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Sr. No.	Name of Author	Title of the Book/Chapter/Proceeding Paper	Page No.
1	Dr. Sugandha V. Khangar	Experiments in Physics	6
2	Dr. S. R. Gedam	Office Automation	8
3	Dr. J. K. Keche	Office Automation	11
4	Dr. J. K. Keche	Desktop Publishing	14
5	Dr. J. K. Keche	Deep learning - A Modern Approach	17
6	Dr. S. R . Gedam	Implementation of Ensemble learning to predict Learner's Attainment- A Random Forest Classifier	21
7	Dr. S. R . Gedam	A Study of Arima model to safeguard he quality of soil in the drip Irrigation system	21
8	Dr.Shubhangi Jagdish Kene	Study of Cheating ion exchange properties and electrical conductivity of terpolymer resins derived from p-Hydroxyacetophenone, Resorcinol and Glycerol	22
9	Dr. S. R. Gedam	Data Structure	23
10	Dr. A. A. Halder	Computer Fundamentals	27

11	Dr. A. A. Halder	Mathematical Foundations of Computer Science	28
12	Dr. A. D. Bobdey	Essentials of Biotecnology for UG and PG students	29
13	Dr. A. D. Bobdey	Food Science and Technology	32
14	Dr. A. D. Bobdey	WildLife Ecology: Management and Conservation	35
15	Dr. Pranita Gulhane	EXPLORE THE WORLD OF DRUGS AND ITS DELIVERY SYSTEM	38
16	Asfiya Shireen Shaikh Mukhtar	Developing a Novel Architecture for Convolutional Neural Network Firewall Anomaly Detection	40
17	Prof. R. N. Jugele	Developing a Novel Architecture for Convolutional Neural Network Firewall Anomaly Detection	41
18	Dr. Reshal Deshmukh	Introduction To Nano Chemistry	42
19	Dr.A. D Bobdey	Animal Physiology	43
20	Prof Yogita Meshram	A Textbook of Environmental Chemistry and Pollution Control	47
21	Dr. Shital S. Deshmukh	Recent Applied Research in medical and Life Science Vol.1	50
22	Dr. S. R. Gedam	Deepfakes and Its Influence on Trust and Perceptron	52
23	Amol Bodkhe	A Review of Tends and Techniques in Predictive Analyics	52
24	Dr. M.T. Wanjari	A Review of Tends and Techniques in Predictive Analyics	52
25	Dr. M.P. Dhore	A Review of Tends and Techniques in Predictive Analyics	52
26	Dr. M.P. Dhore	A Literature review on clustering techniques for big data	52
27	Dr. M.P. Dhore	Face Feature Extraction Techniques Using Internet of Things	52

28	Dr. J.K. Keche	Face Feature Extraction Techniques Using Internet of Things	52
29	Ms. A. J. Mungole	Emerging Trends and Techniques in 3D Visualization or Social Media Data Analysis: A Review	52
30	Dr. M. T. Wanjari	Emerging Trends and Techniques in 3D Visualization or Social Media Data Analysis: A Review	52
31	Dr. M.P. Dhore	Emerging Trends and Techniques in 3D Visualization or Social Media Data Analysis: A Review	52
32	Ms. M. M. Chawale	Review of Big Data Analytics Securing in Healthcare	52
33	Dr. M.P. Dhore	Ensemble learning for Dementia Prediction	52
34	Ms. S . S. Khandalkar	Heart Disease Risk Prediction through Artiicial Neural Network	52
35	Dr. M.P. Dhore	Heart Disease Risk Prediction through Artificial Neural Network	52
36	Apurva Dilip Fuladi	Late Quaterly Alluvial History and Geomorphological mapping of Purna River Basin, Mahrashtra, India	58
37	Apurva Dilip Fuladi	Identification of suitable sites for Artificial rechange Measures in the Part of Dhodana Mini Watershed Deccan Balsaltic Terrain, Maharashtra , India	60
38	Apurva Dilip Fuladi	Hyposometric integral Analytics of Asirgarh Deccan Volcanics, Burhanpur district, Madhya Pradesh: A remote sensing and GIS approach	62
39	Dr. Shital Deshmukh	Medicinally Important Leeches in Churani Region Melghat	63

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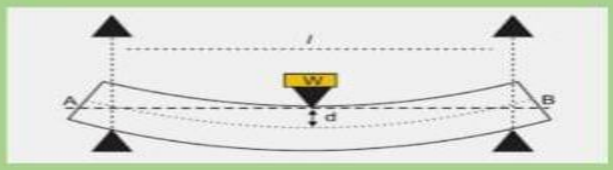
[FOR B. SC. SEMESTER-I AS PER NEP-2020]



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Dr. Y. D. Choudhari
Dr. Y. S. Tamgadge
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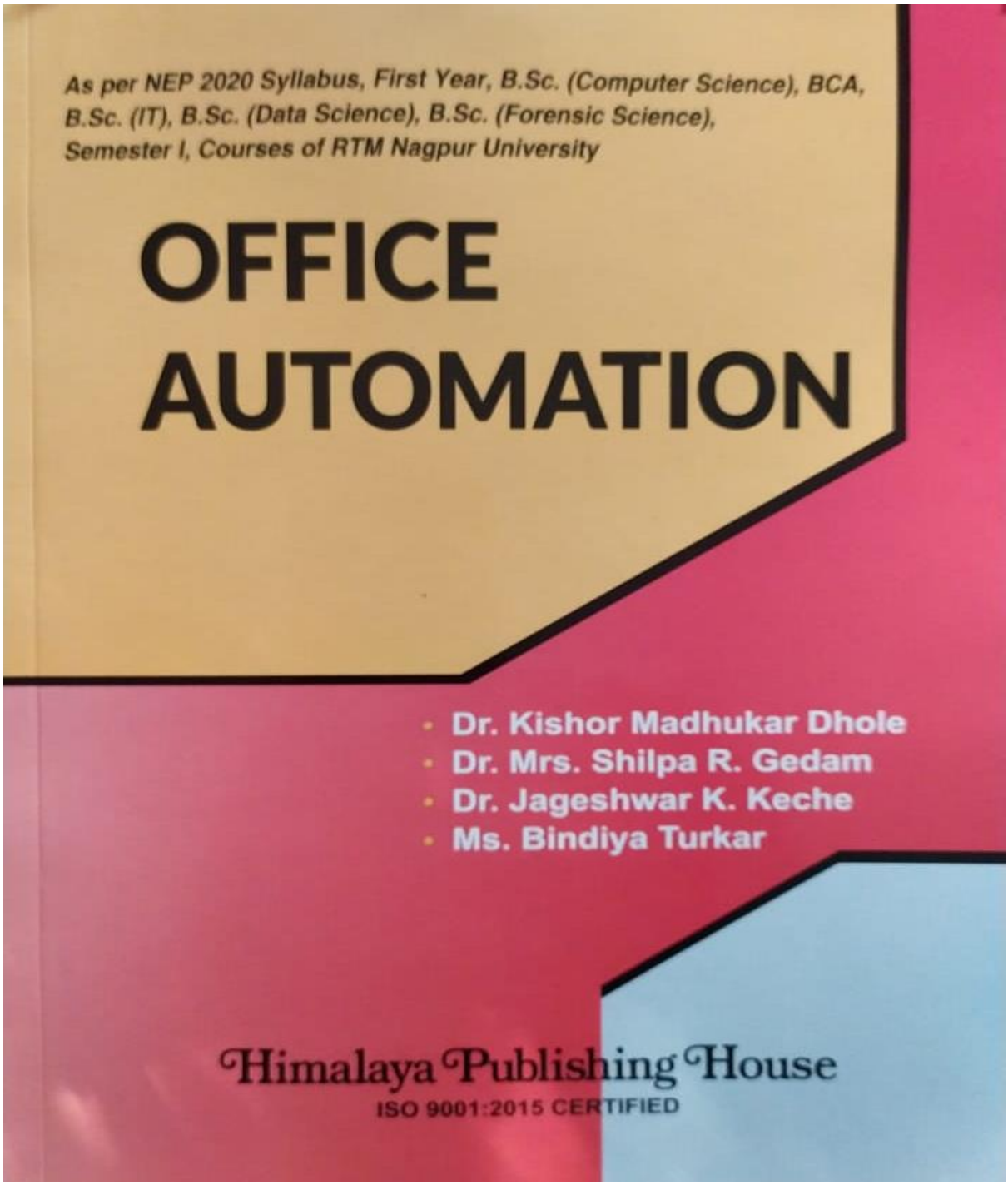
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Contents

Sl. No.	Unit Name	Page No.
Unit - 1	**Introduction to Windows Operating System**	1 - 38
	Introduction to Windows Operating System Advantages of Windows Operating System Using different Windows Applications Simultaneously Operating with Windows GUI Use of help Features Starting an Application Essential Accessories Creating Shortcuts Windows Explorer Control Panel My Computer My Documents Recycle Bin Finding Folders and Files Changing System Settings System Tools Use of Run Command Setting Peripherals Drivers Editing Graphics in Windows Review Questions	
Unit - 2	**Introduction to MS Word**	39 - 80
	Introduction Basics Word Starting Word Creating Document Parts of Word Window Mouse Operations Keyboard Operations Designing a Document	

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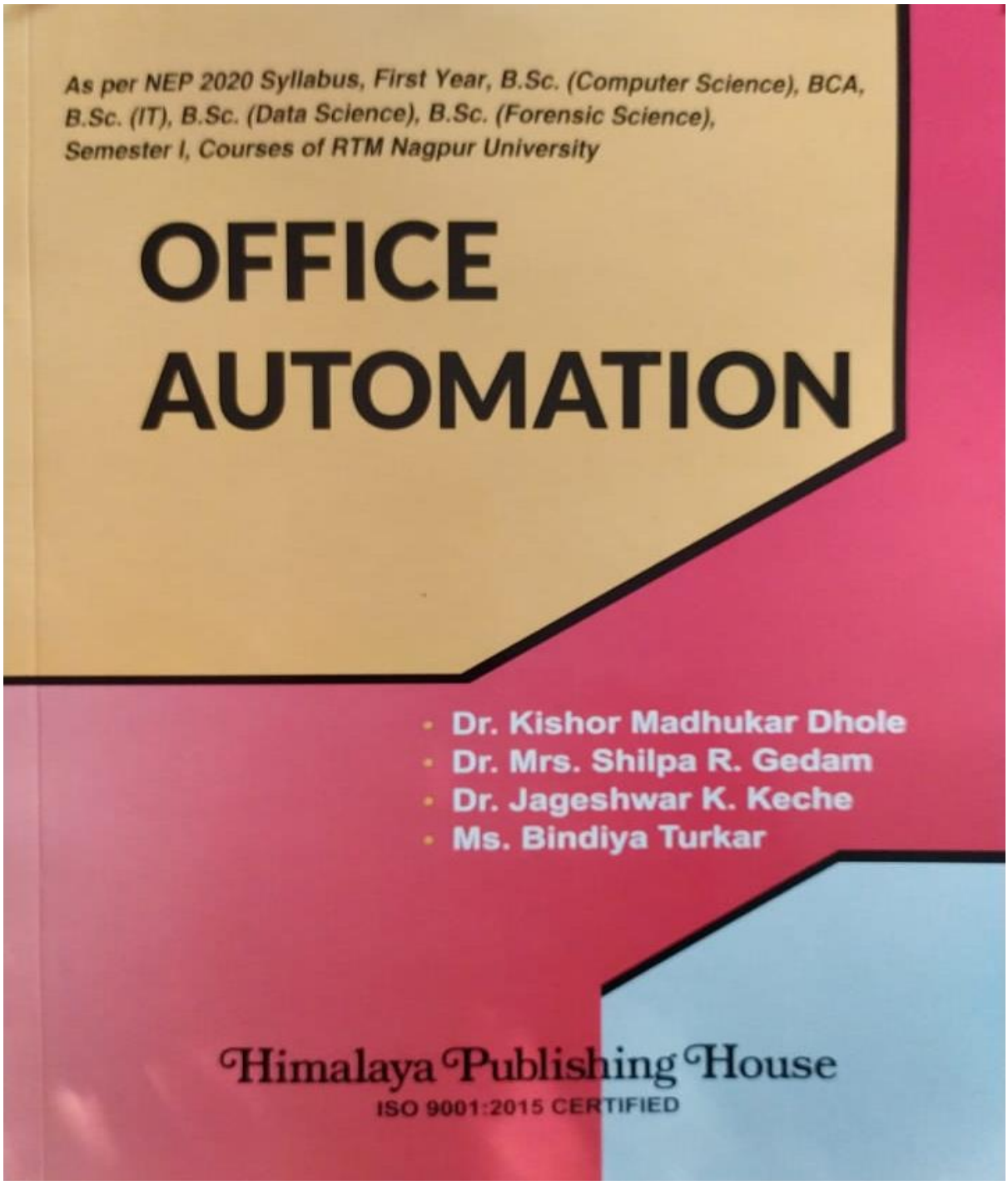
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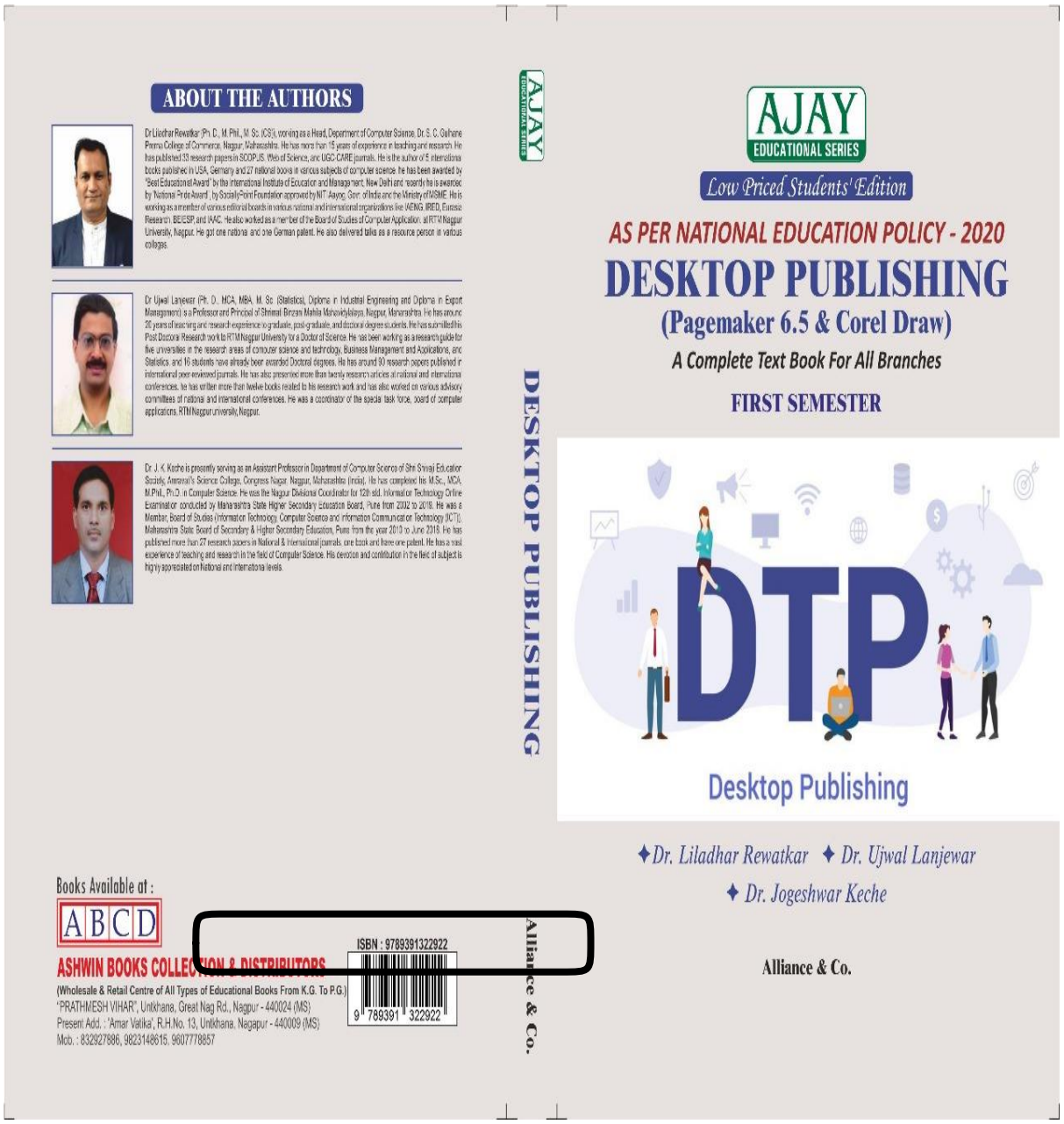

