021
05th–07th August, 2021

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COMPUTING, NETWORKS & RENEWABLE ENERGY

Editors

Satvir Singh
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I.K. Gujral Punjab Technical University
Jalandhar-Kapurthala Highway, Kapurthala–144603 (Punjab) India

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Replacement of Conventional Batteries with Supercapacitors in Energy Harvesting Systems

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***Abstract*—Conventionally, the major source of power in deployed sensors are batteries. Batteries are distinguished by their high energy densities, which are responsible for long-distance activity. Nonetheless, recharging a battery can be a time-consuming process. A supercapacitor is a new type of energy storage that can be charged quickly and can be used to replace traditional batteries. It has come up with an option to conventional sources of power. This paper discusses the varied sources of power and their evolution till now, meeting the energy requirements. The application area of supercapacitors in diverse fields is also explained.**

Keywords: Energy Harvesting (EH), Batteries, Supercapacitors, Hybrid Supercapacitors, Electric Double Layer Capacitors (EDLC).

I. Introduction

Electronic circuitry's continual downsizing is an enabler for implantable biological sensors. Batteries are used to power most implantable sensors. Even though they have high energy densities, charging for longer duration in sensing devices might not be feasible. The functional boundary between capacitors and batteries has blurred due to recent advances in supercapacitor technology, with capacitors having progressively enormous capacity. Although supercapacitors' energy density is still modest, the prospect of using them as a battery replacement now exists.This idea is especially appealing in applications that require quick charging and minimum charge circuitry. Supercapacitors have traditionally been used as a source of peak output power for battery-operated devices [1]. Furthermore, supercapacitors are frequently employed as energy harvesting storage units. For instance, energy harvesters such as solar cells provide sufficient operating power to charge the supercapacitor which in turn delivers it to the load.[2]

The goal of this study is to look into the possibility of using a supercapacitor as a battery replacement in low powered devices.Implantable sensors have traditionally been powered by batteries. Batteries allow the circuitry toget seal and encapuled with the suitable power management for long periods of time.

Batteries, on the other hand, come with a variety of drawbacks:

1. Secondary batteries take a lengthy time to charge. Telemetry Research Ltd's implantable sensor charges in 4 hours and discharges in 9 hours.[3]
2. Various types of batteries are prone to memory effects, which means that if they are not properly maintained, they will degrade with time.
3. Many dangerous heavy metals can be found in batteries.

In today's world, supercapacitors are employed in numerous secondary power source applications. Typically, the supercapacitor is used to complement a traditional battery supply during high load situations. The difference can be much understood from their energy and power density values and in the number of charge and discharge cycles.

Because of the fact that supercapacitors can be charged and discharged quickly depending on their power densities, these are preferred in the applications requiring erratic current pulses. Supercapacitors, on the other hand, have a low energy density, thus batteries are still preferable in applications that require consistent power for longer periods of time. [1] Supercapacitors, in addition to having quick charging capabilities, have the following advantages over batteries:

1. Capacitors can withstand extremely high charge and discharge currents and can simply ascertain their state of charge by monitoring their terminal voltage.
2. Capacitors have low chances of harm as compared to the batteries because of the RoHS (Restriction of Hazardous Substances Directive) compliant. [2]

II. Batteries

A chemical reaction is used to generate electrical power in batteries. They are made up of one or more electrochemical cells that are coupled in series or parallel to provide adequate output. A negative electrode called as anode, a positive electrode called as cathode, and an ionic conductor called as electrolyte are present in each cell of the battery. Both the positive and negative electrodes are separated, and the electrolyte serves as a

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Effect of Noise on the Performance of SCM Radio Over Fiber System

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***Abstract*— Now days the growing petition for bandwidth in optical communication persuades the expansion of high data speed and low-cost optical broadcast. Radio-over-Fiberknowledge is measured as an effective and applied solution for providing (broadband wireless admittance). In this paper, Radio-over-Fiber (ROF) system using Subcarrier Multiplexing/Amplitude Shift Keying techniques to transmit signal. The wavelength is common for both up-link and down-link channel and 1Gbps data rate is distribute over the distance 21 km bidirectional optical fiber. Reflective Filter remains used to remodulation of signal from down-link to up-link at different parameter of noise add or remove. Now the average result obtained from our experience are with noise and without noise as shown Max Q-factor =9.022 for downlink Min BER= 1.105*10^-19 and Q-factor = 6.125 for uplink, Min BER=2.008*10^-10 and eye diagram using Opti-System software-17.1.**

Keywords: ROF, SCM, ASK, BER.

I. Introduction

Opticalfibercommunication is a communication modernization that operates light pluses on the way to transfer data starting from one point to the another through an optical fiber. Now a day a wide demand of bandwidth in wireless and wired communication has been observed [1]. In ROF, radio frequency (RF) signal is transmitted later they are modulated to from an Analog optical connection. RF signal are transmitted from downlink and uplink, to and from Central Stations (CS) to Base Stations (BS). Through RAU, direct detection improves the communicated RF signal in the PIN photodetector [2].

For supportive high capacity transmission at low cost and aiding fiber based wireless, admittance SCM utilized. An effort has been minimize the electronic components number for the detection of baseband signals. Without-any electrical demodulation module baseband signals are directly detected after optical signals. This technique overcomes electronic components limitations and reduces system cost simultaneously[3].

The chromatic dispersion (D) is one of the important factors that used for designing optical fiber communication system results from the limited spectral linewidth of the optical source moreover effect on the system performance [4-5]. The Optical subcarrier multiplexing (SCM) is system which have multiple different signals are multiplexed with the radio frequency signal and carried by a single wavelength. This system has the simple operation, low cost, better spectral efficiency and offers not as much of delicate to chromatic fiber dispersion as compared to conventional time-division multiplexing technique with narrow spacing channel [6 ,7]. Among several optical amplifiers offered,aexcessive preference standsfor EDFA due to its high gain and low noise features.

EDFA remainsintended for long distance broadcast through multi-wavelength causes since their wide bandwidth and optimum Bit Error Rate (BER). EDFAs come across the effects of attenuation, distortion also Rayleigh scattering [8].At the present time, due to changed requirements of operators of the system, the data volume of wireless communication has been totallyextended from modest sound and messages to multimedia through evolutional future facilities. Today knowledge we have two transmitter channel.

Commonly transmitter consume the same components, as shown in figure 1. one transmitter component sinvolve from many components, the pseudo-random bit sequence generator (PRBSG) handed-down for producing the random seeds of the bit[9-21].

II. Opti-system Simulation Setup

The opti-system setup of Radio over Fiber technology used for distribution wavelength for mutually down-link and up-link is design with Opti-System Software version 16.1 as exposed in figure 1. At the transmitter side, pseudorandom bit sequence generator generates the inflection data indication at bit rate 1 Gbps.

Carrier frequency used for amplitude modulation is 1.7 GHz. The RF signal is unitedthrough subcarrier multiplexing component that comprised carrier generator set at 80 channels of 6 MHz arrangement with frequency

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Effects of Noise or Without Noise on Inter-Satellite Optical Wireless Communication System

Sonali Sangral[1*], Dr. Rakesh Goyal[2], Dr. Amit Gupta[3], Dr. Monika Rani[4]
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***Abstract*—In this paper, discusses the effect of noise on IsOWC system using EDFA. The wavelength in this model is 850 nm and 950 nm with same range 300 km for both wavelengths. We observed the BER and Q factor in IsOWC by adding or removing noise in this system. The simulated results shows the all BER graphs by noise addition or remove on different wavelengths.**

Keywords: Inter-Satellite Optical Wireless Communication System (IsOWC), EDFA, Optical Wireless Communication (OWC), BER.

I. Introduction

In day by day the imperious goal is communication from one place to another part on the earth. In the last few years has observed huge growth in communications with Light wave technology in the field of communication. In this communication data transferred in over large distance has become achievable. Optical communication has advanced from long strands to wireless technology .This has resulted to use the optical wireless communication in space. Because of high band width, light weight, small size, low power and low cost of inter satellite optical wireless communication. LASER communication is matured enough to transmit data in space to communication between satellites [1] .Inter-satellite optical wireless communication (IsOWC) is developed by modifying OWC technology into space technology [2]. The transmission of data on long range distance is only possible through optical wireless communication. In IsOWC system, the optical wireless communication between two satellites. The satellite laser links covers a large area of the earth surface. FSO is a medium between two satellites and laser beam provide wireless connectivity between transmitter and receiver [3]. In figure 1. Shows the IsOWC system divided into three parts, the transmitter, OWC channel, the receiver part, the transmitter part is satellite one and the receiver part is satellite second. The transmitter part consists of laser and it is used for generating light, tracking and communication system, satellite telemetry and an optical modulator. This information generally comes from the satellite's telemetry, tracking and communication (TT & C) system [4]. The most important component in the system is light source as communication is done by transmitting light. Two types of optical light source used in optical communication i.e LED (Light Emitting Diode) and IDL (Injected Laser Diode). Optical wireless channel is a transmission medium between two satellites. OWC channel is formed to be free space and it is free from atmospheric attenuation factor[5]. The receiver side it consists of photodiode and a low pass filter. Here avalanche photodiode (APD) is used to convert optical signal to electrical signal, is has high sensitivity compare to PIN [6]. It carry positive and negative charged semiconductor connections, in reverse bias connection like an optical light source [7]. Then, when photons strike the junction, electrical signal is created. Due to the huge amplification of low or weak light signals, APD is employed in freer optical data transfer. [8]. The APD is increased when charged electrons are injected and collide with neutral semiconductor atoms in these high electrical fields which therefore create enormous amounts of additional carriers [9-20].

II. System Simulation Model

The system performance may be verified by examining the BER and Q-factor in numerous ways. The proportion of bit errors identified in the receiver and the amount of bits sent may be described as BER. Due to noise on digital signal, bit errors arise as the result of erroneous judgments taken at a receiver. In the meanwhile, Q-factor is a signal quality measurement. It matches the signal-to-noise ratio of the system. The BER is usually too tiny for the optical system to measure, thus the Q-factor is more suitable for usage. The figure 1. Shows the simulation model of Is OWC with using EDFA. In this model, using frequency is 850 nm and 950 nm and range 300km and EDFA is an operational amplifier. In this model, we analyze the effect of noise on IsOWC by adding or removing of noise in this system model.

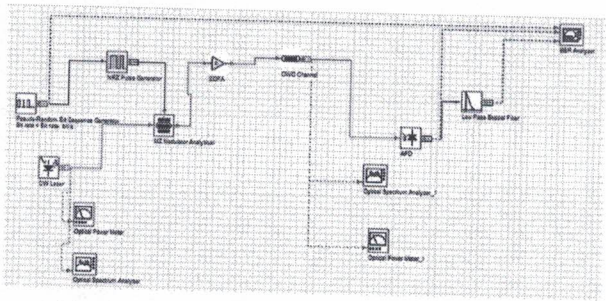

Fig.1: IsOWC simplex model.

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Free Space Optics Performance Analysis Under 8dBm Impact of Power in Spatial CW Laser and Attenuation 2dB/Km in FSO Channel on Various Atmospheric Effects

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***Abstract*—Free space optics is a technology for optical communication. It is used where the fiber optic cable is impracticalbecause of its high cost in installation or other reason. In FSO the signal/information is transmitted by the transmission of light into free space. Wavelength used for the transmitting of data in FSO system are 850nm, 1310nm, and 1550nm. Out of these wavelengths, 1550nm laser wavelength is preferred mostly as this wavelength provides more wide range, the performance, and safeness. The 1550nm has a high data rate ranging from 20 to 40 Gbps and is less affected by solar and also it has a beam level of power. In this research paper the FSO link is assess on the basis of eye diagram readings in the form of q-factor and BER values. From the simulation we have noticed that link distance is reduced while we increase the range and attenuation of the FSO channel.**

Keywords: BER, Spatial CW Laser, Free Space Optics (FSO),BER Pattern, Q-Factor, Eye Diagram.

I. Introduction

Now is the world of connectivity with high data rates with Recent criteria for high-speed and latency applications have departed Wired and wireless RF interaction, but these are the bandwidth of communication systems is small, so Improving the bandwidth used by wireless technology. FSO has an optical transceiver at both ends to provide the bi-direction capability. FSO is a cost-effective and glamorous solution for high data rate and voice communication. FSO avoids many challenges as the digging of ground, roads, etc practically which is very costly, whereas the FSO system is mounted within a building or top of the building/roofs. As compare to the OFC it has a very low error rate, cost-effective. FSO takes much less time in installation as of OFC. In FSO, the presence of physical connection among the transmitter and receiver is not required [1][2]. And it can be presented to upgrade for long distances up to a few kilometres with high data transferring rate. With the wireless industries growing need for higher rates of transfer and higher speeds Optical cable or cables, the higher the volume of data transmitted, Transfer capabilities are approaching their limits. Minimal expense, permit free, and connections of high speed are provided by FREE-SPACE optical (FSO) systems, which makes FSO a promising solution for a variety of applications [3]. In addition to indoor wireless local area networks and network node interconnections, FSO systems are used as a rapidly deployable network. Communication scheme in circumstances of disaster recovery, the atmospheric vibration occurring due to spontaneous variations in the refractive index of air is adversely affected by the device ability and transmission distance of free-space optical links. A number of approaches have been suggested to minimize the Scintillation effects in FSO systems [4]. By averaging the received waveform over the aperture region, a wide aperture receiver will reduce signal fluctuations if its diameter is larger than the optical scintillation spatial coherence scale. The average factor is limited, however, by the size of the optical beam. The scintillation effects can be reduced by having diversity in space. Other methods, such as finely tuned receive filters and automatic filters gaining controls that are typically used in commercial FSO Scintillation noise cannot be mitigated effectively by systems. In this report, they suggest and experimentally explain a simple approach using CW laser for scintillation suppression of FSO channels. When the gain is saturated by the input turbulent signal, the optical amplifier erbium-doped optical amplifier (EDFA) or semiconductor optical amplifier (SOA) can help in the reduction of variations in amplitude and also amplify the optical signal [5][6]. Atmospheric attenuation or turbulence affects the signal propagating through FSO, leading to complete link loss at the Rx end and degrading the link output [7-19].