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Contents

Chapter 1 - Basics of Page Maker .....1 - 66

- Introduction
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- Working with Text
- Working withGraphics
- Starting A Publication from A Template
- Saving & Closing A Publication
- Drawing &Shaping Objects
- Positioning Ruler Guides
- Typing Text
- Creating Columns
- Creating Styles
- Changing Type Style
- Alignment
- Rotating Text Block
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- Moving of Graphics
- Placing Text File
- Setting Tab
- Indents
- Leaders
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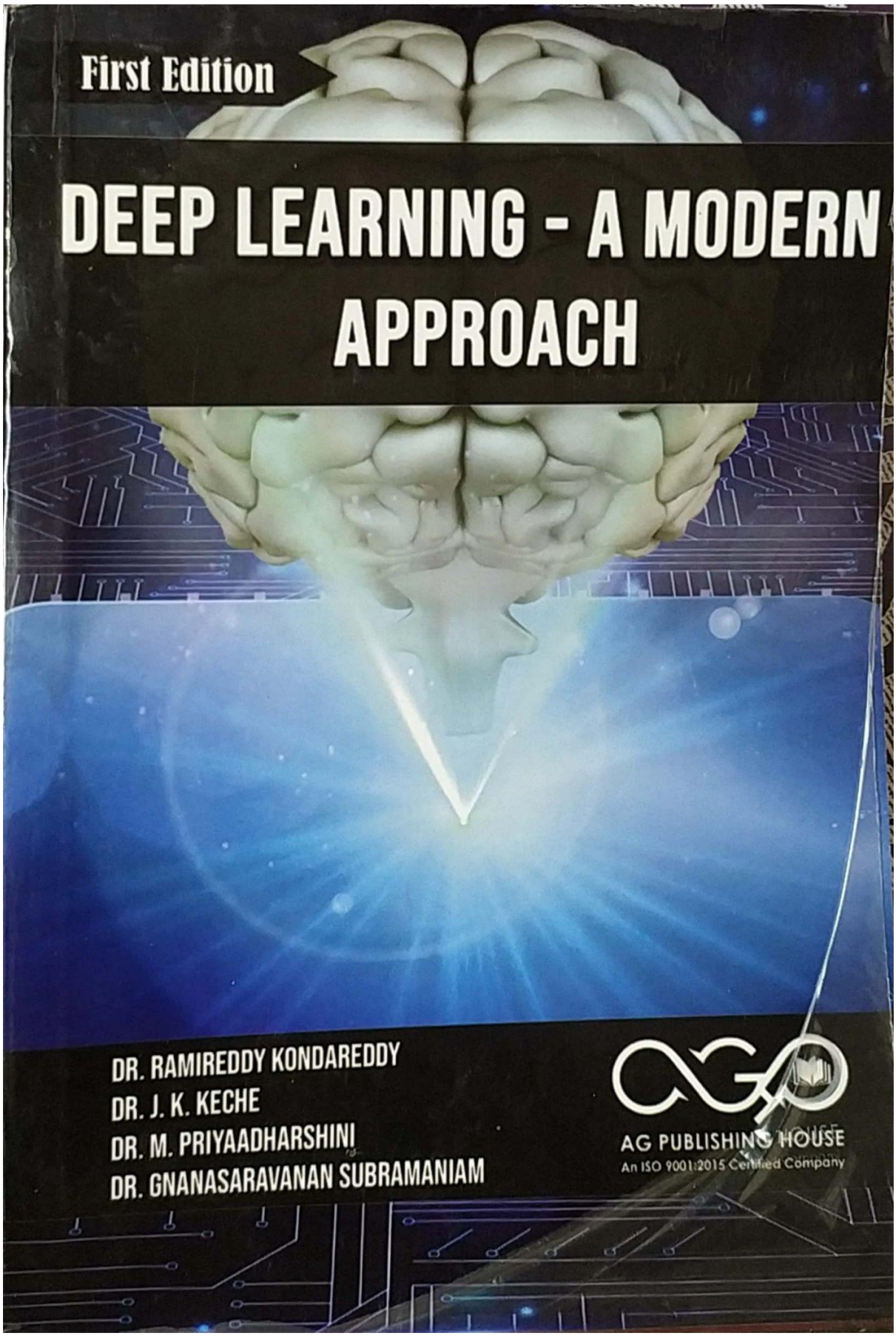
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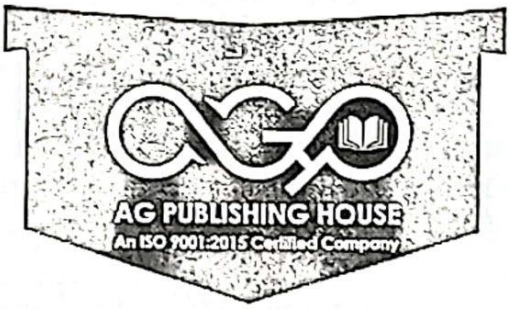