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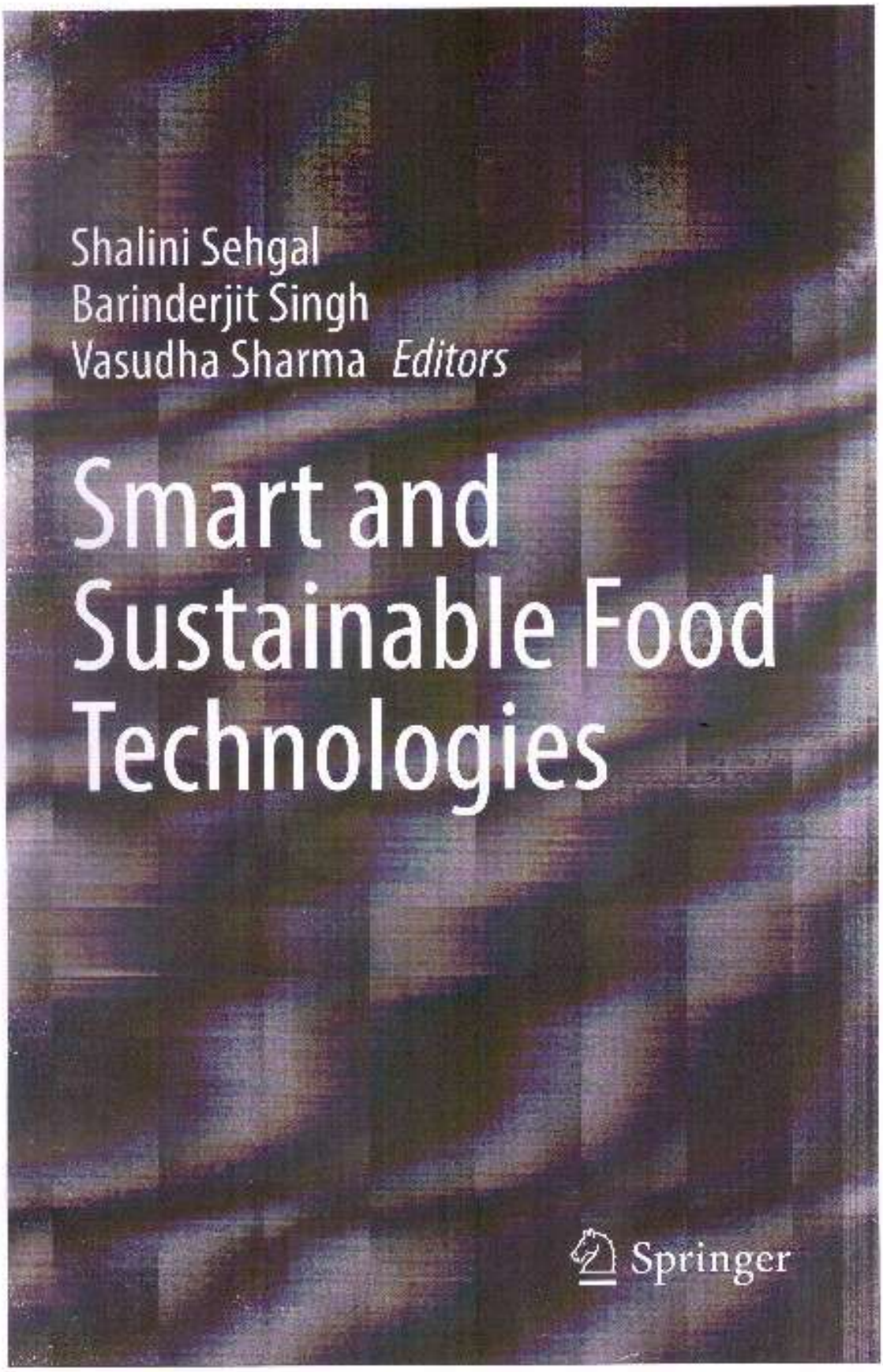

Contents

Chapter 6
Non-thermal Food Preservation Technologies

Ravneet Kaur, Shubhra Shekhar, Sahil Chaudhary, Barinderjit Singh, and Kamlesh Prasad

Abstract Recent food processing trends and preservation technology mainly focus on retaining freshness and minimizing nutritional and sensory losses during processing. Conventional processing techniques involve high temperature (thermal processing) for microbial inactivation and food preservation. Exposure to high-temperature results in the loss of heat-sensitive nutritional components and affects textural and sensory characteristics of foods. Therefore, to obtain high-quality minimally processed food products, non-thermal techniques are found to be better. Standard non-thermal preservation techniques include high-pressure processing, pulsed electric field, cold plasma, supercritical carbon dioxide, irradiation, and ultrasound. This chapter focuses mainly on the principles, processing, and application of non-thermal techniques in food preservation.

Keywords Non-thermal food preservation · High-pressure processing · Pulsed electric field · Cold plasma · Supercritical carbon dioxide · Irradiation · Ultrasound

6.1 Introduction

Food preservation, safety, and quality are the significant goals of food processing industries to meet consumer demand as per the recent trends. Commonly used traditional food processing techniques involve thermal treatment for improving the production rates and shelf-life extension. Thermal processing is required to get the desired characteristics in processed food products but involves higher temperature

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MAHARAJAH'S PALACE IN THE SKY: DISINVESTMENT OF AIR INDIA

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"Air India's achievement is still a part of historical records, a feat performed between August 13 and October 11, 1990. More than 1,70,000 Indians were stranded in Kuwait at that time and Air India operated some 488 flights to evacuate them from Amman to Mumbai, a distance of more than 4,000 km.....the new edition of the Guinness Book of World Records was published with Air India's achievements duly listed."

- JitenderBhargava, former Air India (AI) Executive Director

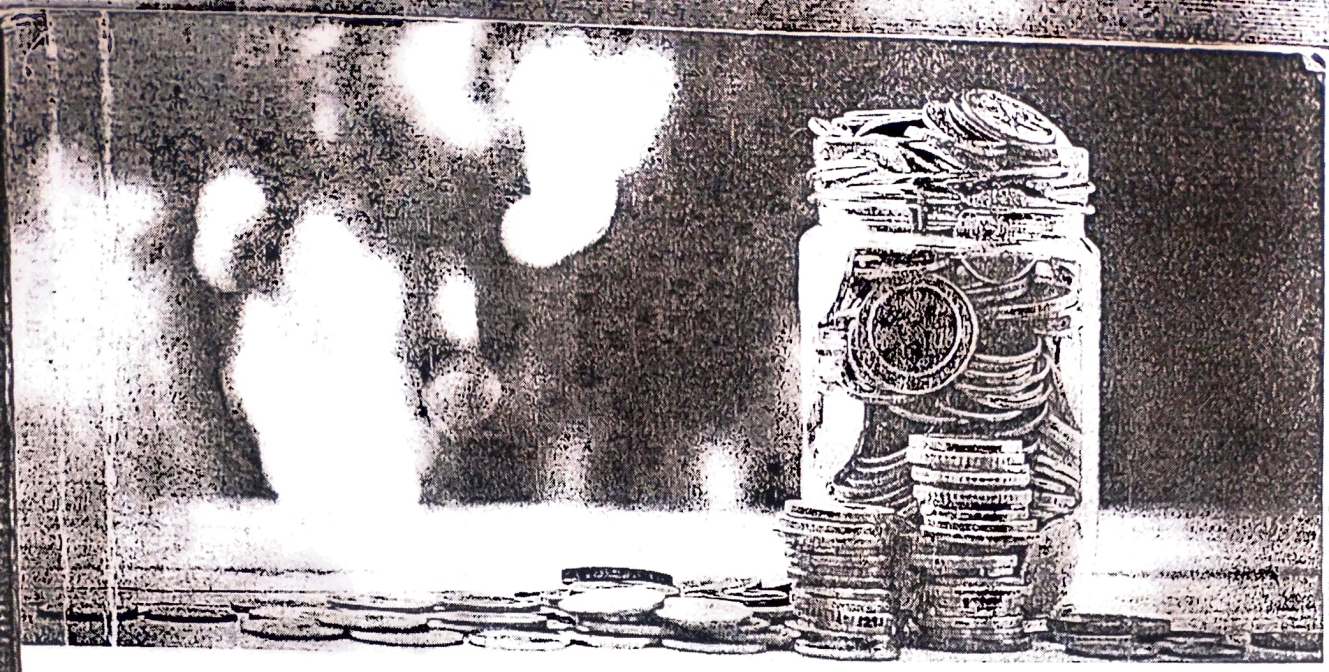
These words signify the importance of Air India, India's national carrier in the history. 'Airlift', a Bollywood-movie, based on these real events and efforts of Air India on evacuation of stranded Indians in Kuwait, brought this to centre stage in 2016. Our Government of India has initiated the process of privatization of Air India.

ABSTRACT AND THE PURPOSE OF THE CASE STUDY: -

Across the world, airlines have been privatized. US never had any government-owned carrier. European countries have privatized most of their carriers. Gulf countries have their carriers as these countries are not a democracy like India. A country like Singpaore also privatized their airline. India has Air India Limited which is a government owned entity as on January 31, 2021. Airline was established as Air India International in 1948 by JRD Tata, a prominent businessman and head of Tata Group at that time. JRD Tata was the first person within the country to fly an aircraft. The Government of India nationalized the airline in 1953 and became the national carrier.From the financial year 2011-12 to August 2020, the Government of India contributed Rs. 30,520.21 crore. In September 2020 the debt of the airline stood at Rs. 60,000. On September 15, 2020, Sh.H.S.Puri, Civil Aviation Minister disclosed in Upper House of Parliament that Government has two options, i.e., either to privatize Air India Limited or shut it down due to such a high debt level. With disinvestment of the airline, it will come to full-circle, i.e. privatization to nationalization in 1953, and nationalization to privatization in 2021, if government succeeds in selling the stake to a private entity. The case study provides interesting insights on valuation, change of control, issues and challenges in privatization of a government entity. Issues become complex when the entity has huge amount of debt, but it is put on sale as a government entity when it proved its utility under many government initiatives. The case study discusses macro issues such as compulsion of the government to disinvest stake in a government-owned entity, implications of government influence on financial decisions and working of a government-owned entity. Besides this, it essentially discusses issues from the buyer/acquirer-side such as reaction of potential investors while participating in the bidding process, and factoring various conditions including compulsion to retain iconic brand by the new owner. It touches key issues related to employees of the target company which is the government-owned entity as for them; the employer will change with a potential change in terms and conditions for working with airline under a new owner. The case study touches important issues pertaining to valuation.

INTRODUCTION

Tata Airlines was set up by Tata Sons in 1932. JRD Tata, who flew the first flight between Karachi and Bombay in 1946, was also the first person to get a License to fly. Air India International in was established in 1948. In 1948,



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PUNJAB AND MAHARASHTRA CO-OPERATIVE (PMC) BANK: TRUST ERODED!

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ABSTRACT

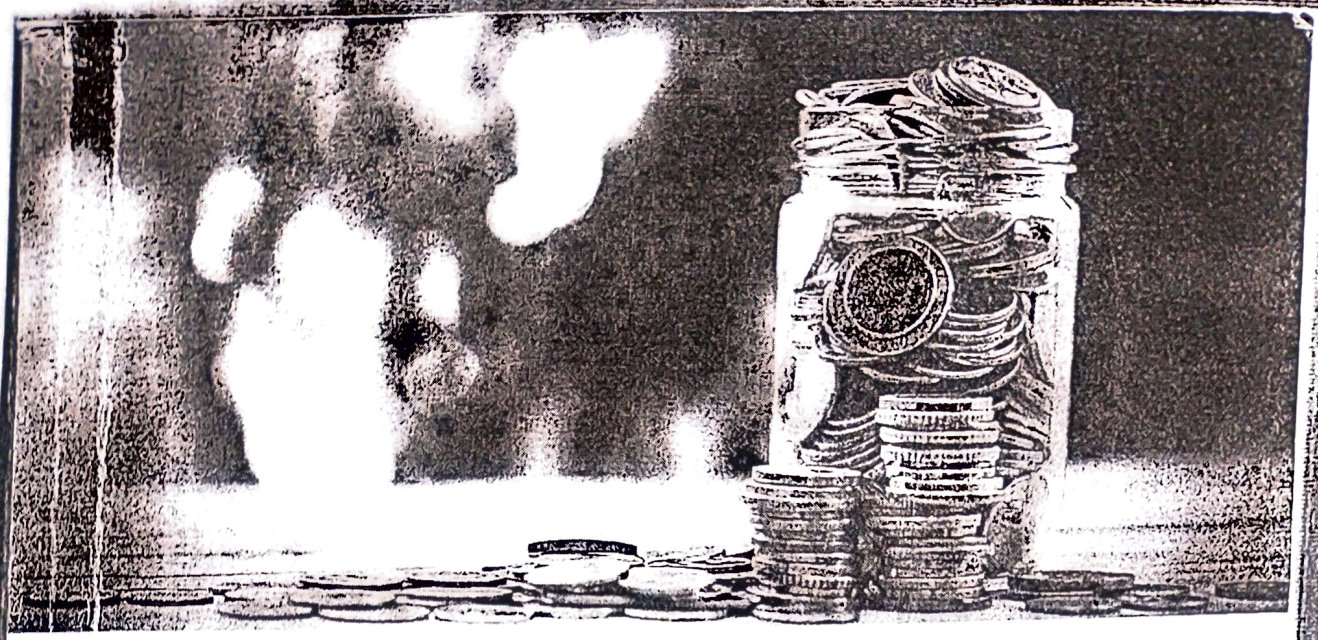
PMC Bank was set up in Mumbai (India) with the main objective to provide financial assistance to taxi drivers especially Sikh drivers who were not able to get loans from state-owned banks at that time. The Bank performed well till September 2019 when the Reserve Bank of India (RBI) initiated an inquiry on the complaint of a whistle blower. Suspended Managing Director of the bank in his confessional letter revealed the role of six officials including the Chairman of the bank in the scam involving Rs.6,500 Crore, making it the 'biggest scam' in a cooperative bank in India. The scam involved sanctioning of loans by the PMC to the promoters of Housing Development and Infrastructure Limited (HDIL), a company in housing and infrastructure sector. The relationship between the 'lender' and 'borrower' got developed over a period as both companies saved each other in their hour of need. The Chairman of PMC Bank was taken on the board of HDIL and became a co-promoter of that company. 70% of the loan book of PMC Bank comprised loan extended to HDIL which became non-performing. To hide the loan, the lender created more than 20,000 fictitious accounts and resorted to 'misreporting'. After taking over the PMC Bank in Sept. 2019, the RBI initiated a forensic audit and imposed severe conditions on operations. It adversely affected a large number of depositors in the bank. Regulatory intervention could save about 78% of the depositors but 9 lakh depositors were at the receiving-end due to restrictions imposed on the payment of deposits. There was laxity on the part of statutory auditors as they failed to perform their role effectively.

The case study deals with corporate governance issues as evident from 'conflict of interest' as lenders and borrowers had some 'commonality' in their management, 'no full and fair disclosure to top management', 'non-reporting of losses', 'sanctioning higher loans in absence of adequate security', 'non-reporting of overdues', 'falsification of records, e.g., reporting 'non-performing loans' as 'performing', non-compliance to 'regulatory norms', among others. Regulatory flaws were evident as the RBI 'failed to act well in time, 'dual regulatory control' resulting into absence of accountability, impact of frequent changes in the top management of the 'regulatory body', delay in increasing limit of 'deposit insurance' and in 'failure to protect interest of depositors'. The case study provides insights on concentration risk and issues due to significant exposure to just one client. The case study delves into issues regarding assessment of the client by the lender on the basis of 'past track record', and 'genuine issues' faced by the client in running a business enterprise. The present case study brings into picture the nexus between real estate companies, politicians, bankers and gangsters. This has implications for businesses in the banking and real estate sector in India. It also provides insights on the functioning of investigating agencies with reference to their attempts to recover dues from the promoters of HDIL.

Keywords: PMC,HDIL,RBI,Corporate Governance.

PUNJAB AND MAHARASHTRA CO-OPERATIVE (PMC) BANK: TRUST ERODED!

Punjab and Maharashtra Co-operative (PMC) Bank, the brainchild of late Gurcharan Singh Kochhar, was set up on February 13, 1984. The first branch of a single room occupied an area of 240 square feet in Sion, Mumbai (then known as - Bombay). Its main aim was to provide financial assistance primarily to taxi drivers as many Sikh drivers found it difficult to get loan from PSBs(Public Sector Banks) at that time. Charan Singh (74) was a founder director of the bank. They got the bank licence in 1983 during the tenure of Dr. Manmohan Singhas the Governor of the



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RECENT TRENDS AND PROGRESS OF SECURITISATION IN INDIA: A PERSPECTIVE

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ABSTRACT

This chapter is about recent developments in Securitisation market in India. Securitisation has seen application in many areas in India. Financial crisis of 2008 was attributed to securitisation along with certain other factors. Still the concept gained currency in India even after the economic crisis of 2008. Underlying reasons behind the significant growth of securitisation in India are different. Significant differences in the use of securitisation in India needs to be established by comparing them with the factors that led to economic crisis, especially in the USA. This chapter elaborates Indian securitisation market, lists existing and emerging securitised asset classes in India, besides describing recent developments regarding securitisation market in India such as impact of COVID-19, impact of default by Infrastructure Leasing & Financial Services and impact of Dewan Housing Finance Corp. Limited (DHFL). Finally, it discusses the changes initiated by the Reserve Bank of India (RBI) in the light of default by IL&FS, DHFL debacle, and Housing Development and Infrastructure Limited (HDIL)&Punjab & Maharashtra Co-operative Bank Limited (PMC) fiasco.

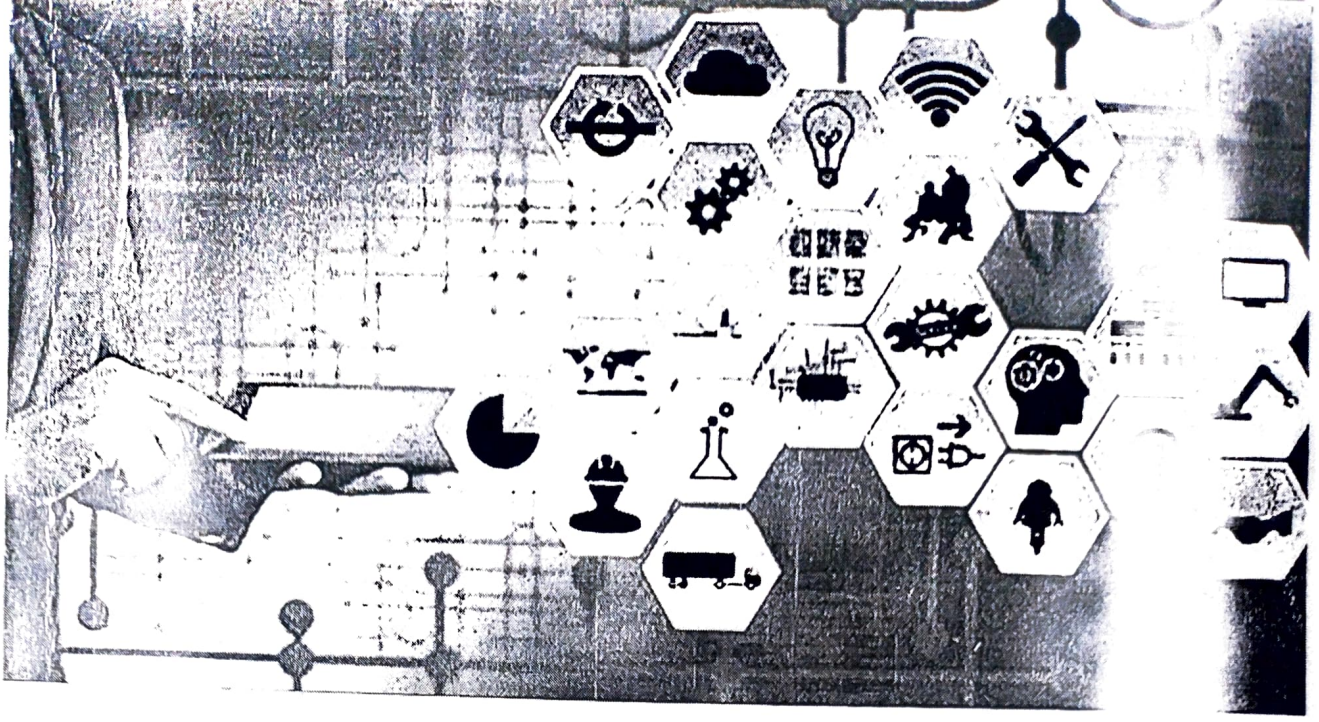
FINANCIAL CRISIS OF 2008 AND ROLE OF SECURITISATION

One major contributor to the financial crisis of 2008 that originated in the USA, was the 'Housing bubble'. There was a huge push for homeownership during that period, and people were encouraged to go in for mortgage which they were not able to afford as rate of interest were very low, i.e., less than 2%. A study by the Harvard Joint Center for Housing Studies (cited in BusinessWeek dated October 20, 2008) concluded that for almost two decades till 2001, the national median home price remained between 2.9 and 3.1 times of the median household income. This ratio touched 4.0 by the year 2004, and further, it touched the level of 4.6. Statistics show that >4 in every 10 households in California who owned a house, used to spend 30% or more than that of their incomes on housing only. Housing loans were given to sub-prime borrowers (i.e., borrowers with low credit score), low-income borrowers, and high-risk borrowers. These loans were bought, bundled, and through securitisation, these were sold to investors. Due to increased flow of funds as a result of securitisation, there was no dearth of funds for housing loans. Home prices kept on rising and lenders as well as rating agencies had the impression that the investment is safe due to mortgage-backed securitisation. When the default started then prices of dwelling units also suffered a setback. In the whole process, the following ratios were not at appropriate and manageable levels:-

(1) Loan-to-Value ratio
(2) Price-to-Income ratio
(3) Household debt to annual Personal Disposable Income

INDIAN SECURITISATION MARKET

Securitisation hasgot a foot-hold in India because of housing finance companies (HFCs) and the housing loan market. The large amount of residential mortgages was the basic reason. As the receivables are backed by mortgage, when the residential property is financed by bank loan, there is the security for the lender. It is therefore referred to as 'Mortgage-backed securitisation' or MBS. There is less erosion in the value of mortgaged property as it does not suffer wear-and-tear like any other physical asset, e.g., car, commercial vehicle, consumer durable, etc. Securitisation found takers in other sectors especially in investment and lending such as investment in long-dated securities, retail financing, financiers of consumer durables, car financing, auto loans, and deferred credit receivables, among others. These are part of 'Asset-backed securitisation' (ABS) or simply, Asset Securitisation



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CONTENT

ACCEPTANCE OF CRYPTO-ASSETS AS A NEW CLASS OF ASSETS: ISSUES AND CHALLENGES

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".....a more fundamental battle is taking place, a philosophical fight between the 'autonocrats' an... 'anthropocrats'. 'Autonocrats' are people who put maximal trust in autonomous systems. 'Anthropocrats' are people who don't really trust autonomous systems. They want humans to be in charge and humans to have a layer of judgement."

- Lane Reti...
- A core developer at the Ethereum Foundati...
The non-profit behind the Ethereum blockchain platfor...
And the 'ether' cr...

Applications of blockchain to the financial system are likely to have significant impact on existing syste... One such application is reflected in emergence of Crypto-assets. Among existing, and established '... classes', a new class of asset has to make a place for itself. Existing trend shows that traditional finance ... be better, cheaper and faster with the use of crypto. This chapter is about issues and challenges in accept... of crypto-assets as a new class of assets. After describing the meaning of 'crypto-assets', the classificati... crypto-assets has been elaborated with the most recent data and the facts. The chapter discusses these i... and challenges from the government and regulator perspective, issuers and market intermedi... perspective, and from the perspective of investors. Any new asset has to take care of these stakeholders as ... first and the foremost condition on acceptance of any asset class is the perception of government ... regulator. Next important factor which is going to determine the success of crypto-assets is the ... foundational infrastructure available in any economy. To support this argument, the most recent d... digital foundational infrastructure has been given on one economy, i.e., India, with reference to succe... specific crypto-assets. Another major factor on acceptance of crypto-assets as a class of assets is the r... market intermediaries as well as issuers, in terms of number of participants, self-regulation, develop... markets, introduction of new products, etc. Finally, from the investors' perspective, crypto-assets are a... to possess certain properties such as liquidity, risk, and return.

INTRODUCTION

A collection of various securities which exhibit similar traits as well as comparable responses to ... fluctuations, is termed as an 'asset class'. There are different asset classes such as 'fixed-income' asse... 'equity asset' class, 'real-estate asset' class, and 'cash and cash equivalents' asset class. Crypto-assets, a... of assets, are of a recent origin. Crypto- as a prefix in crypto-assets and cryptocurrencies, s... 'cryptography'. In common parlance, cryptocurrencies are stated to form all crypto-assets, but that ... reality. It is reflected in the number of crypto-assets which have emerged over a period.