2023

TABLE OF CONTENT

CHAPTER-1: Deep Computer Vision using Convolutional Neural Networks.....1

1.1. Image Classification.....1

1.2. Image Augmentation.....5

1.3. Object Detection or localization and segmentation 7

1.4. Similarity Learning 15

1.5. Image captioning.....18

1.6. Generative models 31

1.7. Video analysis.....37

1.8. Application: Image Classification/Object Detection 47

CHAPTER-2: Transfer Learning.....54

2.1. Popular CNN Architectures and Transfer learning Techniques 54

CHAPTER-3: Recurrent Neural Networks.....76

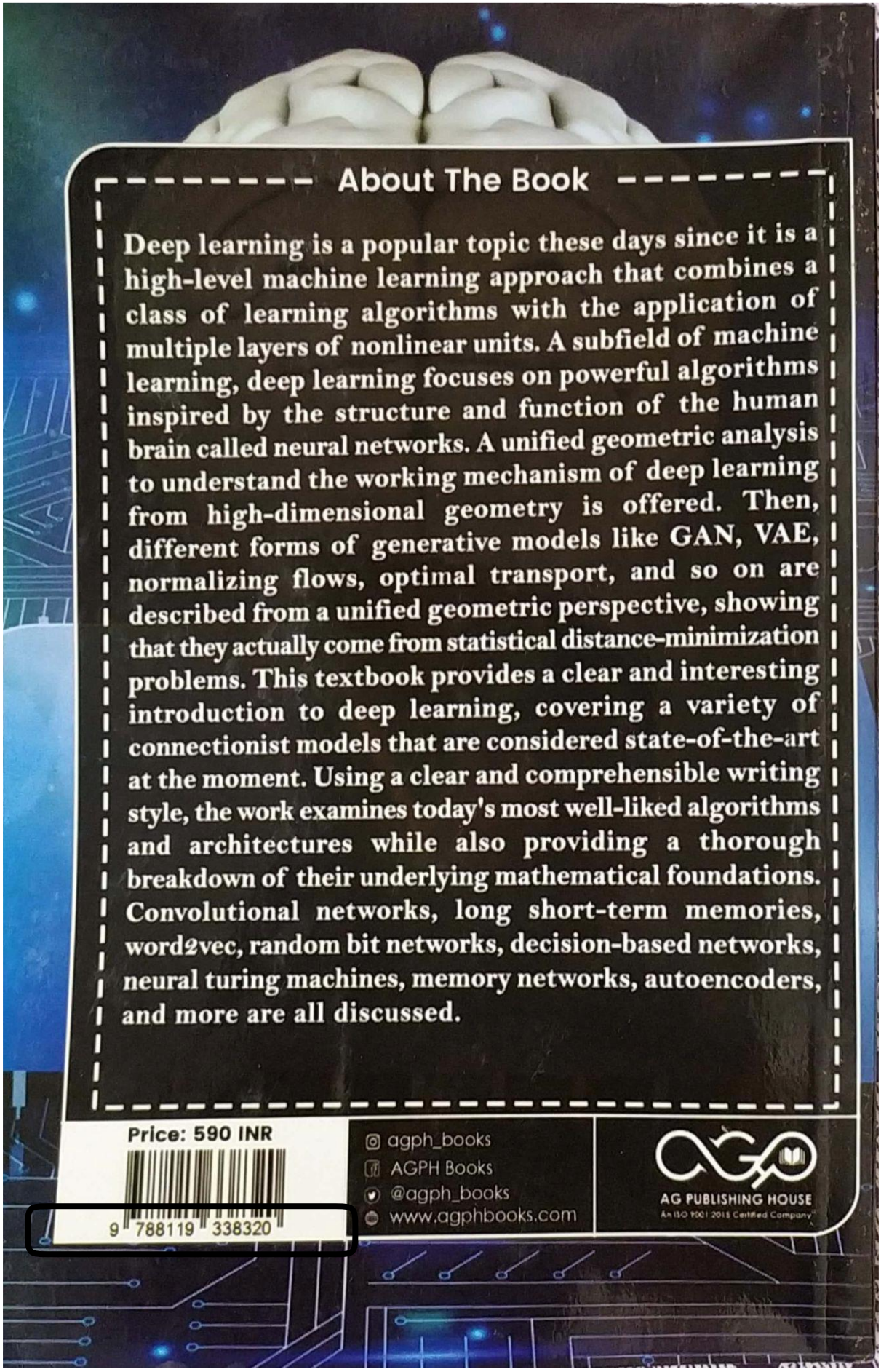
3.1. Introduction to RNN 76

3.2. Architectural Overview.....79

3.3. Bidirectional RNNs.....86

3.4. Encoder-decoder sequence to sequence architectures.....95

3.5. Vanishing and exploding gradient problems ...100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Deep learning is a popular topic these days since it is a high-level machine learning approach that combines a class of learning algorithms with the application of multiple layers of nonlinear units. A subfield of machine learning, deep learning focuses on powerful algorithms inspired by the structure and function of the human brain called neural networks. A unified geometric analysis to understand the working mechanism of deep learning from high-dimensional geometry is offered. Then, different forms of generative models like GAN, VAE, normalizing flows, optimal transport, and so on are described from a unified geometric perspective, showing that they actually come from statistical distance-minimization problems. This textbook provides a clear and interesting introduction to deep learning, covering a variety of connectionist models that are considered state-of-the-art at the moment. Using a clear and comprehensible writing style, the work examines today's most well-liked algorithms and architectures while also providing a thorough breakdown of their underlying mathematical foundations. Convolutional networks, long short-term memories, word2vec, random bit networks, decision-based networks, neural turing machines, memory networks, autoencoders, and more are all discussed.
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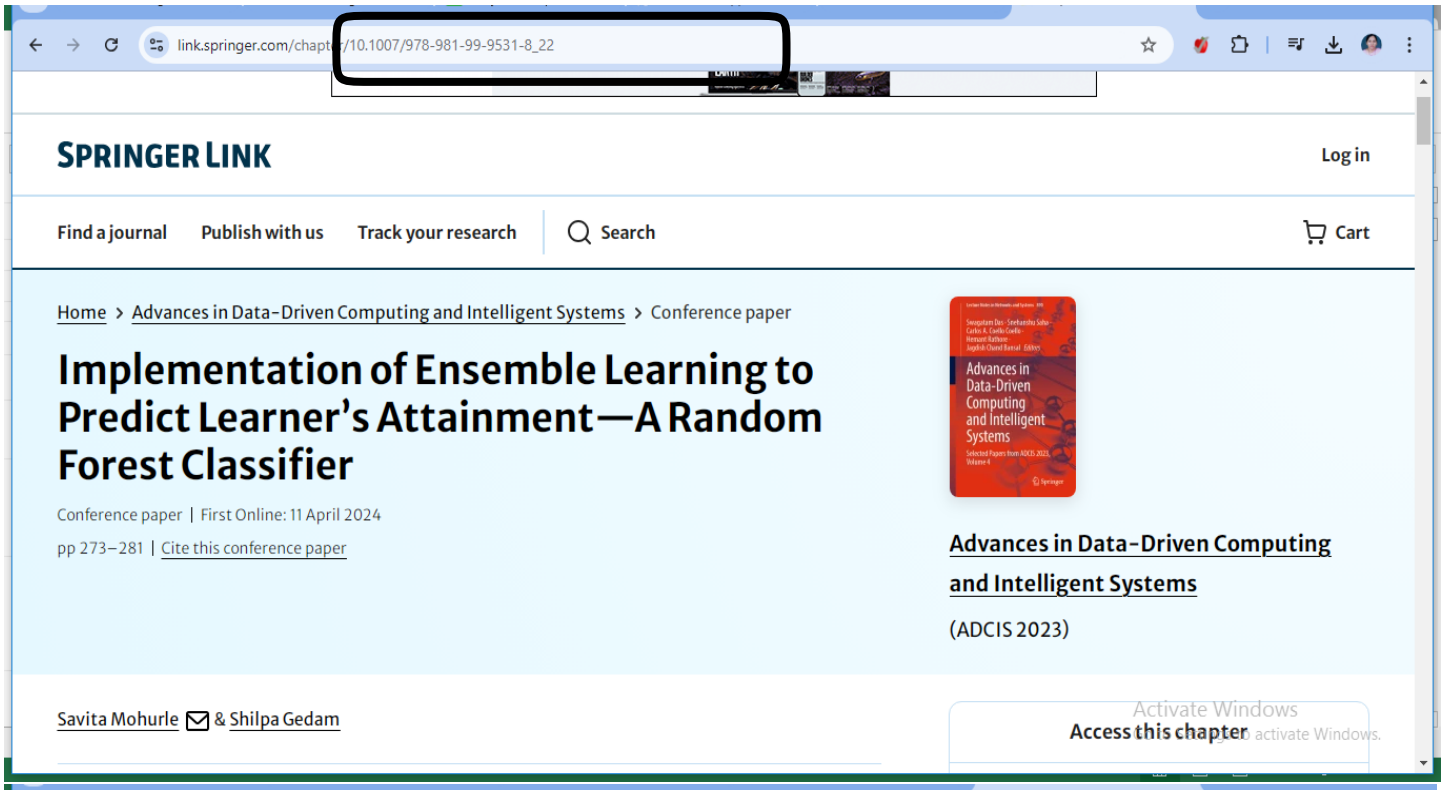
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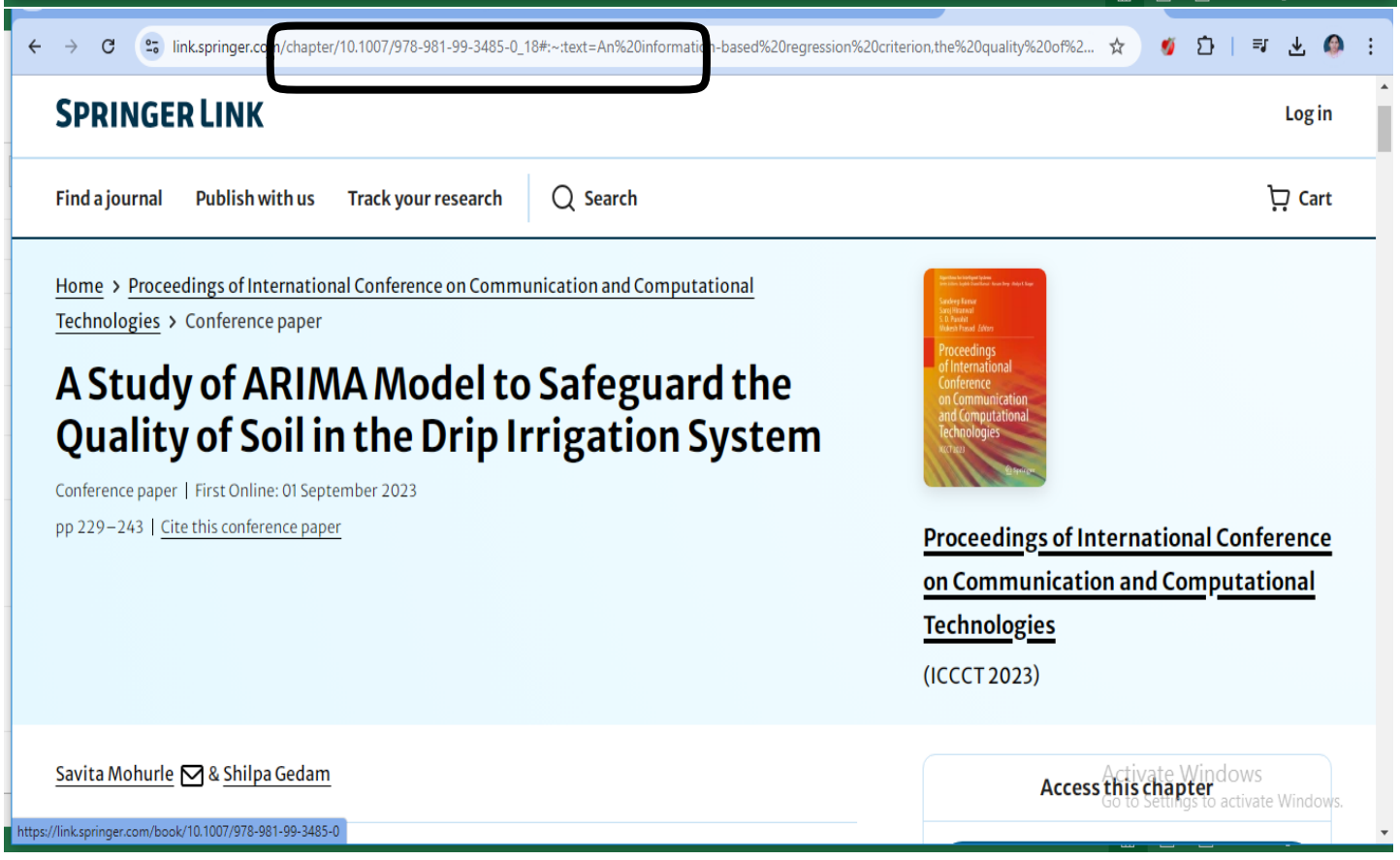
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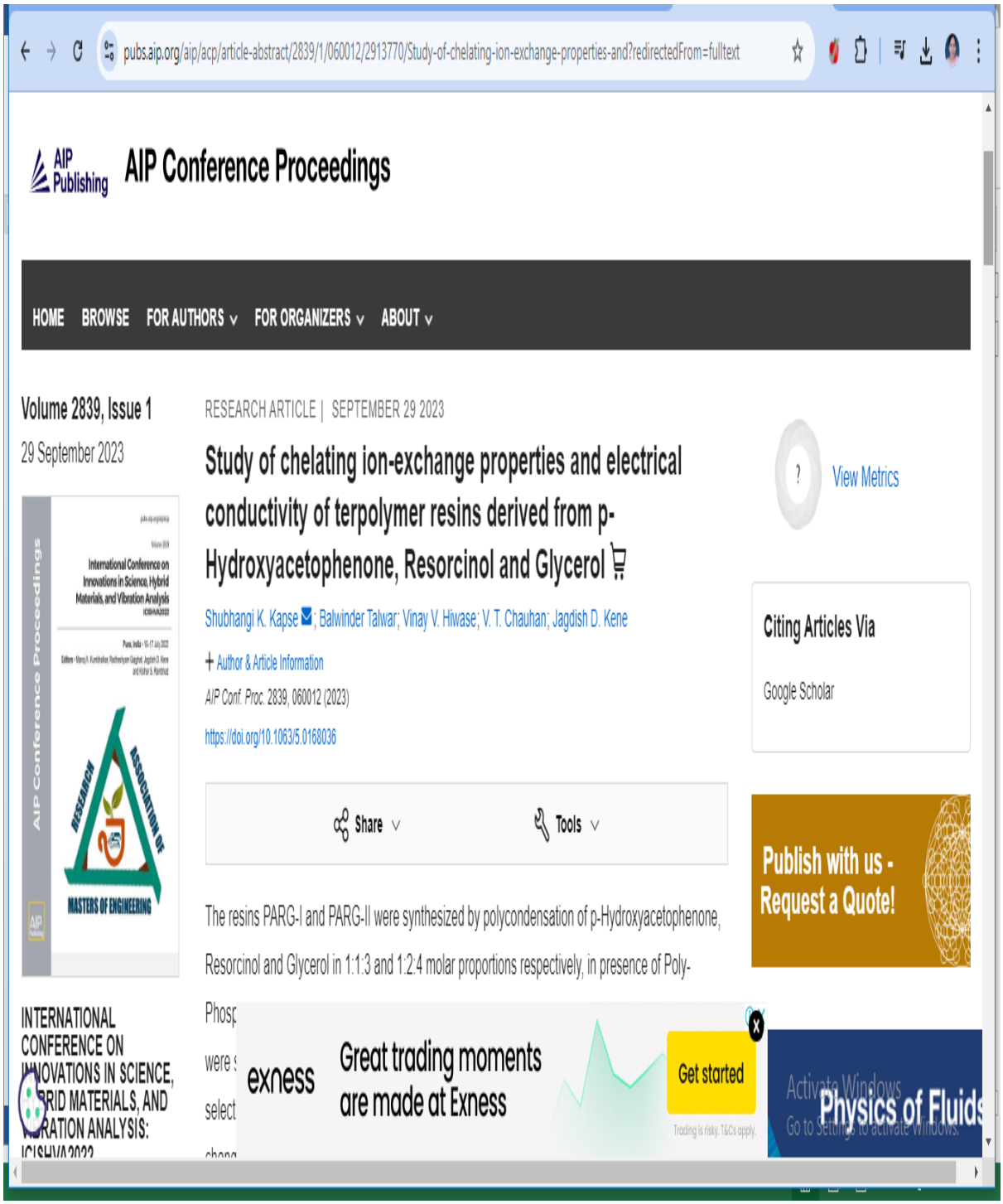
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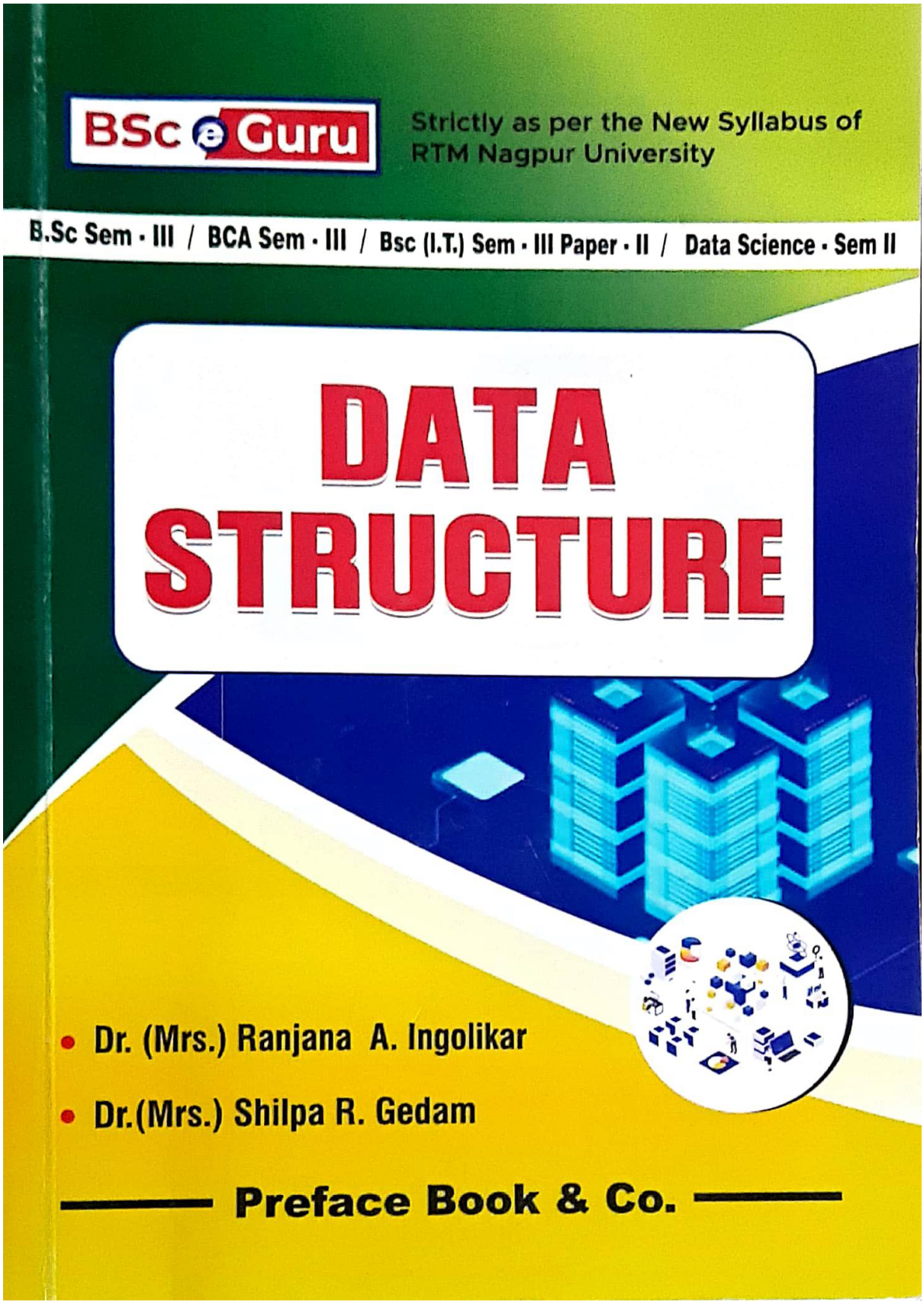
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Contents