Impact of Covid-19 on Economy and Society in India

Dr. Rajpreet Kaur
Dr. Roopali Batra

COVID-2019: Challenges for the Banking Sector in India

Dr. Sanjeev K. Bansal* and Dr. Sandeep K. Bansal**

Abstract

The fulcrum of an economy is banking. The banking industry is a significant link in the various socio-economic activities that contribute to a country's economic development. Since it is regarded as the backbone of economic development, any change in its processes is thought to affect the country's development. The financial viability of the banking system is critical. Banks have collaborated in the past. Banks regulate a large portion of the money supply in circulation. They can sway the essence and character of production in any country by doing so. The world around us has been undergoing tough unprecedented challenges arising out of the COVID-2019 pandemic disrupting the economy in general, and the banking sector in particular. COVID-2019 has very adversely affected the health and wealth of the citizens of almost every country. To tackle the threat of the COVID-2019 pandemic, the Central government and the State Governments have taken up drastic measures by announcing and implementing the series of lockdowns in the country. The Govt. is not risking people's health and lives, which are far more important than the economy of the country. Keeping in mind, the likely liquidity crunch, the Reserve Bank of India has allowed companies to opt for a three-

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FINANCIAL INCLUSION IN INDIA: ITS SIGNIFICANCE AND CHALLENGES

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ABSTRACT

Our country is a country of villages. As a result, the development of rural India is a critical stage in the ov economic development of the country. Financial Inclusion is a worldwide endeavour to give economic disadvantaged and vulnerable people with inexpensive access to and information about various finan services at a reasonable cost and in transparent way by country's financial services providers to assist the move out of poverty. Financial inclusion encompasses more than just the supply of credit. Financial awarene understanding of banks and banking channels, bank amenities, and the benefits of using the banking route all included. It also entails educating individuals about money. The Reserve Bank of India, India's bank regulator, has led the charge for financial inclusion. However, the push of financial inclusion activities in In has not been so much successful in covering major chunk of deserving people under the fold. Finan inclusion is an important step in India's fight against poverty. In India ,Financial inclusion is not very m successful because of various factors like measurement of extent of financial exclusion, low literacy rate low awareness level ,poor saving habits, unique expenditure patterns, lack of desired infrastructure, div local conditions & high transaction costs, perception about risk, recovery related issues, dormant account sustainability factor to name significant ones. Thus, the present paper attempts to review the progress made financial inclusion in India so far and the factors responsible for slow growth in this regard. Fina recommendations have been given to increase the degree of effort by banks, regulators, the government, SH and the corporate sector so that more and more rural poor people can benefit from financial inclusion.

Key Words: Financial Inclusion, Financial Exclusion, RBI, Literacy level, No frills a/c, SHGs.

"The future lies with those companies who see the poor as their customers" - **C.K.Prahalad**

INTRODUCTION

The major chunk of Indian population lives in rural areas, making it the country of villages. India is rank second in the world in terms of the number of people who are financially excluded (only after Chin Uneducated people, disabled people, poor groups in rural and urban areas such as farmers and small sell poor socially underprivileged, mobile population, and poor engaged in unorganized sectors, agricultural a industrial labourers, and old and deserted make up the financially excluded population of society. In country, there is a great divide between India (urban and economically advanced) and Bharat (rural a economically weaker).As a result, rural India's growth is a critical stage in the country's overall econom development. Financial Inclusion is a worldwide effort to provide economically disadvantaged and vulnerab people with access to and information about a variety of financial services at a reasonable cost, delivered in fair and transparent manner by the country's financial service providers, in order to assist them in escapi poverty. The supply of loans is only one aspect of financial inclusion. Financial awareness, understanding banks and banking channels, bank services, and the benefits of using the banking route are all included. It al entails financial literacy for vast swaths of the poor and low-income. Financial inclusion, in fact, c significantly improve people's living standards of the poor and the disadvantaged. Financial Inclusion fundamental for an inclusive democracy.

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INDIA'S TRYST WITH GOODS AND SERVICES TAX (GST): AN ASSESSMENT

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TRACT

r independence, the Goods and Services Tax (GST) is regarded as the major indirect tax reform.GST was ted on July 1, 2017, and is nearly completion of four years. In four years, it is expected that GST ework must have stabilized to a great extent. In this chapter, authors have made an attempt to assess the tiveness of the implementation of GST. For this purpose, certain key aspects have been observed namely, ges in tax slabs, changes (increase, decrease or no change) in the number of registered dealers, change in ership of GST Network (GSTN), impact on 'ease of doing business' through indirect measures, and ue collection through GST. It was expected that the GST will lower cascading effect so it can be inferred majority of the items will fall in lower tax bracket. It was expected that simplification "One Nation One One Market" would expand the tax net so it can be inferred that more dealers will opt for registration. With , it was expected that more tax compliance would be there so number of Micro, Small and Medium prises were expected to join GSTN. In 2013, GSTN was created as a Private Limited Company but many s were expressed on making a huge database available to private entities. So, the changes in ownership m were expected. With simplified and good tax, GST was expected to mop-up higher revenue. Hence, in background, authors considered these aspects for assessment.

Words:- Goods and Services Tax (GST), Tax slabs, Composition Scheme, Registered Dealer, GST Network TN)

RODUCTION

every tax to be appropriate, it is expected that it will follow certain taxation principles namely, adequacy, d-based, compatibility, convenient, efficient, equitable, predictable, neutral (i.e., not favouring one group or or), among others. The Goods and Services Tax (GST) was projected as "One Tax for One Nation and to e whole Nation as One Market" due to the fact that before introduction of GST, there were multiple indirect s across the nation, and across different markets within the country. Due to multiplicity of indirect taxes and rences in state legislations, there was no uniformity and it used to make compliance difficult and costly for esses. The GST was hailed as the biggest taxation reform since Independence of the country. The Prime ster in his address stated GST as 'Good and Simple Tax', a phrase that was used by SatyaPoddar (in ness Standard dated May 18, 2015).GST was expected to be beneficial for all stakeholders, i.e., common (due to exemption on majority of items from GST, or majority of items under 5% tax rate), expected boost nvestments and exports, increase in employment due to increased economic activity, encouragement of ufacturing in India), trade & industry (simplified procedure and no cascading impact of taxation), and the omy (a unified common market across the country, standardisation of laws, and procedures, etc.).

itle of the chapter is based on the historic speech of the first Prime Minister Pandit Jawaharlal Nehru with tle, 'Tryst with Destiny' that was delivered to the Constituent Assembly on the midnight of August 14-15, . In the similar manner, a special midnight session of Parliament took place and the GST was launched on 01, 2017. It was evident from the speech of the Prime Minister when he stated that 'GST has united try the way Sardar Patel had done post-independence'.

he end of this month (June 2021), the implementation of GST is going to complete four (04) years. So, it mes pertinent to assess implementation of GST. Through this chapter, authors have assessed the lementation of GST in India by taking into account the following aspects:-

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STRESSED ASSETS AND BANKING SECTOR IN INDIA: CHALLENGES AND THE DEBT-RECOVERY MECHANISMS

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ABSTRACT

The present chapter, challenges in tackling stressed assets have been dealt with. After that, the strategy to deal with Stressed Assets has been elaborated by providing the details of recent initiatives of the government and the regulator in addition to the comparative success of debt-resolution schemes namely, SDRC (Strategic Debt Restructuring Scheme), SSSA (Sustainable Structuring of Stressed Assets), and IBC (Insolvency and Bankruptcy Code). At the end, the most recent initiative, i.e., Asset Reconstruction Company (ARC) – Asset Management Company (AMC) model and possibilities associated with this model are given.

Key Words: *Stressed Assets, Banking Sector, RBI, Challenges,Debt-Recovery Mechanisms.*

INTRODUCTION

Stressed assets remain a constant challenge for the banking sector in any economy.It is really very much difficult to tackle the challenges present in dealing with the stressed assets have been dealt with. Sincere efforts from the part of the government and the regulatorare needed in order to deal with this issue, and resolving the matter by initiating various schemes like debt-resolution schemes, and other innovative measures.

CHALLENGES IN TACKLING STRESSED ASSETS

From time to time, challenges regarding stressed assets of the banking sector, have been highlighted by various authorities. Economic, industry-specific, and company-specific issues are widely known. Other challenges are as follows: -

Survey the concentration of stressed assets in large corporate entities and issue of 'wilful defaulters': - The default of large corporate companies is one major problem that is seen as 'incentivizing' loan defaults. Just twelve (12) companies accounted for 25% of total NPAs, according to the RBI in October 2017, and these were suggested for immediate bankruptcy proceedings. The RBI has developed a larger Centralized Banking System database known as the "Central Repository of Information on Large Credits (CRILC)," which contains credit information for all borrowers with a credit exposure of Rs. 5 crores or more.As of December 2018, more than 2000 firms had wilfully defaulted on sums totaling more than Rs. 1.61 lakh crore.

Political difficulties: - Ten (10) state governments had declared farm loan waivers totaling Rs. 1,84,800crore as of February 2019, including the Financial Year 2017-18. In comparison, the sum involved in the top twelve (12) NPAs was Rs. 3,45,000 crore, nearly twice as much as the farm loan waivers. In this background, when the default involving corporate entities is of higher magnitude and there is talk of recapitalization of PSBs due to erosion of capital, then farm loan waiver is also considered acceptable. It is observed that farm loan waivers are done by state governments to fulfill their poll promise. The state exchequer will compensate banks. In this way, the indirect burden is on the state or ultimately, on the taxpayer only.

Structural Reforms: - It has been observed that the banking entities keep on extending loans to those very sectors where default took place. In the recent past, two major developments have been observed regarding PSBs, i.e., focus on their consolidation and intention regarding re-privatization of PSBs. The factors such as 'number of employees', 'pressure of the trade unions and 'political repercussions', are likely to have a bearing on the final decision to privatize.

It was expected that the State Bank of India (SBI) is likely to be kept out of the privatization list as it is the only government-owned bank that has been classified as a Domestic Systematically Important Bank (D-SIB).

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TRANSFORMATION OF INDIAN ECONOMY AND ROLE OF STARTUPS: AN ASSESSMENT

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ABSTRACT

From Red Fort, the Prime Minister announced the Startup India Scheme in the year 2015.A fund of funds with capital of Rs 10,000 crore was also declared, with the money to be used by March 31, 2025.Now, more than five years have elapsed. Hence, it becomes pertinent to assess the role of start-ups in transformation of Indian economy. The chapter briefly explains the start up ecosystem in India in introduction as India has emerged as third largest ecosystem for start-ups. The role of start-ups has been attempted to be assessed in this chapter by looking at the number of start-ups recognised by the government over the years, beginning with their inception. It sums up the number of job opportunities created by these start-ups right from inception of Start up India Scheme. Further, the chapter provides details of total number of beneficiaries along with amount disbursed/ sanctioned to all beneficiaries. The number of start-ups registered under the Start up India Scheme has now surpassed 48,000. The impact of the Coronavirus pandemic can be seen in the number of start-ups added during the 2020-21 era for which data is available. Another Scheme, Pradhan Mantri Mudra Yojana (PMMY) is also contributing to the growth of start-ups and has three categories and the loan amount that is given under these categories. Role of start-ups including unicorns, in terms of solution for challenging needs of the country, e.g. education, healthcare, etc, and launch of innovative products does not form part of the chapter. Classification of start-ups as per sector/industry has not been covered as otherwise, that aspect is directly relevant to the transformation of an economy.

Key words:-Start up, Start up India, Start up Ecosystem, Unicorns, Pradhan Mantri Mudra Yojana (PMMY)

INTRODUCTION

Start-ups hold immense potential in transformation of an economy as they can generate employment opportunities, seek and use additional capital, bring new ideas into action, bring changes in existing ways of doing the business, among others. The term, 'Start up' gained currency due to 'Start up India' initiative that was launched on January 16, 2016. The Ministry of Commerce and Industry's Department for Promotion of Industry and Internal Trade (DPIIT) is the project's nodal agency. The Start up India Action Plan stipulated that a start-up must be incorporated or registered in India for less than seven years (up to ten years for biotech start-ups), have a goal of developing, deploying, or commercialising new products, processes, or services based on technology or intellectual property, and have an annual turnover of up to Rs. 25 crore in any of the previous financial years. formation of start-up by splitting up or reconstruction of an existing business, formation as a private limited company, or partnership firm or a limited liability partnership (LLP), etc. In 2016, the Small Industries Development Bank of India (SIDBI) established a Rs 10,000-crore "fund of funds" to address the financial needs of start-ups.

The objective of this chapter is to assess the role of Start-ups in transformation of Indian economy. To fulfil this objective, an attempt has been made to find out the number of start-ups which came up in existence in last few years and cumulative number of start-ups since the initiation of Start up India initiative. Second objective is to identify the cumulative number of job opportunities created (direct as well as indirect) by these start-ups. Thirdly, the objective is to find out the role played by these start-ups in transforming Indian economy. For this purpose, the role of unicorns (start-ups valued at US $1 billion) has been observed as these start-ups have the real capacity to transform the economy in a big way.

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WORK FROM HOME: INSIGHTS FROM PRACTICES ADOPTED BY INFORMATION TECHNOLOGY (IT) COMPANIES IN INDIA

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STRACT

rk from Home (WFH) has come up as a 'compulsion' rather than as a 'choice' due to the spread of corona s. Across the sectors, the response varied. The response of select top Information Technology (IT) panies in India in such a scenario gives insights that are useful for IT other sectors as well. In this paper, an mpt has been made to analyse the response of prominent IT companies to the necessity of WFH have been ied. The underlying reason for including top IT companies is due to their size, their number of employees, r market capitalization, among others. Further, it has been studied that how these companies have responded the WFH scenario.

y Words: Work from Home (WFH), TCS, Infosys, HCL Technologies, Wipro.

TRODUCTION

certain sectors and functional areas, it is simply not possible that employees go in for WFH, e.g., in duction, Research and Development (R&D), etc. Within the IT sector as well, it is commonly seen that due security requirements of customer projects, e.g., in sectors like the defence sector, Banking, Financial vices & Insurance (BFSI) sector, Public Sector, employees may not be given an option to WFH.

me IT companies were allowing WFH earlier too, and the pandemic only accelerated the trend of WFH. rtain benefits are evident, e.g., reduction in the travel costs for employees, reduction in travel time for ployees, positive impact on pollution, etc.

rtinent questions posed regarding WFH included: -

1. Will Work from Home (WFH) affect productivity?
2. Will WFH lower the investment in real estate as corporate entities in the IT sector invest a lot in offices?
3. What will happen to the investment made by bigger IT companies in real estate and infrastructure for offices?
4. Will WFH affect the efficiency of employees?
5. Will it ask for more investment in technology, security, and related aspects?
6. What will happen to the business continuity?

ata Consultancy Services (TCS) became the world's largest IT company by market capitalization in the last eek of January 2021.

Table 26.1: Indian IT Companies among Top 10 IT Services Companies Globally By Market Capitalization

Ranking	Company	Market Cap (In $ Bn)	Market Cap (In Rs. Tn)	Stock Exchange
1	TCS	169.2	12.34	BSE
5	Infosys	77.28	5.63	BSE
7	HCL Technologies	35.25	2.57	BSE
8	WIPRO	34.15	2.49	DSE

Source: Chandrashekhar, Anandi (2021, January 25). TCS overtakes Accenture to become the world's largest IT firm by market cap. The Economic Times.

CHAPTER 16

A Detailed Study on Evolution of Behavioural Finance

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ABSTRACT

Theory of Behavioural finance has been more popular since the 1980s. Its impact has grown in recent years, and it has actively challenged mainstream financial theories to help investors make better decisions. It covers three major topics. Firstly, the relevance of standard finance theories has been forecasted as well as the scenarios in which they are insufficient, such as market anomalies. Second, it denotes behavioural finance's contribution to closing the gap between traditional finance theories and current market realities. Finally, it addresses certain broad concepts of behavioural biases, such as theory of heuristics and theory of prospects, as well as their underlying psychology and influence on capital market and decision making of an investor. The study examines a new branch of study that offers evolutionary and behavioural approaches to financial market modelling. The fundamental goal is to develop a convincing alternative to the traditional Walrasian equilibrium theory, which is predicated on the assumption that market participants are fully rational. Rather of optimising often unobservable individual utility functions, traders/investors can engage wide sets of strategic behaviour patterns that are based on their own psychology. Elements of evolutionary game theory (solution ideas) and stochastic dynamic games are combined in the models addressed in this topic (strategic frameworks). While the focus of standard finance is on theories like modern portfolio theory and EMH theory, this study examines how current behavioural finance ideas have evolved from the conventional framework.

Keywords: Standard finance, Behavioural Finance, Behavioural Biases, Investment Decision, Psychological factors and Market Anomalies.

INTRODUCTION

The study of how emotional, cognitive, and psychological aspects impact financial decisions is known as behavioural finance. Thousands of researches have proven that humans are completely illogical when it comes to making decisions. Communication and information are now available throughout the world in a matter of seconds. The majority of short-term price movements are caused by market participants who are periodically affected by emotion or fast obtained news, resulting in abnormalities in investor behaviour.

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STRATEGIC ADVANTAGE IN PHARMACEUTICAL SECTOR THROUGH INNOVATIONS: AN ANALYSIS OF TOP PHARMACEUTICAL COMPANIES IN INDIA

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ABSTRACT

Traditionally, it was accepted that innovation in pharmaceuticals was achieved through Research and Development (R&D). Not all companies could meet the capital-intensive requirements to set up R&D facilities and the cost of its operations. The larger players who enjoyed the privilege of possessing the capital to setup R&D facilities, enjoyed the fruits of their investments. Since in a high capital-intensive investment like R&D which does not assure successful output, there existed a dire need for pharmaceutical companies to look into R&D as well as for options other than R&D to find innovative ideas. Though since the last decade, the meaning of innovation has been greatly extended to other operations in pharma including manufacturing, sales and marketing, supply chain etc. It is a well-known fact that companies that fail to grow, innovate and adapt to the changing trends sooner or later are found to become obsolete. Considering these facts, pharma companies have started investing in other aspects of innovations that help them streamline their business processes and increase the overall profitability. It is a particular unique strategic advantage that a company possesses which gives them an edge over their competitors. This paper elaborates different dimensions of innovation in pharmaceutical sector by giving details of innovation pertaining to top pharmaceutical companies in India. These dimensions cover all components of value chain. The paper lists key drivers of outcome in the form of innovation along with outcome, e.g., investment in R&D and new products launched/new drugs approved. Finally, the paper explains the rise of these companies to become top companies due to these innovations.

Keywords: Innovation, R&D, Pharmaceutical Companies, Supply Chain, Abbreviated New Drug Application (ANDA)

INTRODUCTION

The biggest provider of generic medications worldwide is India. About 60% of the world's demand for vaccines, 40% of the demand for generic drugs in the US, and 25% of the demand for all medicines in the UK are met by the Indian pharmaceutical industry. By volume, India is the third-largest pharmaceutical producer in the world and the fourteenth largest by value. A network of 3,000 medicinal businesses and 10,500 manufacturing units make up the domestic pharmaceutical sector. As

Paradigm Shift in Marketing and Finance

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CHAPTER 8

A Paradigm Shift in Pharmaceutical Marketing

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Vishal***, Dr. Anand Sharma**** &
Dr. Sanjeev K. Bansal*****

ABSTRACT

India has a Brobdingnagian pharmaceutical market that caters to its domestic requirements which is valued at US $ 42 billion while also exports pharmaceutical products to more than 200 countries around the globe and is hence regarded as 'Pharmacy of the World'. The Department of Pharmaceuticals has announced a wide range of initiatives to further strengthen the existing stronghold. Pharmaceutical marketing in India is conventionally done to healthcare practitioners by pharmaceutical companies which engage sales representatives to brief the Healthcare Professionals (HCP) via visual aids and other promotional material. India does not permit direct-to-consumer advertising for prescription drugs but over-the-counter medicines can be promoted directly to consumers. Companies also try to maintain good public relations as part of holistic marketing. Pharma companies had to spend above 40% of their marketing budget on conventional marketing techniques which

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Impact of Covid-19 on Economy and Society in India

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Dr. Roopali Batra

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Impact of COVID-19 on the Banking Sector in India: An Assessment

Dr. Anil Kumar Angrish and Dr. Roopali Batra***

Abstract

COVID-19 that emerged in Wuhan, China, in mid-November 2019, has wreaked havoc on economies around the world, infecting 137 million people globally as of April 12, 2021, and killing over 3.0 million (mn) people worldwide. The European region that includes 51 countries has the highest total number of deaths at nearly 1.1 mn. Five European countries namely the UK, Russia, France, Italy and Germany, constitute about 60% of Europe's total corona-related deaths. It is worrying to note that it took more than a year for the global corona deaths toll to reach 2 mn. The next 1 mn deaths were added in about three months. Now, India is also a major sufferer due to corona cases as it has 13.53 million infected persons and 170,209 deaths, or 1.26 per cent of the total confirmed infections, and has the second-highest number of coronavirus infections as of April 12, 2021. No doubt, COVID-19 has adversely affected almost all the sectors in the economy, but this paper is limited to assess the impact of the pandemic on the banking Sector in India.

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Dr. Rajpreet Kaur
Dr. Roopali Batra

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Impact of COVID-19 on Indian Automobile Sector

Pawan Kumar and Dr. Roopali Batra***

(16)

Abstract

In few years automobile sector has been emerged as a prominent contributor to the growth of the Indian Economy. Automobile Industry has not only contributed to the Indian growth story but has also helped families tap into the success of Indian Industry. The automobile industry in India is the world's fourth largest. India was the world's fourth-largest manufacturer of cars and seventh largest manufacturer of commercial vehicles in 2019. Indian automotive industry (including component manufacturing) is expected to reach nearly INR 18.18 trillion by 2026.

The year 2020 has been full of unwelcome surprises and inescapable new realities, which set off as a health threat, escalated rapidly into an economic and humane crisis. The Corporate world and individuals alike have had to acclimate swiftly to get by with uncertainty and angst in a ostensibly unending agony. And still, everyone endures. A similar impact of COVID-19 is identified in the case of the Indian Auto sector. The pandemic came with irregular supply chain scenarios, restructured people's reconciliation with mobility and transportation. As per data released by the Society of Indian Automobile Manufacturers (SIAM), the sales of passenger vehicles in India have declined by

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Dr. Rajpreet Kaur
Dr. Roopali Batra

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Coronavirus : Emotional Wellness, Difficulties and Strategies to Survive

Aman Bahri and Dr. Roopali Batra***

Abstract

In this current pandemic situation the deadly Coronavirus disease represented an unrivaled difficulties to the health care framework, economy, socio-political associations and the foundation of most nations climate created or develping economies all throughout the planet. This deadly disease of COVID-19 has badly affected the physical and mental health of people around the world. It is suggested on the basis of facts and evidence of gathered across the world that all the countries need to improve their health care systems to overcome from this pandemic COVID-19. As we know mental health is being neglected around the world with the fact that there is approximately 1 billion people living with mental illness. So, it is need of the hour that urgent attention is given to adequately address mental health needs of people. There is growing concern about the mental health challenges of the general population, close contacts, COVID-19-infected patients, old age people, children and the front line workers. The aim of writing this paper is to explore the various mental health measures in the context of such quickly spreading transmittable illness and identify measures to deal with same.

Keywords: *COVID-19; Emotional wellness; Strategies.*

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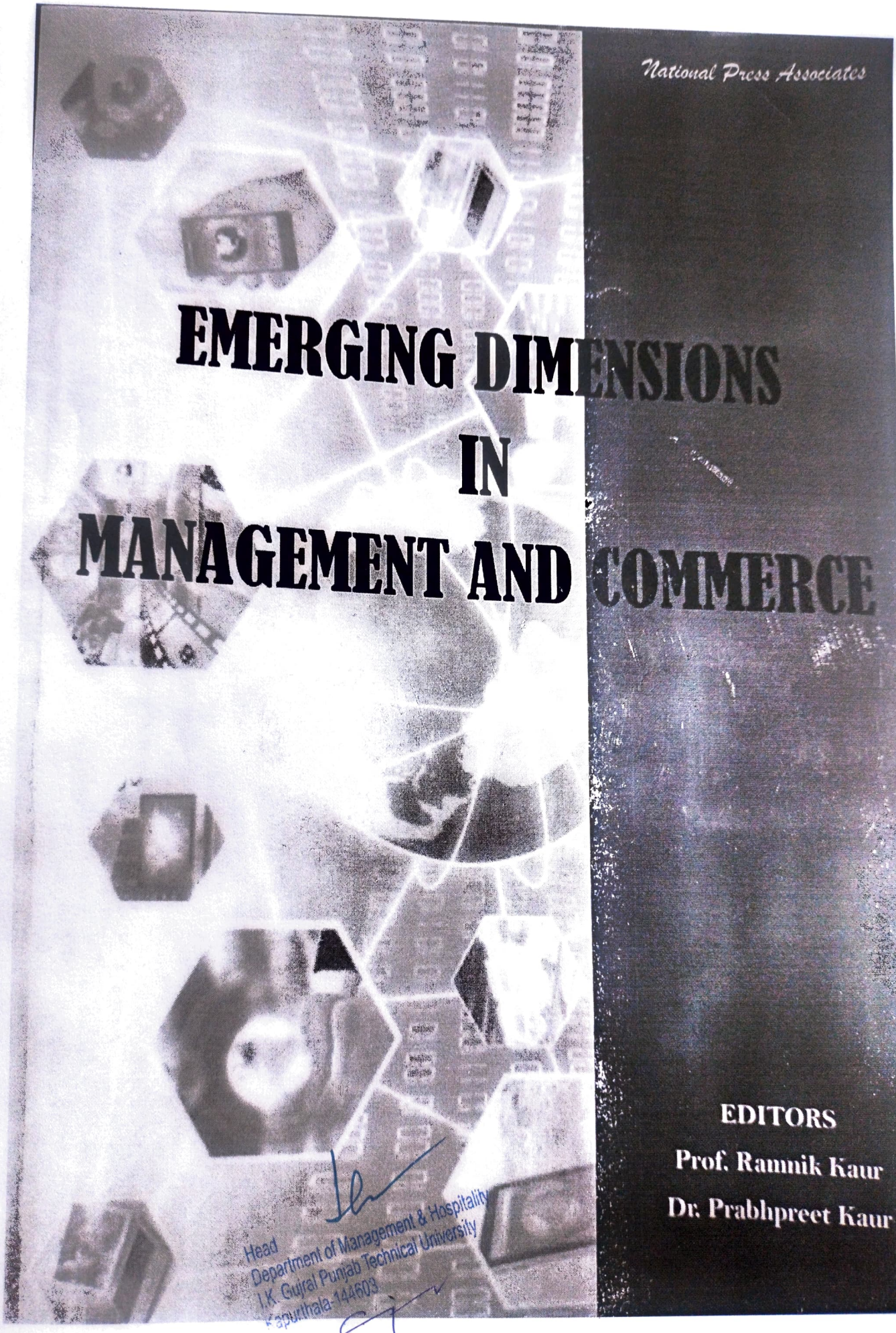
1. Introduction