Sr.	Name of Unit	Pg. No.
1.	**Unit - I**	
	⇒ Introduction to Data Structure	1
	⇒ Operation on Data Structure	2
	⇒ Types of Data Structure	2
	⇒ Linked List	2
	➢ Single Linked List	2
	• Representaion of linked list in Memory	3
	• Traversing a linked list	4
	• Memory Bank	5
	• Overflow and Underflow	6
	• Garbage Collection	7
	• Operations on linkedlist	8
	⇨ Insertion in linked list	11
	⇨ Deletion in linked list	15
	⇨ Searching in linked list	16
	⇨ Concatenation of two linked list	17
	⇨ Copying a linked list	18
	• Cicular linked list	18
	⇨ Traversing a Circular linked list	19
	⇨ Insertion in Circular linked list	21
	• Double linked list	21
	⇨ Operations on Double linked list	22
	❖ Insertion in Double linked list	26
	❖ Deletion in Double linked list	29
	⇒ Polynomial Representaion	30
	• Manipulations on Polynomial	35-36
	Exercise on Unit - I	
2.	**Unit - II**	
	⇒ STACKS :	37
	• Stacks terminology	37
	• Why to use Stack	38
	• Overflow and Underflow in Stack	38
	• Representaion of Stack	39
	• Operations on Stack	
	⇒ Arithmetic Expressions	41

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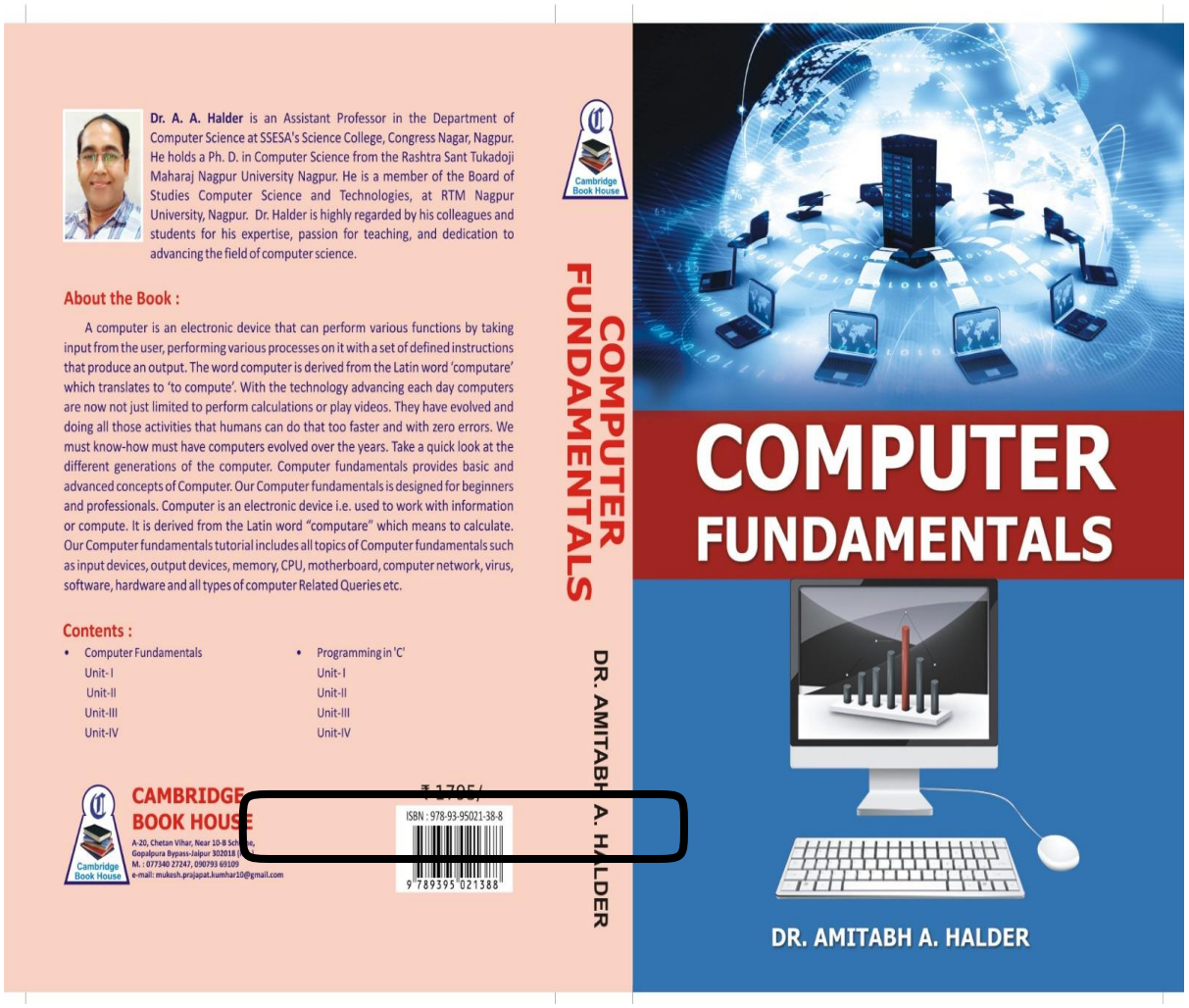
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Contents :
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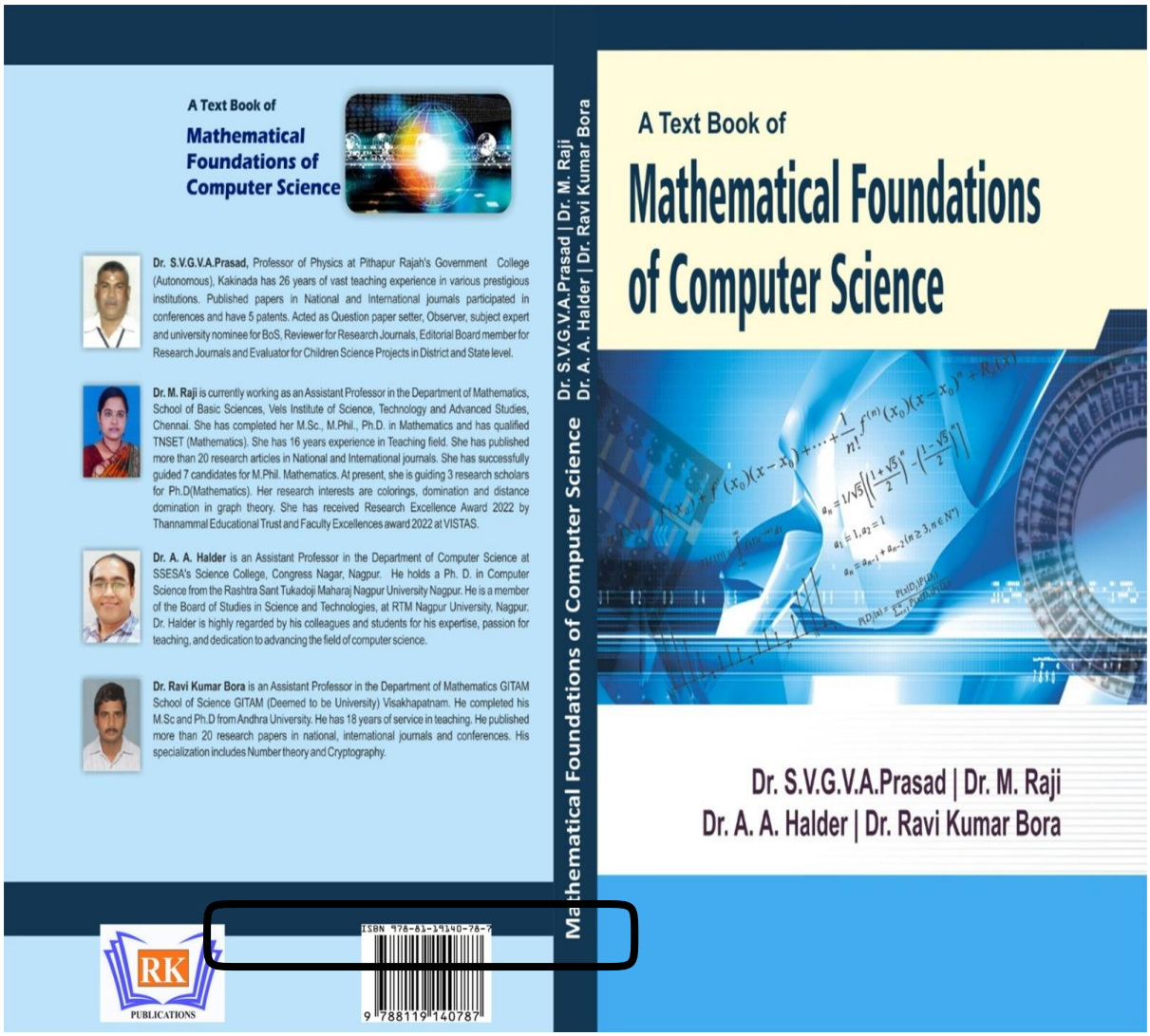
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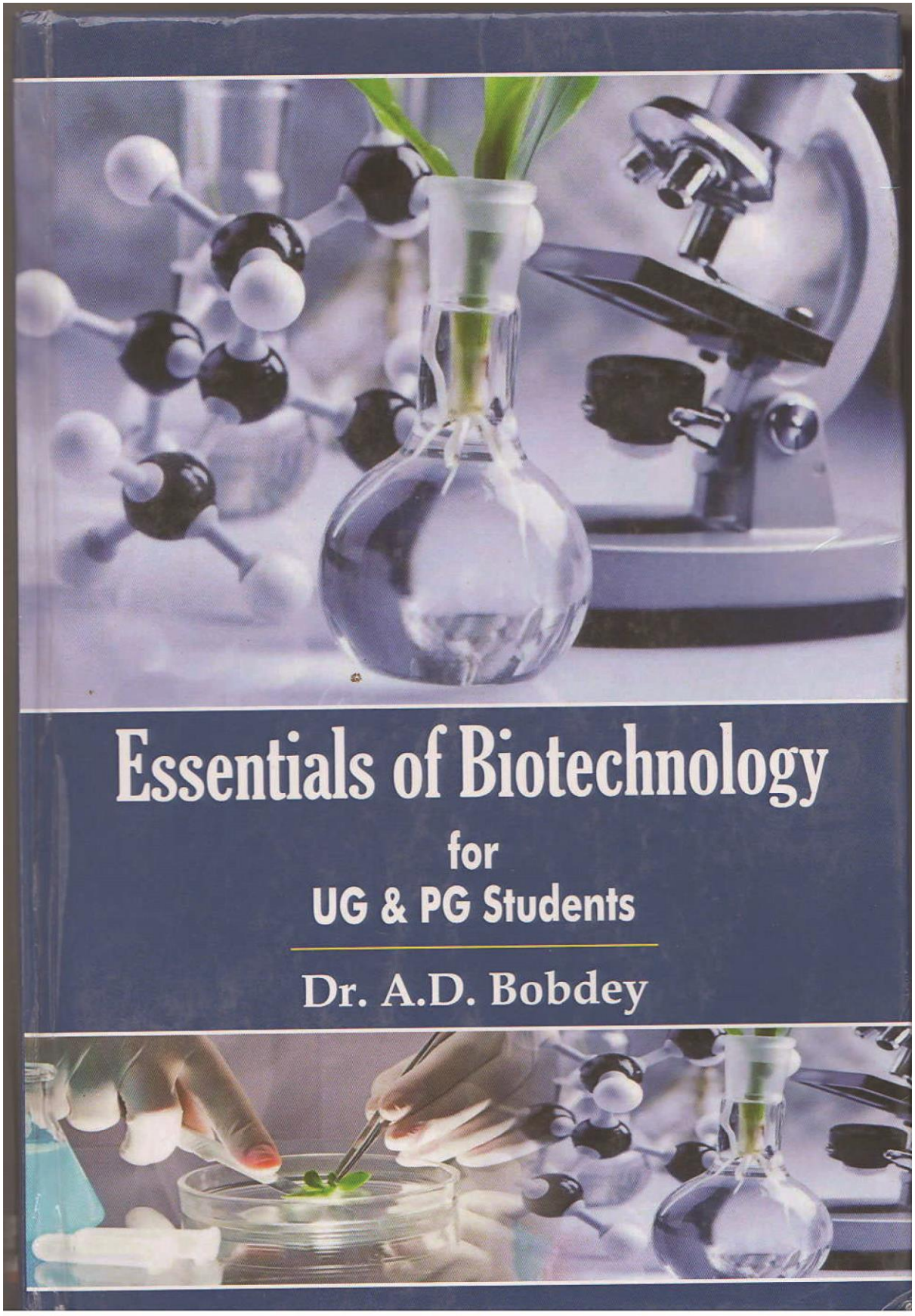
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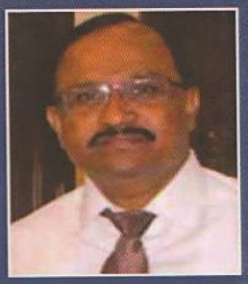
Essentials of Biotechnology

ABOUT THE BOOK

Biotechnology is responsible for many of the things that make our lives better. The field focuses on the intersection of biology and technology, leading to a vast array of new products that are designed to enrich lives, make day-to-day living easier, and make us healthier. From vaccine production to genetic modification, biotechnology is everywhere – and as a result, biotechnology careers are quite promising for new graduates. This guide focuses on the various biotechnology degrees, jobs and expectations for those who are interested in the field.

The term biotechnology was first coined in 1919 by Károly Ereky, a Hungarian agricultural engineer, who foresaw a time when biology could be used for turning raw material into useful products. The emerging field of synthetic biology represents the natural progression of this idea as our ability to synthesize gene sequences and engineer biochemical pathways and even entire microorganisms in rational designs for a myriad of purposes from speciality chemicals, to food, to energy improves.