In the 21st century the COVID 19 poses a global threat. During the last few months there has been tremendous growth in number of COVID-19 contaminated cases and mortality due to this infectious deadly disease. The COVID -19 has originated from the Wuhan city of China and later on swiftly spread across the worldwide. It has been witnessed over the past several months that the daily health care services, including mental health of public at large are badly affected in most of the countries across worldwide including India. Along with this, domestic and international media reports are suggesting there is tremendously increase in mental health issues such as nervousness, depression, sleeplessness, and anger among the general population, health care professionals and also among the people who are kept in isolation due to infection with COVID-19 or contacted with infected person. Till date (08th May 2021), the total number of cases are 15.7 Crore and recovered cases are 9.7 Crore and deaths due to COVID -19 are 32.7 lac. As this pandemic disease is spreading at a quicker pace and many of the affected countries are not able to fulfil the demand of infrastructure equipment and shortage of oxygen leads to large number of deaths in the countries like India. In order to overcome the government of India has taken the initiative to import oxygen concentrator and establish oxygen plants in various states in order to meet the demand of oxygen where there is shortage and save the lives of human beings. Major objectives laid down by World Health Organisation (WHO) are to prevent from people to people transmission, prevent the spread of infection to closely related contacts and also among medical professionals. Aside from this World Wellbeing Association featuring the perspective how to forestalling the improvement of issues in contaminated people, alongside this who are in segregation and isolate office arrangement, profiting indicative and lab office, exploration to create explicit treatment, antibody and, diminishing the effect on the general public also on the economy .

2. Different Psychological Wellness Issues in Coronavirus

The rapid promising mental health issues may threaten the individual well-being and have a huge possibility to influence the



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PITFALLS AND ADVANCEMENTS IN SUPPLY CHAIN MANAGEMENT: ISSUES & CHALLENGES

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ABSTRACT

In most of the industries, integration of supply chain activities & technologies has become competitive necessities to accomplish the specified goals with optimum cost and fewer time investment. during this regard, it's the main challenge for today's manager to smoothly manage the flow of materials from supply sources to the last word customer (Sadler, I., & Hines, P. 2002), the main concept of Supply Chain Management has been adopted by many industries as a crucial tool in designing, planning, & controlling the network of facilities and tasks that comprise the various stages of the availability chain. together manager has noted: "With almost daily technology advancement globally in every facet of the business, organizations got to synchronize by adopting and implementing new electronic commerce and provide chain technology so as to guard market share, to not mention improve market penetration". This text focuses on various advancements in supply chain management. "The key factors influencing the adoption of supply chain technology have also been discussed. Overall efforts are given to supply a far better understanding of the availability chain technology process. within the other side of the coin, over the decades, manufacturers are only concentrating of quality of incoming materials and outgoing products, but little attentions are given to the prices related to inventory management" docplayer.net . Consequences, succumbed to the pitfalls of inventory management. Some efforts also are given to covers the pitfalls for inventory management.

Keywords: Supply chain management; Technologies, Advances & pitfalls.

INTRODUCTION

"Basically, supply chain management (SCM) is that the management of a network of interconnected various businesses involved within the ultimate provision of product & service packages required by the top customers. It concentrates on all movement & storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption (supply chain)". Supply chain strategies require a complete system view of the linkages within the chain that employment together efficiently to make customer satisfaction at the top point of delivery to the buyer. Overall efficiency must be increased, bottlenecks removed and performance measurement must specialise in total systems efficiency and equitable reward distribution to those within the supply chain adding value (Davis et.al, 2004).

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Exploring the Factors Influencing Online Learning due to COVID-19 Pandemic

Davinder Kaur and Dr. Rajpreet Kaur***

Abstract

A pandemic is an epidemic that is growing simultaneously in many regions across the world. This phenomenon has affected a variety of industries, particularly education. The COVID-19 epidemic has led the whole world to shut down educational institutions. This scenario propels educational institutions to transit from face-to-face learning to virtual learning. During the COVID-19 pandemic, many educational institutions are finding it difficult to have and use online learning systems. Whether willingly or unwillingly, the entire world has started the use of e-learning to provide education to students. The use of online learning among students influenced by various forces. This study aimed to conceptually elaborate on the various factors that impact the use of online learning among students. This study is based on the review of previously available literature to explore several variables to determine the usage of e-learning systems in higher educational institutes among students during the COVID-19 pandemic.

Keywords: *Online learning; COVID-19 Pandemic; Higher Educational Institutions.*

1. Introduction

The COVID-19 pandemic, as seen across the globe is pushing educational institutions like universities to quickly transition to distance and digital education (Almaiah, Al-Khasawneh, & Althunibat, 2020). The world is experiencing a one-of-a-kind scenario in which education at all academic levels is delivered by online classes via the Internet (Zia, 2020). Students who attend online or remote learning are physically apart from their teachers and need a distribution system (Patricia Aguilera-Hermida, 2020). Technology mediates student-teacher engagement, and the architecture of learning environments may have a significant impact on learning outcomes (Bower, 2019). COVID-19 has compelled higher educational institutions all over the world to embrace online education.

In this emergency, everyone must respond with various and readily accessible learning methods, such as e-learning and mobile learning apps. Learners are familiar with both online and distance learning. The COVID-19, on the other hand, has reignited the need to investigate online teaching and learning options. As per the reports of UNESCO (2021), 210 countries fully or partially close their educational institutions due to COVID-19. Thus, whether voluntarily or involuntarily, the entire world has begun to teach through the internet medium (Zia, 2020). These initiatives have undoubtedly triggered some discomfort, but they have also sparked modern scenarios of instructional creativity including digital initiatives.

Furthermore, the COVID-19 has not only interrupted global Programmes but has also addressed big concerns about how various factors influence students' use of e-learning systems. Based on the review of previous studies, this study aims to conceptually explore the factors responsible for the usage of online learning systems among students during the coronavirus pandemic. In order to answer the research question of this study, a review of the previously available literature is conducted. In the structure of this paper, the next section describes online learning in higher education, followed by the various factors derived from the literature responsible for e-learning adoption among students, and finally the conclusion.

1.1 Online Education in Higher Education

Online learning is becoming more common as a modern approach to education around the world. Due to expanded access

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Impact of Covid-19 on Economy and Society in India

Dr. Rajpreet Kaur
Dr. Roopali Batra

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Aftermath Effects of COVID-19 on Higher Education in India

Harleen Kaur and Dr. Rajpreet Kaur***

Abstract

Covid-19's pandemic has disrupted all aspects of human life, including education. It has put the education system to the test in a way it has never been done before. Several educational organizations around the world have closed their campuses and learning has moved online. The pace of globalization has declined significantly. In India, approximately 43 crore students were not able to go to schools or universities, and all educational operations were halted. Despite these obstacles, Higher education institutions (HEIs) have responded favourably and have been able to sustain teaching-learning, scientific, and research programmes, and societal service with the help of certain methods and techniques during the pandemic. The main effects of Covid-19 on HEIs in India are discussed in this article. HEIs and educational authorities in India took several steps to deliver streamlined educational facilities throughout the crisis, which are addressed. There are several new learning methods available, new insights, and new trends have ascended because of the pandemic, and this pattern may continue as we move further into the future. As a result, we've highlighted some of the post-Covid-19 developments that could lead to new forms of teaching and studying in higher education in India. There are also some useful ideas for carrying out training

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ਸ੍ਰੀ ਗੁਰੂ ਤੇਗ ਬਹਾਦਰ : ਮੁੱਢਲੇ ਜੀਵਨ ਸਰੋਤ

ਡਾ. ਸਰਬਜੀਤ ਸਿੰਘ ਮਾਨ*

ਨਵਮ ਪਾਤਸ਼ਾਹ ਸ੍ਰੀ ਗੁਰੂ ਤੇਗ ਬਹਾਦਰ ਜੀ ਦੇ ਜੀਵਨ ਬਾਰੇ ਉਨ੍ਹਾਂ ਦੇ ਸਮਕਾਲ ਵਿਚ ਬਹੁਤ ਘੱਟ ਸਰੋਤ ਸਮੱਗਰੀ ਪ੍ਰਾਪਤ ਹੁੰਦੀ ਹੈ ਪਰੰਤੂ ਉਨ੍ਹਾਂ ਦੀ ਸ਼ਹਾਦਤ ਤੋਂ ਇਕਦਮ ਬਾਅਦ ਬਹੁਤ ਸਾਰੀਆਂ ਅਜਿਹੀਆਂ ਲਿਖਤਾਂ ਮਿਲਦੀਆਂ ਹਨ ਜਿਨ੍ਹਾਂ ਤੋਂ ਉਨ੍ਹਾਂ ਦੇ ਜੀਵਨ, ਬਾਣੀ ਤੇ ਸ਼ਹਾਦਤ ਬਾਰੇ ਪ੍ਰਮਾਣਿਕ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ। ਪਰੰਤੂ ਕੁਝ ਲਿਖਤਾਂ ਦਾ ਰਚਨਾ ਕਾਲ ਬਹੁਤ ਬਾਅਦ ਦਾ ਹੈ। ਉਨ੍ਹਾਂ ਦੇ ਜੀਵਨ ਸਬੰਧੀ ਪ੍ਰਾਪਤ ਹੁੰਦੀ ਇਹ ਸਰੋਤ ਸਮੱਗਰੀ ਫ਼ਾਰਸੀ, ਗੁਰਮੁਖੀ,ਖ਼ੁਸ,ਬੰਗਾਲੀ ਤੇ ਭਟਾਖਰੀ ਵਿਚ ਹੈ। ਇਸ ਖੋਜ ਪੱਤਰ ਵਿਚ ਨਵਮ ਪਾਤਸ਼ਾਹ ਬਾਰੇ ਪ੍ਰਾਪਤ ਜੀਵਨ ਸਰੋਤਾਂ ਤਕ ਪਹੁੰਚ ਕਰਨ ਦਾ ਯਤਨ ਹੈ ਫਿਰ ਵੀ ਹਰ ਸਰੋਤ ਤਕ ਪਹੁੰਚ ਜਾਣ ਦੀ ਮੁਕੰਮਲਤਾ ਦਾ ਦਾਅਵਾ ਨਹੀਂ। ਨੌਵੇਂ ਸਤਿਗੁਰਾਂ ਦੇ ਜੀਵਨ ਸਬੰਧੀ ਸਭ ਤੋਂ ਭਰੋਸੇਯੋਗ ਤੇ ਪ੍ਰਮਾਣਿਕ ਸਰੋਤ ਨੌਵੇਂ ਪਾਤਸ਼ਾਹ ਦੀ ਉਚਾਰਣ ਕੀਤੀ ਬਾਣੀ ਹੈ ਜੋ 59 ਸ਼ਬਦਾਂ ਤੇ 57 ਸਲੋਕਾਂ ਦੇ ਰੂਪ ਵਿਚ ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਵਿਚ ਸੁਸ਼ੋਭਿਤ ਹੈ। ਉਨ੍ਹਾਂ ਦੀ ਬਾਣੀ ਤੋਂ ਉਨ੍ਹਾਂ ਦੀ ਜੀਵਨ-ਦ੍ਰਿਸ਼ਟੀ, ਦਰਸ਼ਨ ਤੇ ਆਤਮਿਕ ਅਵਸਥਾ ਦਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ। ਉਨ੍ਹਾਂ ਦੀ ਬਾਣੀ ਤੇ ਜੀਵਨ ਵਿਚ ਅਭੇਦਤਾ ਸਬੰਧੀ ਇਹ ਸਲੋਕ ਦੇਖ ਸਕਦੇ ਹਾਂ, ਜਿਸ ਤੋਂ ਉਨ੍ਹਾਂ ਦੀ ਸ਼ਹਾਦਤ ਦੀ ਸਾਰਥਕਤਾ ਪ੍ਰਗਟ ਹੁੰਦੀ ਹੈ :

ਭੈ ਕਾਹੂ ਕਉ ਦੇਤ ਨਹਿ ਨਹਿ ਭੈ ਮਾਨਤ ਆਨ ॥
ਕਹੁ ਨਾਨਕ ਸੁਨਿ ਰੇ ਮਨਾ ਗਿਆਨੀ ਤਾਹਿ ਬਖਾਨਿ ॥[1]