ABOUT THE AUTHOR



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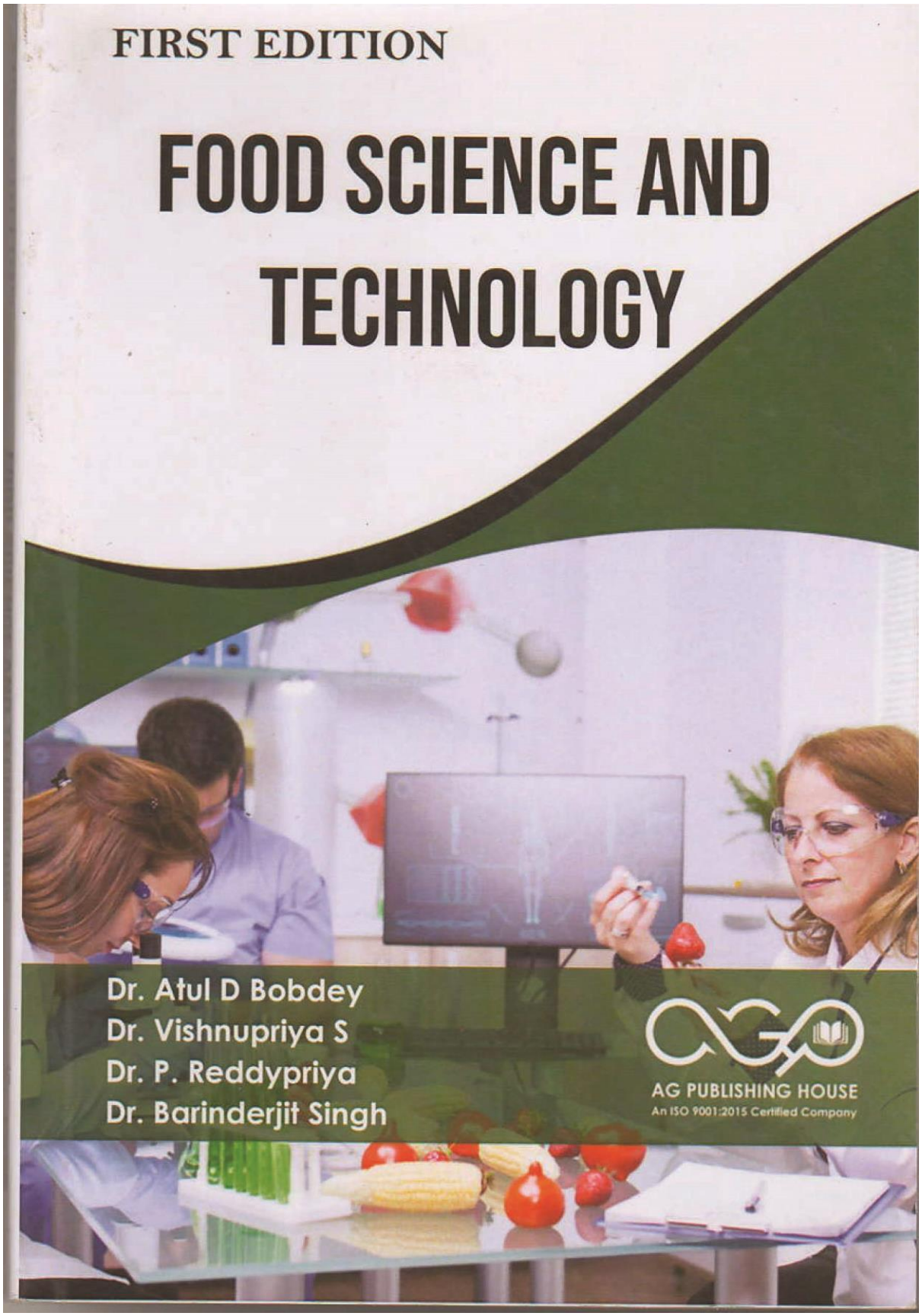
Contents

	Preface	*V*
1.	*Introduction*	*1*
2.	*DNA, RNA and Protein*	*18*
3.	*Recombinant DNA Technology*	*55*
4.	*Cell Culture*	*97*
5.	*Genomics of Probiotic*	*124*
6.	*Genetic Engineering*	*150*
7.	*Genetically Modified Organism*	*169*
8.	*Industrial Fermentation*	*183*
9.	*The Impact of Biotechnology on Poultry Genetics and Breeding*	*199*
	Bibliography	*215*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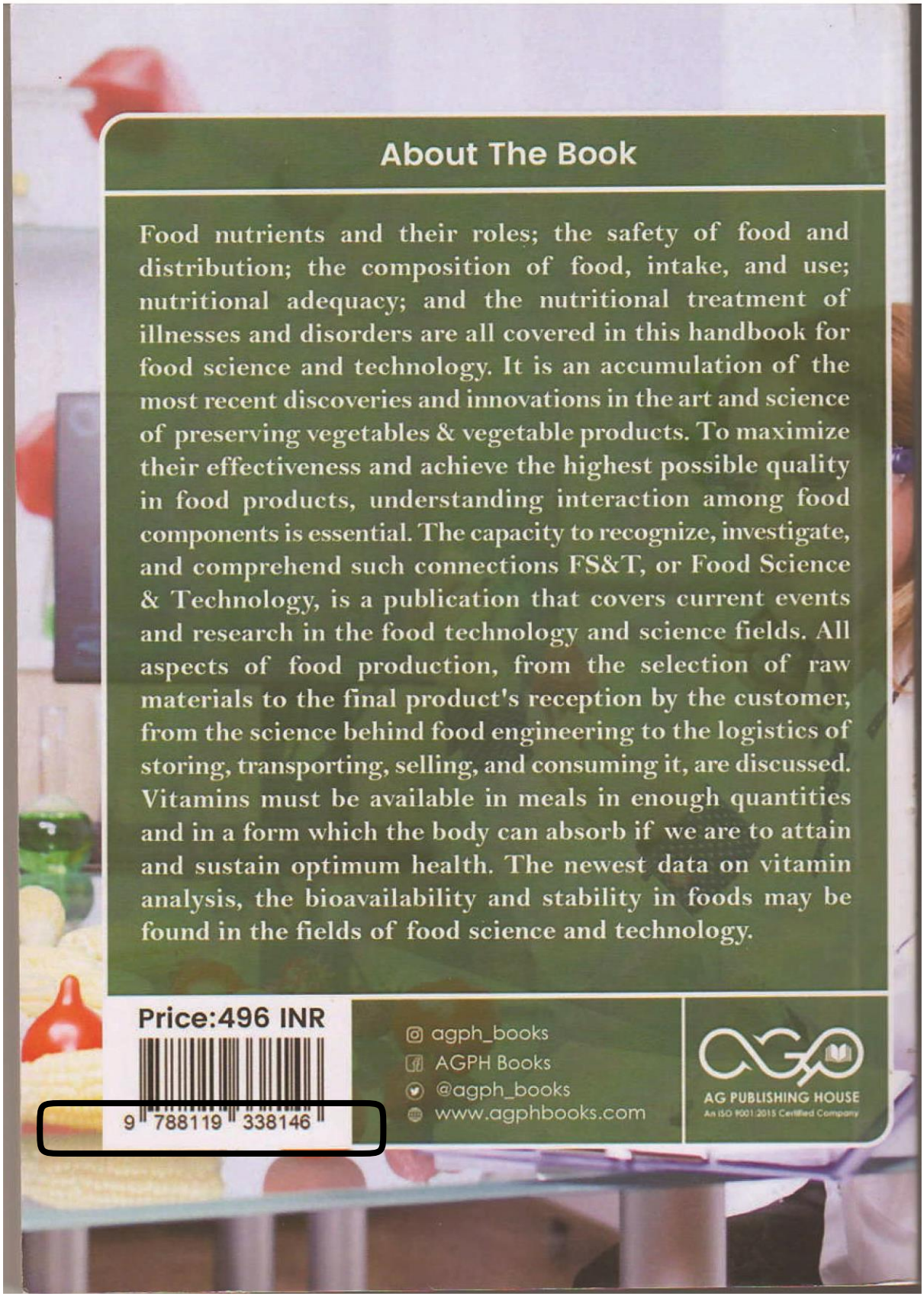

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Food nutrients and their roles; the safety of food and distribution; the composition of food, intake, and use; nutritional adequacy; and the nutritional treatment of illnesses and disorders are all covered in this handbook for food science and technology. It is an accumulation of the most recent discoveries and innovations in the art and science of preserving vegetables & vegetable products. To maximize their effectiveness and achieve the highest possible quality in food products, understanding interaction among food components is essential. The capacity to recognize, investigate, and comprehend such connections FS&T, or Food Science & Technology, is a publication that covers current events and research in the food technology and science fields. All aspects of food production, from the selection of raw materials to the final product's reception by the customer, from the science behind food engineering to the logistics of storing, transporting, selling, and consuming it, are discussed. Vitamins must be available in meals in enough quantities and in a form which the body can absorb if we are to attain and sustain optimum health. The newest data on vitamin analysis, the bioavailability and stability in foods may be found in the fields of food science and technology.

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PREFACE

Food scientists examine foods' chemical, biological, and physical components, as well as what goes into spoilage and how to prevent it.

Scientists in the food industry use knowledge from fields such as chemistry, engineering, and microbiology to study food to make it healthier, more accessible, and more nutrient-dense.

Food scientists work to improve the methods used to prepare, preserve, pack, and/or store food in accordance with industry and government standards and regulations in their respective fields of expertise.

For the purpose of creating and managing food supplies, food scientists and technologists conduct fundamental scientific, microbiological, biochemical, nutritional, biotechnological, and engineering research. Science that studies the content, characteristics, and behavior of food items during production, handling, storage, distribution, and consumption.

The increasing needs of modern markets necessitate the use of food science. As more people seek low-fat, low-carbohydrate, and low-sugar meal options, the food science sector expands to meet the demand.

TABLE OF CONTENT

CHAPTER-1: Dimensions of food science 1

1.1. Food groups classification 1

1.2. Composition and nutritive value of cereals 5

1.3. Malting and Germination of Grains 33

1.4. Nutritional Benefits and uses 44

1.5. Current trends in food science 49

CHAPTER-2: Fundamentals of nutrition 60

2.1. Brief history of nutrition 60

2.2. Nutrient needs 62

2.3. Dietary guidelines 72

2.4. Food guide pyramid 74

2.5. Role of Enzymes in Digestion 87

2.6. Hormonal Mechanism 96

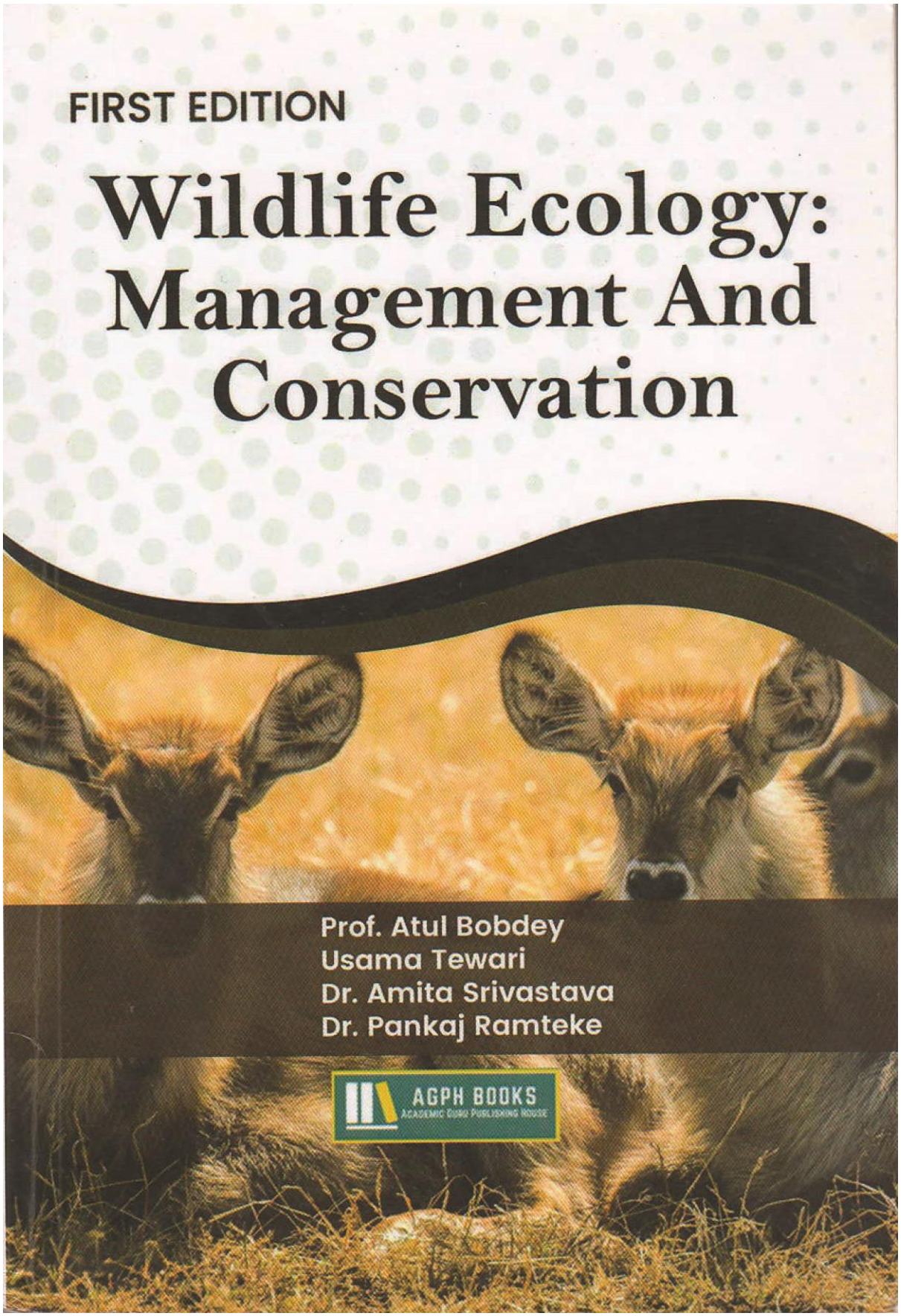
2.7. Macronutrients and Micronutrients 105

CHAPTER-3: Food preservation and processing 118

3.1. Historical developments in food preservation and processing 118

3.2. Introduction to process of food preservation 140

3.3. Basic concepts in unit operation 148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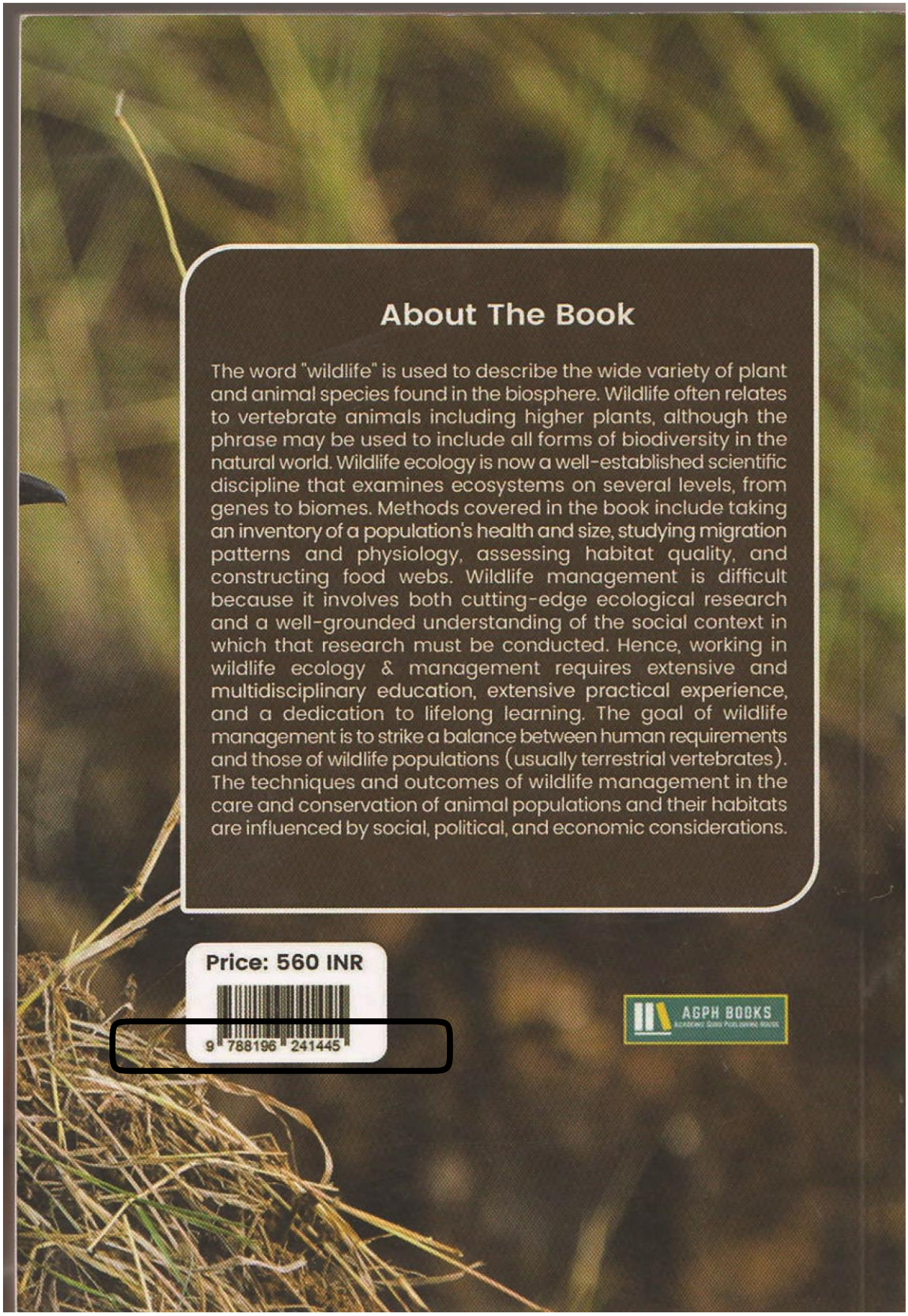
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The word "wildlife" is used to describe the wide variety of plant and animal species found in the biosphere. Wildlife often relates to vertebrate animals including higher plants, although the phrase may be used to include all forms of biodiversity in the natural world. Wildlife ecology is now a well-established scientific discipline that examines ecosystems on several levels, from genes to biomes. Methods covered in the book include taking an inventory of a population's health and size, studying migration patterns and physiology, assessing habitat quality, and constructing food webs. Wildlife management is difficult because it involves both cutting-edge ecological research and a well-grounded understanding of the social context in which that research must be conducted. Hence, working in wildlife ecology & management requires extensive and multidisciplinary education, extensive practical experience, and a dedication to lifelong learning. The goal of wildlife management is to strike a balance between human requirements and those of wildlife populations (usually terrestrial vertebrates). The techniques and outcomes of wildlife management in the care and conservation of animal populations and their habitats are influenced by social, political, and economic considerations.
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TABLE OF CONTENT

CHAPTER-1: Wildlife Ecology 1

1.1. Biomes 2

1.2. Animals as Individuals 3

1.3. Food and Nutrition 4

1.4. The Ecology of Behavior 8

1.5. Population Growth 9

1.6. Dispersal, Dispersion, and Distribution 12

1.7. Population Regulation, Fluctuation, and Competition within Species 13

1.8. Predation 19

CHAPTER-2: Habitat Analysis, Evaluation, And Management Of Wild Life 23

2.1. Physical parameters: Topography, Geology, Soil, and water 23

2.2. Biological Parameters: food, cover, forage, browse and cover estimation 25

2.3. Standard evaluation procedures: remote sensing and GIS Management of Habitats 26

2.4. General genetic diversity 40

CHAPTER-3: Population Estimation 44

3.1. Population density 44

3.2. Natality 50

3.3. Mortality 52

3.4. Sex Ratio Computation 54

3.5. National parks 57

3.6. Wildlife Sanctuaries 61

3.7. Protected areas in India 66

3.8. Tiger conservation 77

CHAPTER-4: Conservation 88

4.1. Conservation in Theory 88

4.2. Conservation in practice: Introduction 102

CHAPTER-5: Wildlife Harvesting And Control 125

5.1. Wildlife harvesting: Introduction 125

5.2. Wildlife Control: Introduction 139

CHAPTER-6: Ecosystem Management And Conservation 151

6.1. Introduction 151

6.2. Definitions 154

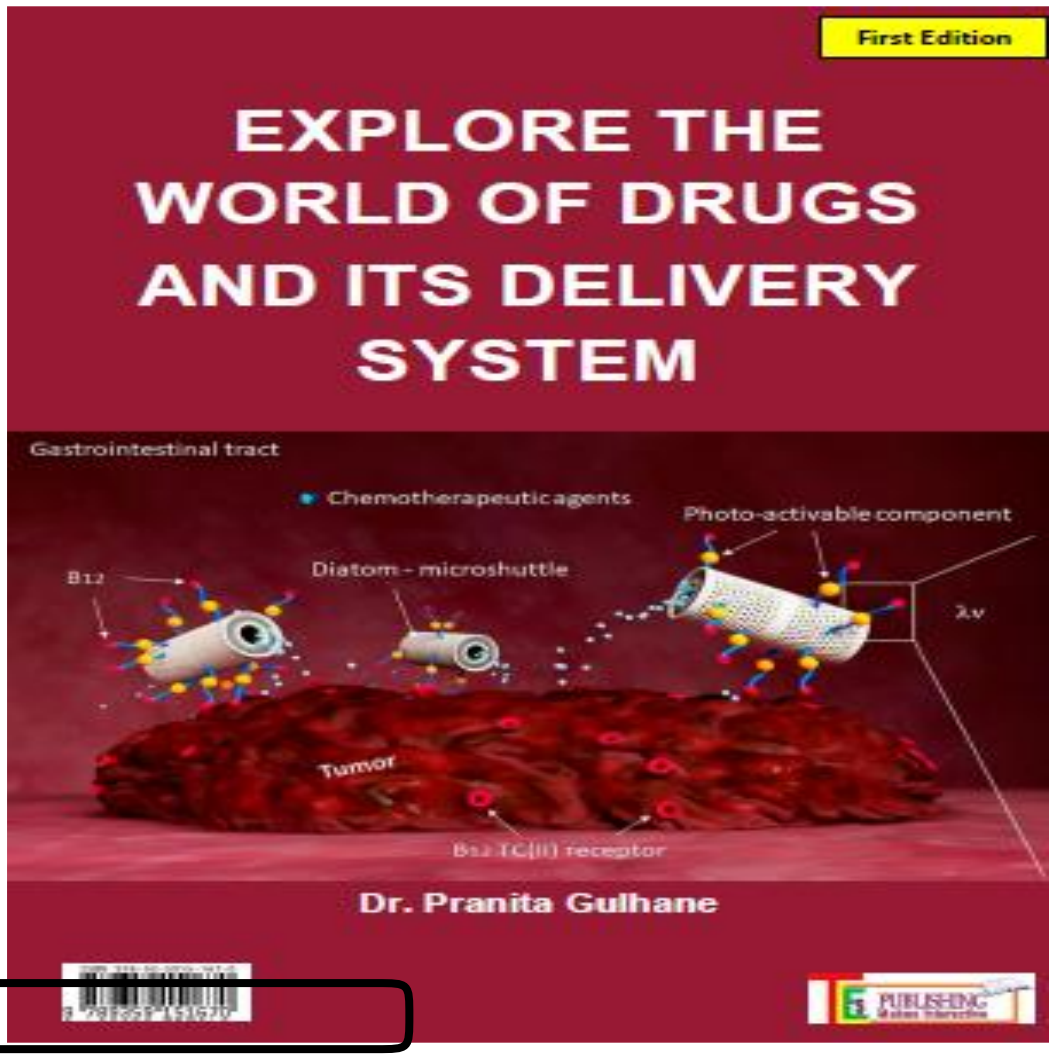
6.3. Gradients of communities 156

6.4. Niches 157

6.5. Food webs and intertropical interaction 159

6.6. Community features and management consequences 166

6.7. Multiple states 167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ABSTRACT

The increasing complexity of cyberattacks in the quickly changing field of cybersecurity necessitates constant innovation in protection systems. Even while they worked well in the past, traditional methods now struggle to keep up with the ever-changing nature of cyberattacks. This research presents a novel architecture that integrates three DL models and seven ML models in a strategic way to detect firewall anomalies using convolutional neural networks (CNNs). Rather than relying on rule-based methods, the suggested design combines CNN_LSTM, Feedforward Neural Network, Neural Network, KNeighborsClassifier, Gaussian NB, Linear SVC and Random Forest Classifier. The technology overcomes the drawbacks of conventional firewalls by giving the firewall intelligence and flexibility through machine learning, enabling it to recognize and react to changing cyberthreats on its own. The inclusion of deep learning models enhances the architecture's capacity for capturing complex patterns, emphasizing the CNN-LSTM hybrid model's spatial-temporal awareness. This interdisciplinary initiative aims not only to fortify cybersecurity systems but also to contribute to the broader discourse on integrating machine learning and deep learning in real-world applications, redefining the efficacy of firewall systems against the evolving cyber threat landscape.

1. INTRODUCTION

In the ever-evolving realm of cybersecurity, the sophistication of cyber threats necessitates continuous innovation in defense mechanisms. The conventional approaches, while effective, are increasingly being challenged by the dynamic nature of contemporary cyber-attacks. In response to this pressing need, our research endeavors to pioneer a novel architecture for (CNN) Firewall Anomaly Detection a transformative initiative that draws on the strengths of both machines learning and deep learning models. This introduction serves as a prelude to the multifaceted framework that integrates seven machine learning models, including Logistic Regression, KNeighboursClassifier, Gaussian NB, Linear SVC and Random Forest Classifier, as well as three deep learning models—Neural Network, CNN_LSTM and Feedforward Neural Network. Traditional firewall systems have primarily relied on rule-based mechanisms to filter and regulate network traffic. However, the intricate patterns and subtle deviations characterizing modern cyber threats demand a more nuanced and adaptive approach. Leveraging machine learning models in the proposed architecture adds a layer of intelligence to the firewall, allowing it to autonomously learn and adapt to the evolving threat landscape [1]. The inclusion of algorithms for machine learning, like logistic regression, KNeighboursClassifier, Gaussian NB, Linear SVC and Random Forest Classifier broadens the spectrum of anomaly detection capabilities. Each model brings unique strengths, enhancing the system's ability to discern abnormal patterns and intrusions within network traffic. Complementing the machine learning ensemble, the architecture incorporates three deep learning models Neural Network, CNN_LSTM and Feedforward Neural Network. With its representation learning and hierarchical identification of features, deep learning offers an effective toolkit for identifying intricate patterns in data. The Neural Network component capitalizes on the flexibility and adaptability inherent in neural architectures, while the CNN_LSTM hybrid model combines the spatial awareness of Networks of Convolutional Neurals with the temporal understanding of networks with long short-term memory. The Neural Network Feedforward, characterized by its layered architecture, excels in capturing intricate relationships within the data. The holistic integration between deep learning and machine learning models in our novel architecture aims to create a comprehensive and adaptive firewall system. This ensemble approach capitalizes on the diverse strengths of each model to collectively enhance the accuracy, sensitivity, and responsiveness of anomaly detection. The Research aims to support not just the robustness of cybersecurity systems but

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Developing a Novel Architecture for Convolutional Neural Network Firewall Anomaly Detection