ਗੁਰੂ ਤੇਗ ਬਹਾਦਰ ਜੀ ਬਾਰੇ ਬਹੁਤ ਸਾਰੀਆਂ ਪੁਰਾਤਨ ਲਿਖਤਾਂ ਉਨ੍ਹਾਂ ਦੇ ਜਸ ਗਾਇਨ ਜਾਂ ਉਸਤਤ ਰੂਪ ਵਿਚ ਮੰਗਲਾਚਾਰ ਕਰਨ ਦੀਆਂ ਹਨ, ਜਿਨ੍ਹਾਂ ਵਿਚ ਅਰਦਾਸ ਵੀ ਸ਼ਾਮਿਲ ਹੈ। ਸਿਰਦਾਰ ਕਪੂਰ ਸਿੰਘ ਅਨੁਸਾਰ 'ਅਰਦਾਸ ਵੀ ਸਿੱਖ ਇਤਿਹਾਸ ਦਾ ਰੂਪ ਹੈ। ਉਨ੍ਹਾਂ ਅਨੁਸਾਰ "ਸਿੱਖਾਂ ਦੀ ਸੰਗਤੀਯ ਅਰਦਾਸ ਵਿਚ ਸਿੱਖ ਪੰਥ ਦੀ ਸਮੁੱਚੀ ਹਿਸਟਰੀ ਦਾ ਸਾਰੰਸ਼-ਸਤ, ਅੰਡ-ਰੂਪ ਵਿਗਿਆਨ ਇਸ ਅਰਦਾਸ ਦੇ ਅਨਿੱਖੜਵੇਂ ਅੰਗ ਦੇ ਰੂਪ ਵਿਚ ਮੌਜੂਦ ਹੈ।"[2] ਅਰਦਾਸ ਰੂਪ ਵਿਚ ਪਏ ਇਸ ਇਤਿਹਾਸ ਦੇ ਸੰਦਰਭ ਵਿਚ ਨੌਵੇਂ ਪਾਤਸ਼ਾਹ ਬਾਰੇ ਦਸ਼ਮੇਸ਼ ਜੀ ਦੁਆਰਾ ਲਿਖਿਤ ਮੰਗਲਾਚਰਣ ਦੇਖ ਸਕਦੇ ਹਾਂ:

ਤੇਗ ਬਹਾਦਰ ਸਿਮਰਿਐ ਘਰਿ ਨਉ ਨਿਧਿ ਆਵੈ ਧਾਇ ॥
ਸਭ ਥਾਈਂ ਹੋਇ ਸਹਾਇ ॥[3]

* ਸਹਾਇਕ ਪ੍ਰੋਫੈਸਰ, ਆਈ. ਕੇ. ਗੁਜਰਾਲ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਕਪੂਰਥਲਾ।

ਬਚਿਤ੍ਰ ਨਾਟਕ

ਗੁਰੂ ਤੇਗ ਬਹਾਦਰ ਜੀ ਮਹਾਰਾਜ ਦੀ ਬਾਣੀ ਵਰਗੀ ਪ੍ਰਮਾਣਿਕਤਾ ਗੁਰੂ ਗੋਬਿੰਦ ਸਿੰਘ ਜੀ ਦੇ ਬਚਿਤ੍ਰ ਨਾਟਕ ਦੀ ਹੈ ਜਿਸ ਵਿਚ ਦਸ਼ਮੇਸ਼ ਪਾਤਸ਼ਾਹ ਨੇ ਪਹਿਲਾਂ ਅੱਠ ਪਾਤਸ਼ਾਹੀਆਂ ਦਾ ਸੰਜੁ-ਰੂਪ ਵਰਣਨ ਕੀਤਾ ਹੈ ਫਿਰ ਨੌਵੇਂ ਪਾਤਸ਼ਾਹ ਦੀ ਸ਼ਹਾਦਤ ਦਾ ਸਰਬਕਾਲਕ ਪ੍ਰਸੰਗ ਸਿਰਜਿਆ ਹੈ:

ਤਿਲਕ ਜੰਞੂ ਰਾਖਾ ਪ੍ਰਭ ਤਾ ਕਾ ॥ ਕੀਨੋ ਬਡੋ ਕਲੂ ਮਹਿ ਸਾਕਾ ॥
ਸਾਧਨਿ ਹੇਤਿ ਇਤੀ ਜਿਨਿ ਕਰੀ ॥ ਸੀਸੁ ਦੀਆ ਪਰ ਸੀ ਨ ਉਚਰੀ ॥
ਧਰਮ ਹੇਤ ਸਾਕਾ ਜਿਨਿ ਕੀਆ ॥ ਸੀਸੁ ਦੀਆ ਪਰ ਸਿਰਰੁ ਨ ਦੀਆ ॥
ਨਾਟਕ ਚੇਟਕ ਕੀਏ ਕੁਕਾਜਾ ॥ ਪ੍ਰਭ ਲੋਗਨ ਕਹ ਆਵਤ ਲਾਜਾ ॥
ਠੀਕਰਿ ਫੋਰਿ ਦਿਲੀਸ ਸਿਰਿ ਪ੍ਰਭ ਪੁਰ ਕੀਯਾ ਪਯਾਨ ॥
ਤੇਗ ਬਹਾਦਰ ਸੀ ਕ੍ਰਿਆ ਕਰੀ ਨ ਕਿਨਹੂੰ ਆਨ ॥
ਤੇਗ ਬਹਾਦਰ ਕੇ ਚਲਤ ਭਯੋ ਜਗਤ ਕੋ ਸੋਕ ॥
ਹੈ ਹੈ ਹੈ ਸਭ ਜਗ ਭਯੋ ਜੈ ਜੈ ਜੈ ਸੁਰ ਲੋਕ ॥[4]

ਦਸ਼ਮੇਸ਼ ਜੀ ਨੇ ਬਚਿਤ੍ਰ ਨਾਟਕ ਵਿਚ ਗੁਰੂ ਤੇਗ ਬਹਾਦਰ ਜੀ ਦੇ ਧਰਮ ਹੇਤ ਕੀਤੇ ਬਲੀਦਾਨ ਤੇ ਸਿਰਜ ਉਪਰ ਧਿਆਨ ਕੇਂਦਰਿਤ ਕੀਤਾ ਹੈ। ਇਸ ਵਿਚ ਵਰਣਿਤ ਇਤਿਹਾਸ ਗੁਰ-ਵਿਅਕਤੀ ਇਤਿਹਾਸ ਨਹੀਂ, ਗੁਰ-ਜੋਤਿ ਇਤਿਹਾਸ ਹੈ। ਪਰ ਇਹ ਗੁਰ-ਜੋਤਿ ਸ਼ੂਨਯ ਵਿਚ ਨਹੀਂ ਇਤਿਹਾਸ ਤੇ ਇਤਿਹਾਸ-ਪਾਰ ਹੋ ਕੇ ਗੁਰਦੇਵ ਦੇ ਦੈਵੀ ਜਲੌਅ ਨੂੰ ਪ੍ਰਗਟ ਕਰਦੀ ਹੈ। ਇਸ ਰਚਨਾ ਵਾਸਤੇ ਸੈਨ-ਸੈਮਤ ਜਾਂ ਤਿਥੀਵਾਰ ਇਤਿਹਾਸਕ ਤੱਥ ਜ਼ਰੂਰੀ ਨਹੀਂ ਸਗੋਂ ਇਤਿਹਾਸ ਨੂੰ ਨਵਾਂ ਮੋੜ ਦੇਣ ਵਾਲਾ ਸਤਿ ਮਹੱਤਵਪੂਰਣ ਹੈ। ਗੁਰੂ ਦਾ ਪ੍ਰਕਾਸ਼ ਜਦੋਂ ਧਰਤੀ ਉਪਰ ਫੈਲਦਾ-ਵਿਗਸਦਾ ਹੈ ਤਾਂ ਸ਼ਹਾਦਤ ਦੀ ਕਰਮਾਤ ਵਾਪਰਦੀ ਹੈ। ਗੁਰੂ ਤੇਗ ਬਹਾਦਰ-ਬਾਣੀ ਤੇ ਸ਼ਹਾਦਤ ਇਸਦੀ ਸ਼ਾਹਦੀ ਭਰਦੇ ਹਨ। ਦਸ਼ਮੇਸ਼ ਪਿਤਾ ਦਾ ਬਚਿਤ੍ਰ ਨਾਟਕ ਵੀ ਗੁਰੂ ਦੇ ਇਸੇ ਦੈਵੀ ਪ੍ਰਕਾਸ਼ ਵਿਚੋਂ ਉਦੈ ਹੁੰਦਾ ਹੈ।

ਇਸ ਉਪਰੰਤ ਗੁਰੂ ਗੋਬਿੰਦ ਸਿੰਘ ਜੀ ਦੇ ਸਮਕਾਲੀ ਤੇ ਦਰਬਾਰੀ ਕਵੀ ਭਾਈ ਨੰਦ ਲਾਲ ਜੀ ਗੋਇਆ ਜੀ ਦਾ ਗੰਜਨਾਮਾ, ਜੋਤਿ ਬਿਗਾਸ (ਫ਼ਾਰਸੀ) ਤੇ ਜੋਤਿ ਬਿਕਾਸ (ਪੰਜਾਬੀ), ਕਵੀ ਸੈਨਾਪਤਿ ਦੀ ਸ੍ਰੀ ਗੁਰ ਸੋਭਾ, ਕਵੀ ਕੰਕਣ ਦੀ ਦਸ ਗੁਰ ਕਥਾ, ਭਾਈ ਗੁਰਦਾਸ (ਦੂਜਾ) ਦੀ 'ਵਾਰ ਸ੍ਰੀ ਭਗਉਤੀ ਜੀ ਕੀ ਪਾਤਿਸਾਹੀ ਦਸਵੀਂ ਕੀ'[5] (ਇਸਦਾ ਦੂਸਰਾ ਨਾਂ 'ਵਾਰ ਭਾਈ ਗੁਰਦਾਸ ਜੀ ਕੀ' ਹੈ) ਲਿਖਤਾਂ ਆਉਂਦੀਆਂ ਹਨ । ਇਹ ਚਾਰ ਕਵੀ ਗੁਰੂ ਗੋਬਿੰਦ ਸਿੰਘ ਦੇ ਨਿਕਟਵਰਤੀਆਂ ਵਿਚੋਂ ਸਨ, ਇਸ ਲਈ ਇਨ੍ਹਾਂ ਦੀਆਂ ਲਿਖਤਾਂ ਵੀ ਨਵਮ ਪਾਤਸ਼ਾਹ ਸਬੰਧੀ ਪ੍ਰਮਾਣਿਕ ਸਰੋਤ ਵਜੋਂ ਦੇਖੀਆਂ ਜਾ ਸਕਦੀਆਂ ਹਨ। ਇਨ੍ਹਾਂ ਲਿਖਤਾਂ ਵਿਚ ਗੁਰੂ ਸਾਹਿਬ ਨਮਨ ਰੂਪ ਵਿਚ ਮੰਗਲਾਚਰਨ ਗਾਇਆ ਹੈ। ਇਵੇਂ ਇਨ੍ਹਾਂ ਚਹੁੰ ਕਵੀਆਂ ਦੀਆਂ ਲਿਖਤਾਂ ਤੇ ਵਿਸਥਾਰ ਵਿਚ ਚਰਚਾ ਕੀਤੀ ਗਈ ਹੈ।

ਗੁਰੂ ਤੇਗ਼ ਬਹਾਦਰ ਸੀ

ਸੀਸੁ ਦੀਆ ਪਰ ਸਿਰਰੁ ਨ ਦੀਆ ॥

ਸੰਪਾਦਕ

ਹਰਬੀਰ ਸਿੰਘ ਭੰਵਰ

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(Sis Dia par sirar na dia)