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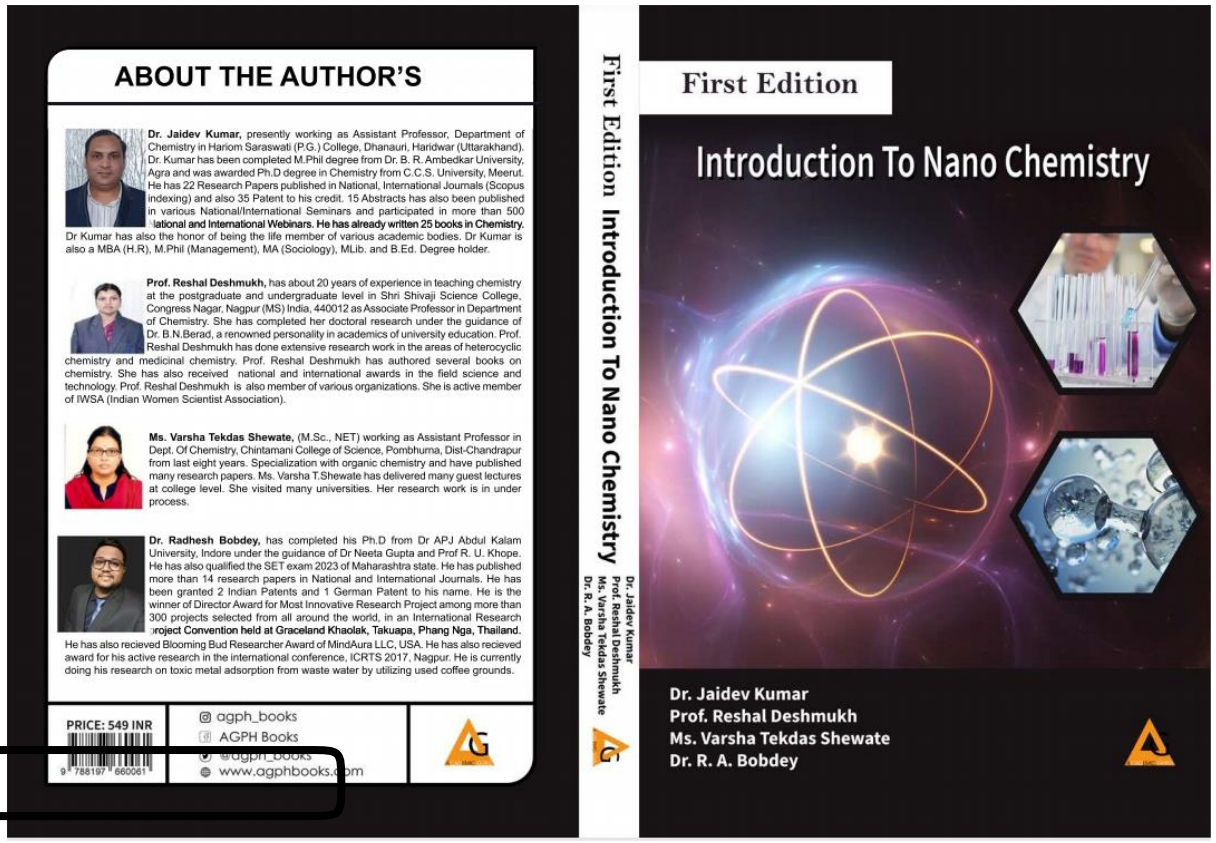

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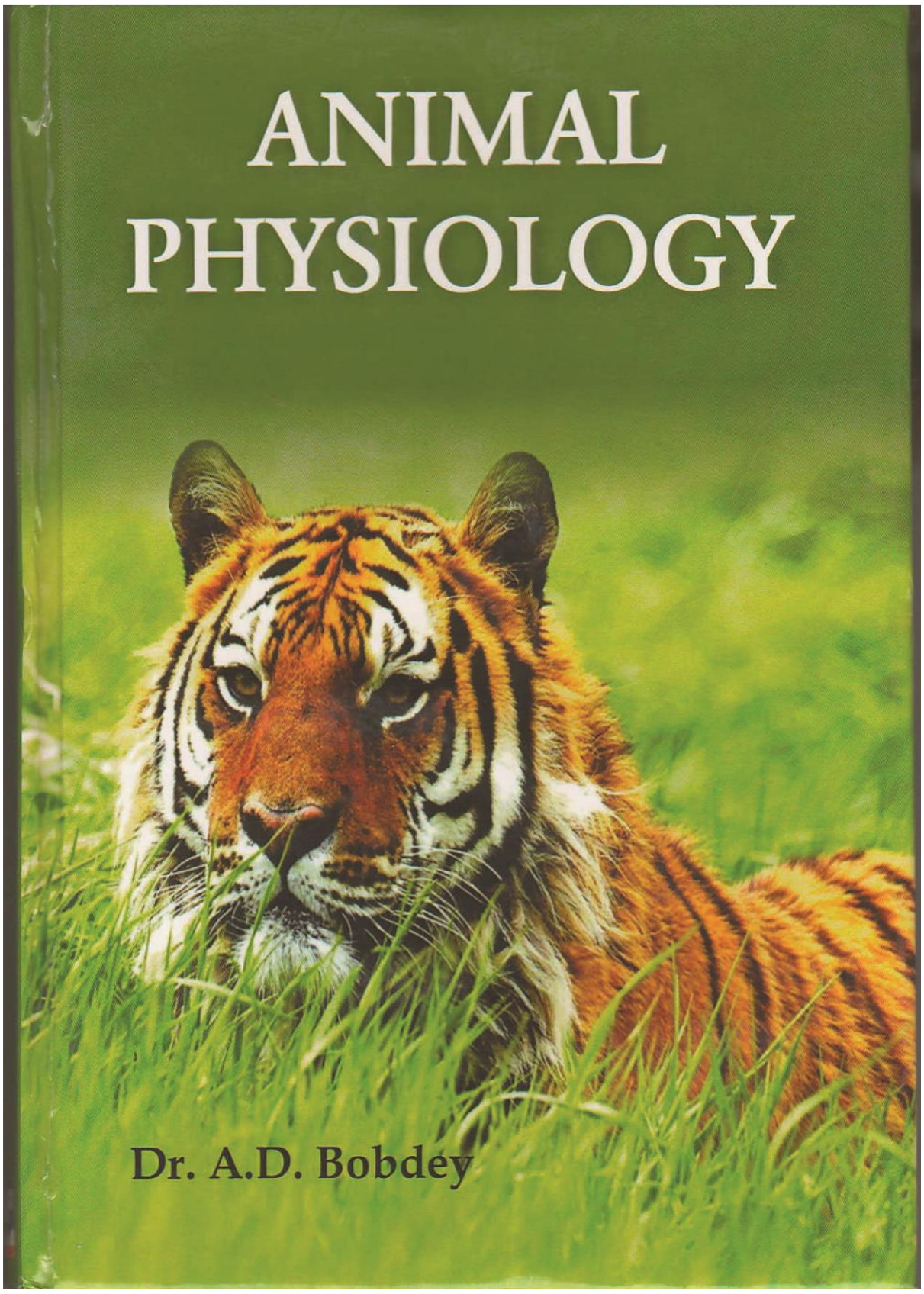
ANIMAL
PHYSIOLOGY
Dr. A.D. Bobdey

Contents

	Preface	*v*
1.	*Introduction*	*1*
2.	*Body Organisation*	*18*
3.	*Animal Skin*	*36*
4.	*Animal Skeleton*	*48*
5.	*Animal Muscles*	*74*
6.	*Animal Cardiovascular System*	*83*
7.	*Animal Respiratory System*	*115*
8.	*Animal Lymphatic System*	*137*
9.	*Animal Digestive System*	*148*
10.	*Animal Urinary System*	*173*
11.	*Animal Reproductive System*	*185*
	Bibliography	*215*

ANIMAL PHYSIOLOGY

ABOUT THE BOOK

Physiology is the study of the functions of the body, or how the body works. Animal physiology is the study of the internal physical and chemical functions of animals. Professionals in this field may explore the makeup of animals, including their genetics, their behaviors and their biological structure. Animal Physiology entails the anatomy, histology, and endocrine functioning of the physiological processes of livestock under specific conditions. This also includes the possible manipulation of the reproductive processes by means of accelerated breeding techniques for more efficient livestock and poultry production.

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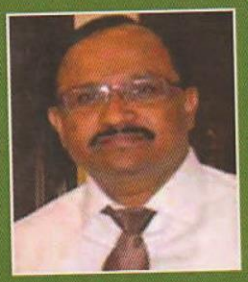

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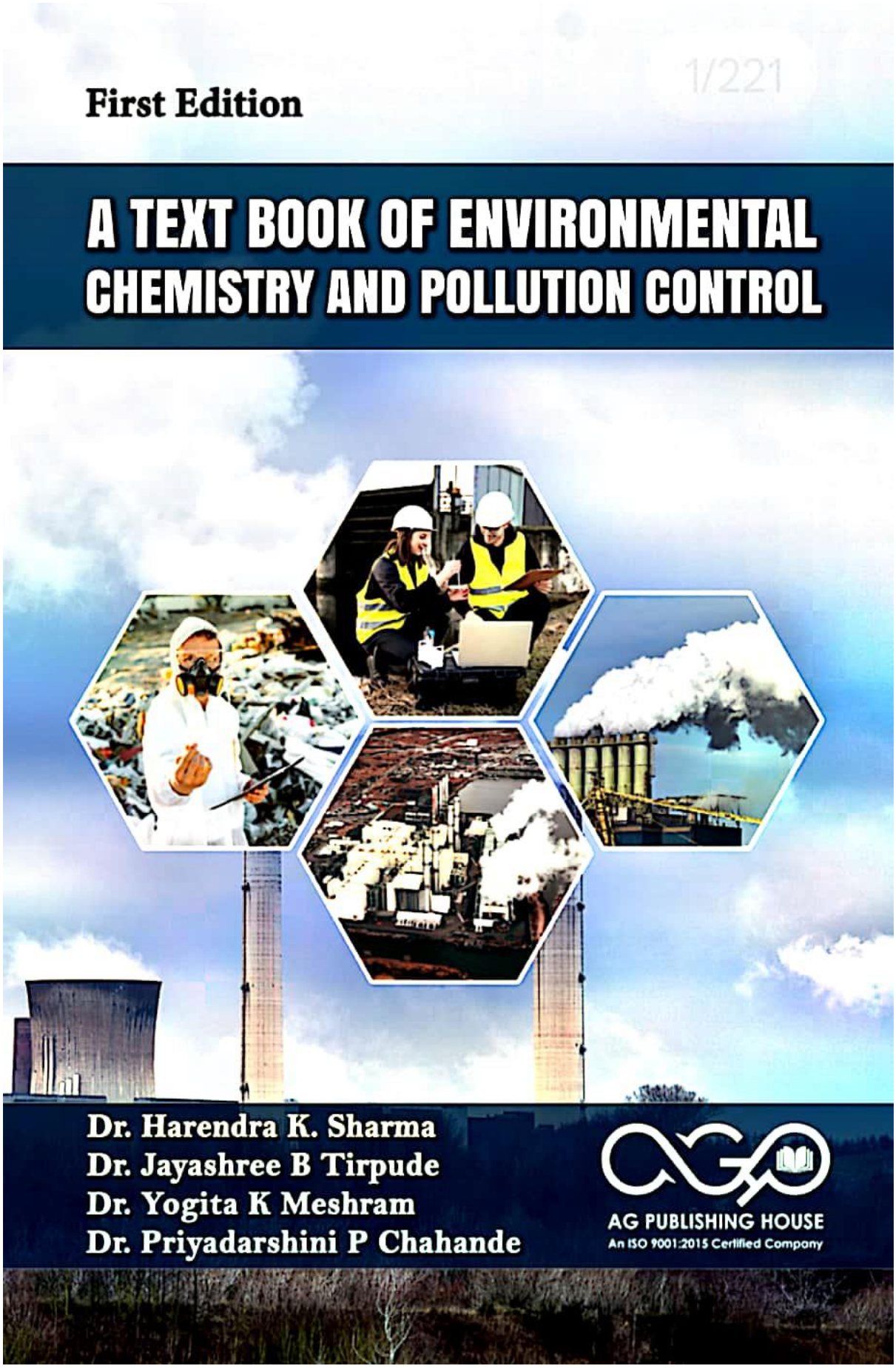
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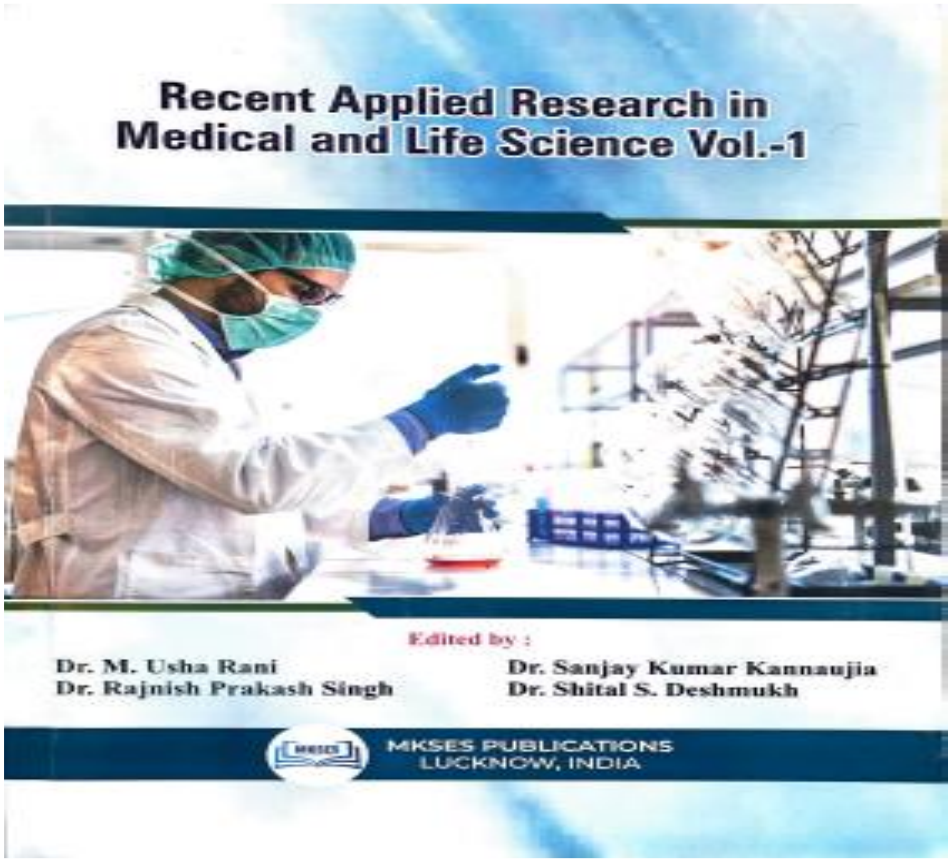