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ਮਾਲਵਾ ਦੇਸ਼ ਰਟਨ ਦੀ ਸਾਖੀ ਪੋਥੀ

ਡਾ. ਸਰਬਜੀਤ ਸਿੰਘ ਮਾਨ

ਨਵਮ ਪਾਤਸ਼ਾਹ ਸ੍ਰੀ ਗੁਰੂ ਤੇਗ ਬਹਾਦਰ ਜੀਉ ਦੇ ਜੀਵਨ ਬਾਰੇ ਉਨ੍ਹਾਂ ਬਹੁਤ ਸਾਰੀ ਜੀਵਨ ਸਮੱਗਰੀ ਕਾਵਿ-ਰੂਪ ਵਿਚ ਪ੍ਰਾਪਤ ਹੁੰਦੀ ਹੈ ਪਰੰਤੂ ਵਾਰਤਕ ਰੂਪ ਵਿਚ ਇਸ ਸਬੰਧ ਵਿਚ ਕੇਵਲ ਇਕ ਸਰੋਤ ਪ੍ਰਾਪਤ ਹੁੰਦਾ । ਇਹ ਦੁਰਲਭ ਲਿਖਤ 'ਮਾਲਵਾ ਦੇਸ਼ ਰਟਨ ਦੀ ਸਾਖੀ ਪੋਥੀ' ਹੈ ਜਿਸ ਵਿਚ ਨੌਵੇਂ ਤੇ ਦਸਵੇਂ ਪਾਤਸ਼ਾਹ ਬਾਰੇ ਮਾਲਵਾ ਦੇਸ਼ ਰਟਨ ਦੀਆਂ ਸਾਖੀਆਂ ਹਨ। ਇਸ ਸਾਖੀ ਪੋਥੀ ਵਿਚ ਨੌਵੇਂ ਪਾਤਸ਼ਾਹ ਬਾਰੇ 38 ਸਾਖੀਆਂ ਹਨ ਅਤੇ ਦਸਵੇਂ ਪਾਤਸ਼ਾਹ ਬਾਰੇ 118 ਸਾਖੀਆਂ ਹਨ। ਇਹ ਸਾਖੀਆਂ ਪਹਿਲੀ ਵਾਰ ਸਰ ਸਰਦਾਰ ਅਤਰ ਸਿੰਘ ਜੀ ਰਈਸ ਭਦੌੜ ਦੁਆਰਾ ਅੰਗਰੇਜ਼ੀ ਵਿਚ ਅਨੁਵਾਦ ਕਰਕੇ ਜਨਵਰੀ 1876 ਈ. (The Travels of Guru Teg Bahadur and Guru Gobind Singh) ਵਿਚ ਸਿਰਲੇਖ ਹੇਠ ਪ੍ਰਕਾਸ਼ਿਤ ਕਰਵਾਇਆ ਗਿਆ। ਇਹ ਸਾਖੀਆਂ ਪੰਜਾਬੀ ਵਿਚ ਪਹਿਲੀ ਵਾਰ ਖਾਲਸਾ ਸਮਾਚਾਰ ਵਿਚ 1950 ਈ. ਵਿਚ ਭਾਈ ਸਾਹਿਬ ਭਾਈ ਵੀਰ ਸਿੰਘ ਦੁਆਰਾ ਸੰਪਾਦਿਤ ਹੋ ਕੇ ਪ੍ਰਕਾਸ਼ਿਤ ਹੋਈਆਂ। ਭਾਈ ਸਾਹਿਬ ਨੂੰ ਇਨ੍ਹਾਂ ਸਾਖੀਆਂ ਦਾ ਪੁਰਾਤਨ ਕਲਮੀ ਨੁਸਖਾ ਭਾਈ ਸਾਹਿਬ ਸਿੰਘ ਜੀ ਗਿਆਨੀ ਧਿਆਨ ਸਾਹਿਬ ਵਾਲਿਆਂ ਦੀ ਮਦਦ ਨਾਲ ਮਾਲਵੇ ਵਿਚੋਂ ਪ੍ਰਾਪਤ ਹੋਇਆ। ਇਸ ਪੁਰਾਤਨ ਨੁਸਖੇ ਦਾ ਮਿਲਾਣ ਭਾਈ ਵੀਰ ਸਿੰਘ ਨੇ ਗੁਰ ਪ੍ਰਤਾਪ ਸੂਰਜ ਗ੍ਰੰਥ ਦੀਆਂ ਸਾਖੀਆਂ ਨਾਲ ਕੀਤਾ ਤੇ ਇਸਨੂੰ ਪ੍ਰਕਾਸ਼ਨ ਦਾ ਜਾਮਾ ਪਹਿਨਾਇਆ। ਇਹ ਵੀ ਧਿਆਨਯੋਗ ਹੈ ਕਿ ਗੁਰਪ੍ਰਤਾਪ ਸੂਰਜ ਗ੍ਰੰਥ ਤੇ ਵਿਲਾਵਾ ਕੇਵਲ ਇਹ ਸਾਖੀਆਂ ਹੀ ਨੌਵੇਂ ਪਾਤਸ਼ਾਹ ਦੇ ਮਾਲਵੇ ਵਿਚ ਠਹਿਰਾਉ ਦਾ ਵਰਣਨ ਕਰਦੀਆਂ ਹਨ। ਇਨ੍ਹਾਂ ਦੋ ਸਰੋਤਾ ਨੂੰ ਛੱਡ ਕੇ ਹੋਰ ਕੋਈ ਵੀ ਸਰੋਤ ਆਪ ਜੀ ਦੇ ਮਾਲਵੇ ਦੇ ਸਫਰਾਂ ਬਾਰੇ ਏਨੀ ਵਿਸਤਰਿਤ ਟੋਹ ਨਹੀਂ ਦਿੰਦਾ।

ਭਾਈ ਵੀਰ ਸਿੰਘ ਆਪਣੀ ਸੰਪਾਦਕੀ ਸੂਝ ਬੂਝ ਦੇ ਆਧਾਰ 'ਤੇ ਇਸ ਸਾਖੀ ਪੋਥੀ ਨੂੰ 1880 ਬਿਕਰਮੀ (1823 ਈ.) ਦੇ ਲਾਗੇ-ਚਾਗੇ ਦੀ ਰਚਨਾ ਮੰਨਦੇ ਹਨ।[1] ਫਿਰ ਵੀ ਏਨਾ ਤਾਂ ਸਪਸ਼ਟ ਹੈ ਕਿ ਇਹ ਸਾਖੀਆਂ ਗੁਰੂ ਸਾਹਿਬ ਦੇ ਜੀਵਨ-ਕਾਲ ਤੋਂ ਬਹੁਤ ਬਾਅਦ ਵਿਚ ਰਚੀਆਂ ਗਈਆਂ ਹਨ। ਭਾਵੇਂ ਭਾਈ ਵੀਰ ਸਿੰਘ ਇਸ ਸਾਖੀ ਪੋਥੀ ਦਾ ਰਚੇਤਾ ਕਿਸੇ ਉਦਾਸੀ ਸਾਧੂ ਹੋਣ ਦਾ ਕਿਆਸ ਕਰਦੇ ਹਨ ਪਰ ਸਿਰਦਾਰ ਕਪੂਰ ਸਿੰਘ ਦਾ ਮਤ ਇਸ ਦੇ ਵਿਪਰੀਤ ਹੈ। ਉਨ੍ਹਾਂ ਅਨੁਸਾਰ ਇਸਦੇ ਪਾਠ ਵਿਚ ਰਲੇਵੇਂ ਤੋਂ ਇਨਕਾਰ ਨਹੀਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਅਤੇ ਇਸ ਲਈ ਇਸਦੇ ਲੇਖਕ ਕੋਈ ਦੋ ਵੱਖੋ-ਵੱਖਰੇ ਵਿਅਕਤੀ ਹਨ। ਏਨਾ ਜ਼ਰੂਰ ਹੈ ਕਿ ਇਨ੍ਹਾਂ ਸਾਖੀਆਂ ਦਾ ਰਚੇਤਾ ਕੋਈ ਸੈਲਾਨੀ ਜੀਊੜਾ ਹੈ ਜੋ ਗੁਰਧਾਮਾਂ ਦੀ ਆਪ

* ਸਹਾਇਕ ਪ੍ਰੋਫੈਸਰ, ਆਈ.ਕੇ. ਗੁਜਰਾਲ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਕਪੂਰਥਲਾ।

3.4.6

Quality in Higher Education

Current Priorities and Future Challenges

Dr. Suman Dalal
Dr. Monika • Dr. Sushila Jaglan

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Editors
Dr. Suman Dalal
Dr. Monika
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8

Importance of Research and Innovation in Higher Education

Dr. Sarabjit Singh

Assistant Professor, I.K. Gujral Punjab Technical University, Kapurthala (Punjab)

Abstract

The main objective of this research paper is to draws an attention about the importance of research and innovation in the higher education system. The paper tries to investigate that how the higher educational institutions play an important role to the knowledge society with research findings and innovations. Despite some hurdles in terms of infrastructure, resources, and manpower, these higher institutions are making bridge between the idea and its execution and creation of knowledge and its value-added uses in human life. The dots between innovator, innovation, industry, and users can only be connected through academic institutions in a better way.

Keywords: *Research, invent, innovation, knowledge, idea, cost-effective value-addition.*

What is Research?

The research is basically meant to create the knowledge. It exhausts the available limits or boundaries of a knowledge domain. For example, if a particular disease is cured by a medicine in a year and the new research finding may shorten the time span to six months or less. The new discovered

Chapter

Identification of Lung Cancer Malignancy Using Artificial Intelligence

By Vinod Kumar, Brijesh Bakariya

Book Artificial Intelligence, Machine Learning, and Data Science Technologies

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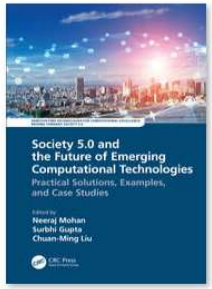

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Sustainable Smart Cities

Theoretical Foundations and Practical Considerations

Springer

Smart School Selection with Supervised Machine Learning

Deepak Kumar, Chaman Verma, Veronika Stoffová, Zoltán Illes, Anish Gupta, Brijesh Bakariya, and Pradeep Kumar Singh

Abstract In today's competitive academic environment, parents and students usually face the school selection problem for a decade. Keeping the question in mind, we proposed to seek the select significant features (academic, social, demographic, etc.) with the help of machine learning algorithms (Support Vector Machine (SVM), Extreme Gradient Boosting (XGB), and Random Forest (RF)). These features will be helpful for guardians/parents, schools, and teachers in deciding the students the best school for their education. We used a statistical approach (one-way ANOVA) to investigate the impact of school selection reasons towards student's grades. The standard open data set of Portuguese secondary school student was used here for analysis. A Synthetic Minority Over-sampling Technique-Nominal Continuous (SMOTE-NC) technique was used for resampling the imbalanced Reason target class. The proposed automatic school selection recommender might be helpful in every academic community and intelligent education. We found school selection reasons have a statistically significant impact on the final grade. The RF comes out as a strong predictor among all proposed models with an accuracy of 71%. The final grade, going out with friends, parents' job, and activities are the essential features for Smart School Selection.

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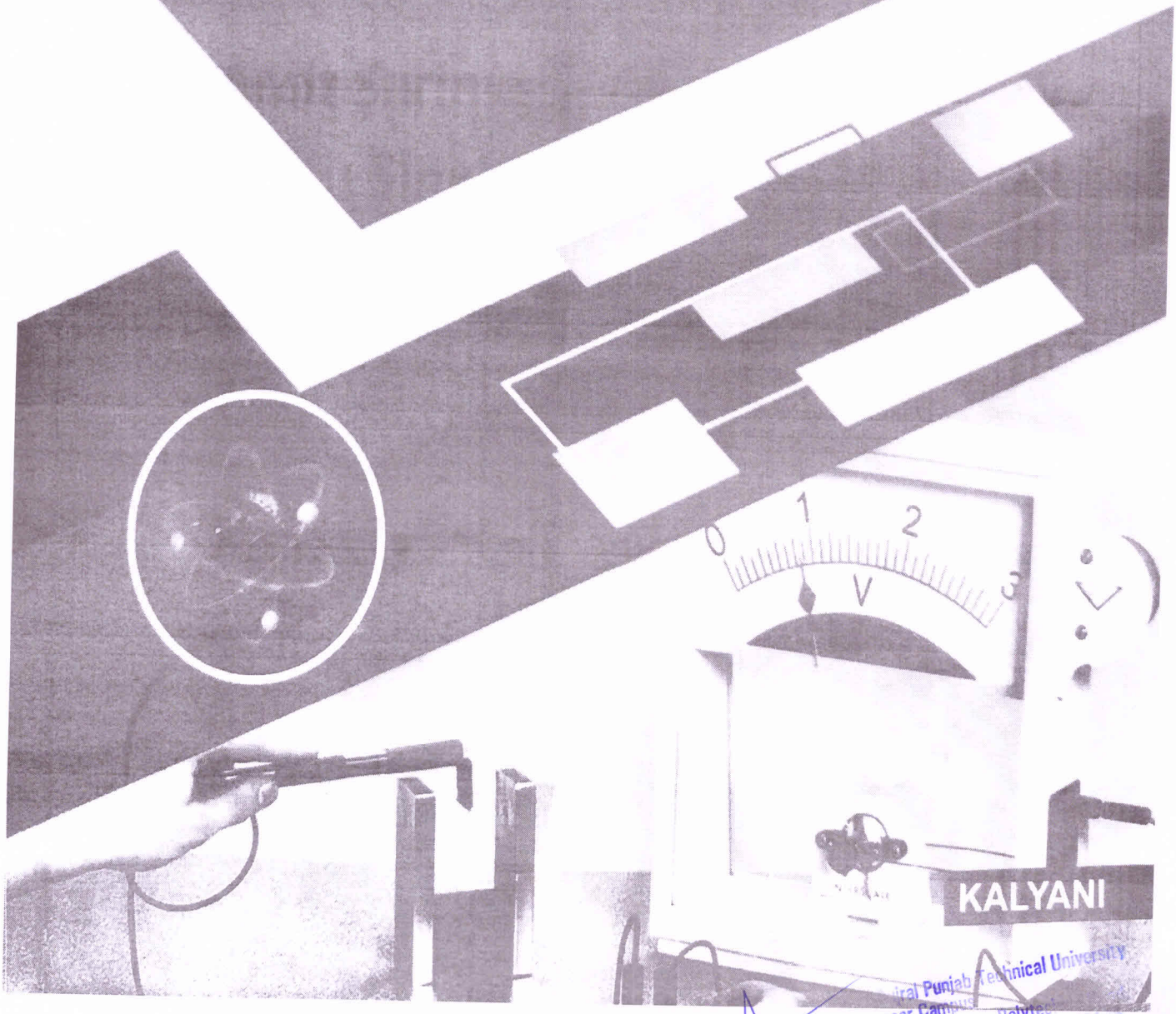

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