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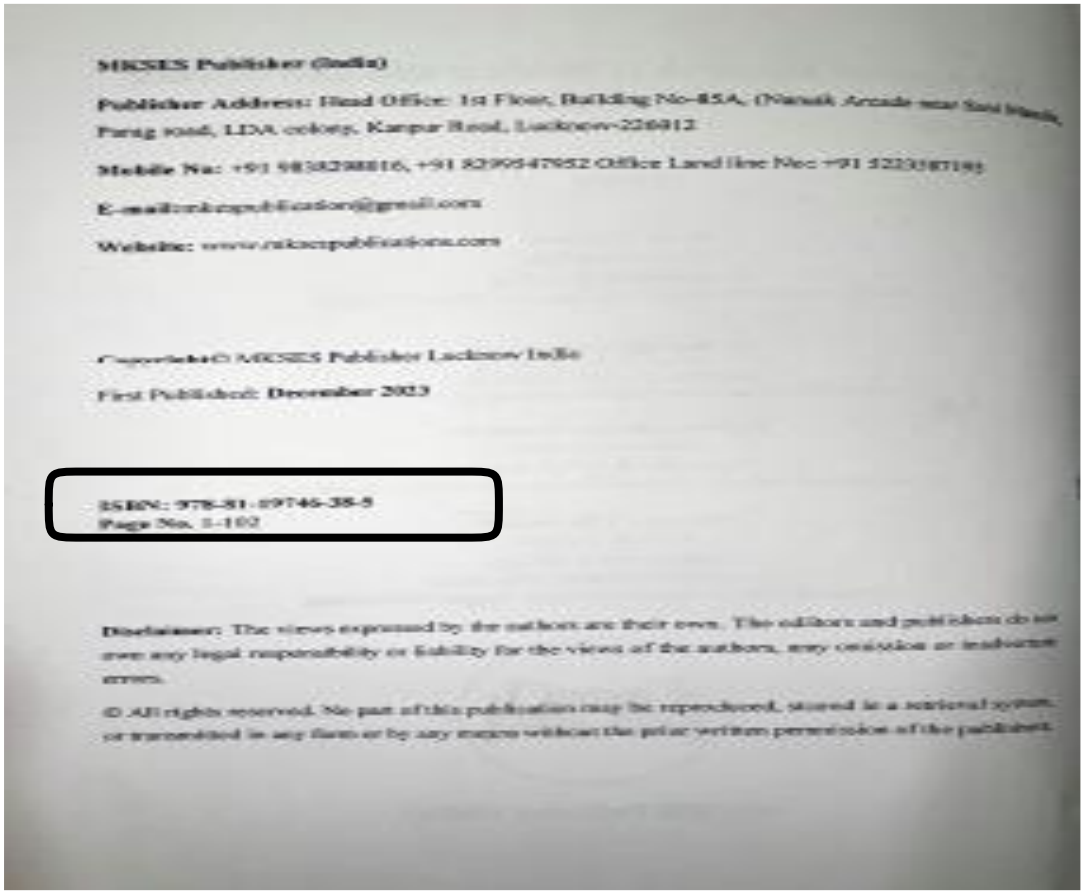

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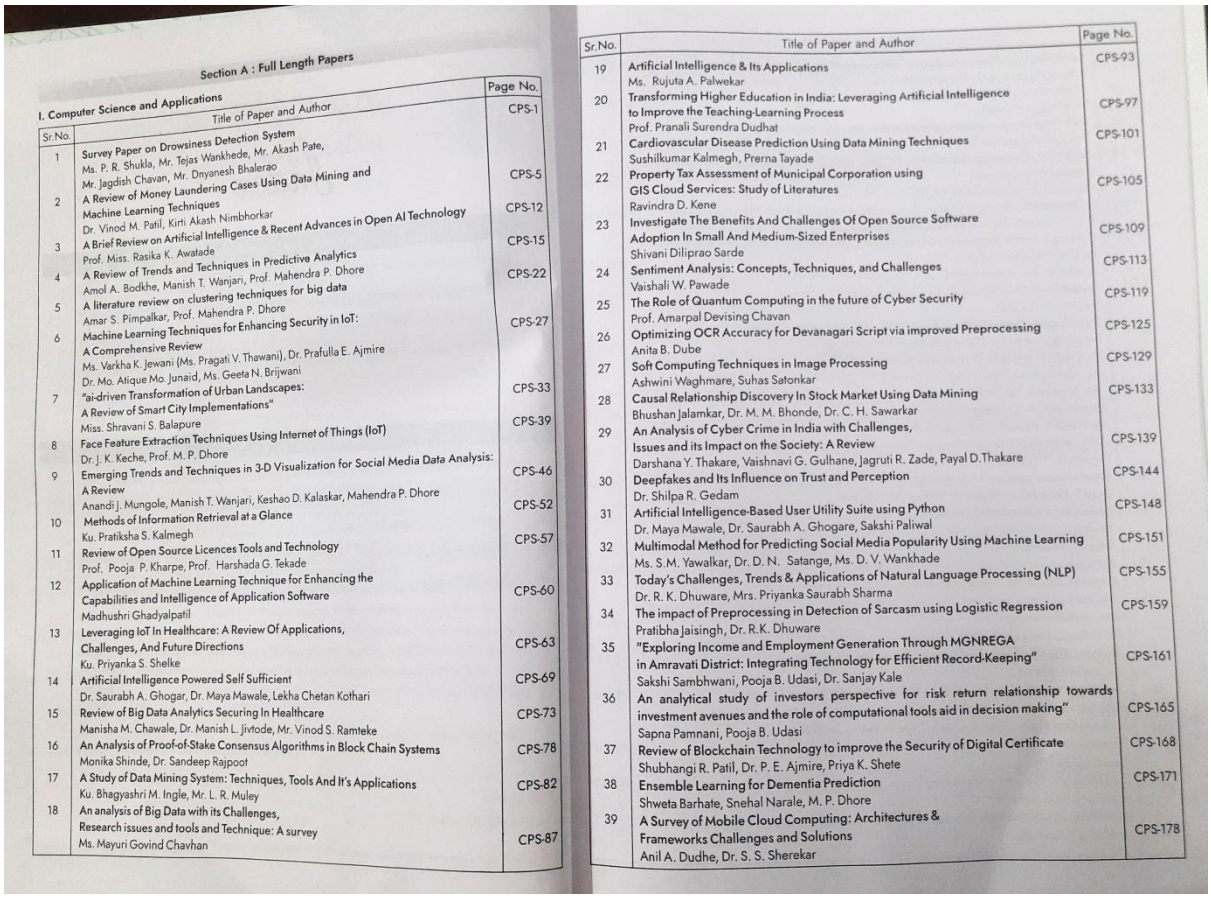

Section A : Full Length Papers

I. Computer Science and Applications

Sr.No.	Title of Paper and Author	Page No.
1	Survey Paper on Drowsiness Detection System Ms. P. R. Shukla, Mr. Tejas Wankhede, Mr. Akash Pate, Mr. Jagdish Chavan, Mr. Dnyanesh Bhalerao	CPS-1
2	A Review of Money Laundering Cases Using Data Mining and Machine Learning Techniques Dr. Vinod M. Patil, Kirti Akash Nimbhorkar	CPS-5
3	A Brief Review on Artificial Intelligence & Recent Advances in Open AI Technology Prof. Miss. Rasika K. Awatade	CPS-12
4	A Review of Trends and Techniques in Predictive Analytics Amol A. Bodkhe, Manish T. Wanjari, Prof. Mahendra P. Dhore	CPS-15
5	A literature review on clustering techniques for big data Amar S. Pimpalkar, Prof. Mahendra P. Dhore	CPS-22
6	Machine Learning Techniques for Enhancing Security in IoT: A Comprehensive Review Ms. Varkha K. Jewani (Ms. Pragati V. Thawani), Dr. Prafulla E. Ajmire Dr. Mo. Atique Mo. Junaid, Ms. Geeta N. Brijwani	CPS-27
7	"ai-driven Transformation of Urban Landscapes: A Review of Smart City Implementations" Miss. Shravani S. Balapure	CPS-33
8	Face Feature Extraction Techniques Using Internet of Things (IoT) Dr. J. K. Keche, Prof. M. P. Dhore	CPS-39
9	Emerging Trends and Techniques in 3-D Visualization for Social Media Data Analysis: A Review Anandi J. Mungole, Manish T. Wanjari, Keshao D. Kalaskar, Mahendra P. Dhore	CPS-46
10	Methods of Information Retrieval at a Glance Ku. Pratiksha S. Kalmegh	CPS-52
11	Review of Open Source Licences Tools and Technology Prof. Pooja P. Kharpe, Prof. Harshada G. Tekade	CPS-57
12	Application of Machine Learning Technique for Enhancing the Capabilities and Intelligence of Application Software Madhushri Ghadyalpatil	CPS-60
13	Leveraging IoT In Healthcare: A Review Of Applications, Challenges, And Future Directions Ku. Priyanka S. Shelke	CPS-63
14	Artificial Intelligence Powered Self Sufficient Dr. Saurabh A. Ghogar, Dr. Maya Mawale, Lekha Chetan Kothari	CPS-69
15	Review of Big Data Analytics Securing In Healthcare Manisha M. Chawale, Dr. Manish L. Jivtode, Mr. Vinod S. Ramteke	CPS-73
16	An Analysis of Proof-of-Stake Consensus Algorithms in Block Chain Systems Monika Shinde, Dr. Sandeep Rajpoot	CPS-78
17	A Study of Data Mining System: Techniques, Tools And It's Applications Ku. Bhagyashri M. Ingle, Mr. L. R. Muley	CPS-82
18	An analysis of Big Data with its Challenges, Research issues and tools and Technique: A survey Ms. Mayuri Govind Chavhan	CPS-87
19	Artificial Intelligence & Its Applications Ms. Rujuta A. Palwekar	CPS-93
20	Transforming Higher Education in India: Leveraging Artificial Intelligence to Improve the Teaching-Learning Process Prof. Pranali Surendra Dudhat	CPS-97
21	Cardiovascular Disease Prediction Using Data Mining Techniques Sushilkumar Kalmegh, Prerna Tayade	CPS-101
22	Property Tax Assessment of Municipal Corporation using GIS Cloud Services: Study of Literatures Ravindra D. Kene	CPS-105
23	Investigate The Benefits And Challenges Of Open Source Software Adoption In Small And Medium-Sized Enterprises Shivani Diliprao Sarde	CPS-109
24	Sentiment Analysis: Concepts, Techniques, and Challenges Vaishali W. Pawade	CPS-113
25	The Role of Quantum Computing in the future of Cyber Security Prof. Amarpal Devising Chavan	CPS-119
26	Optimizing OCR Accuracy for Devanagari Script via improved Preprocessing Anita B. Dube	CPS-125
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28	Causal Relationship Discovery In Stock Market Using Data Mining Bhushan Jalamkar, Dr. M. M. Bhonde, Dr. C. H. Sawarkar	CPS-133
29	An Analysis of Cyber Crime in India with Challenges, Issues and its Impact on the Society: A Review Darshana Y. Thakare, Vaishnavi G. Gulhane, Jagruti R. Zade, Payal D.Thakare	CPS-139
30	Deepfakes and Its Influence on Trust and Perception Dr. Shilpa R. Gedam	CPS-144
31	Artificial Intelligence-Based User Utility Suite using Python Dr. Maya Mawale, Dr. Saurabh A. Ghogare, Sakshi Paliwal	CPS-148
32	Multimodal Method for Predicting Social Media Popularity Using Machine Learning Ms. S.M. Yawalkar, Dr. D. N. Satange, Ms. D. V. Wankhade	CPS-151
33	Today's Challenges, Trends & Applications of Natural Language Processing (NLP) Dr. R. K. Dhuware, Mrs. Priyanka Saurabh Sharma	CPS-155
34	The impact of Preprocessing in Detection of Sarcasm using Logistic Regression Pratibha Jaisingh, Dr. R.K. Dhuware	CPS-159
35	"Exploring Income and Employment Generation Through MGNREGA in Amravati District: Integrating Technology for Efficient Record-Keeping" Sakshi Sambhwani, Pooja B. Udasi, Dr. Sanjay Kale	CPS-161
36	An analytical study of investors perspective for risk return relationship towards investment avenues and the role of computational tools aid in decision making" Sapna Pamnani, Pooja B. Udasi	CPS-165
37	Review of Blockchain Technology to improve the Security of Digital Certificate Shubhangi R. Patil, Dr. P. E. Ajmire, Priya K. Shete	CPS-168
38	Ensemble Learning for Dementia Prediction Shweta Barhate, Snehal Narale, M. P. Dhore	CPS-171
39	A Survey of Mobile Cloud Computing: Architectures & Frameworks Challenges and Solutions Anil A. Dudhe, Dr. S. S. Sherekar	CPS-178

Sr.No.	Title of Paper and Author	Page No.
40	Cyber Security: Threat Intelligence and Incident Response Strategies Bobade Ashwini N. D., Bhonde M M	CPS-182
41	Applications of Deep Learning in Agriculture : A Review Dhammapal Y. Tayade	CPS-187
42	Web Page Segmentation Approaches for Extracting Informative Web Content Prof. Ather Iqbal, Mr. D. M.Kene	CPS-190
43	Exploring Clustering Techniques in Data Mining: Algorithms, Applications, and Comparative Analysis Gautam Appasaheb Kudale, Dr. Sandeep Singh Rajpoot	CPS-194
44	A Comparative Study Of Feature Selectiontechniques For High Dimensional Data Kiran H. Varma, Dr. P. E. Ajmire, Amit B. Rehapade	CPS-200
45	Utilizing Logistic Regression for Multiclass Classification in Analysing Soil Contents for Crop Recommendation Avinash Kadam, Kranti Sapkal	CPS-203
46	Linked Open Data Mining for Democratization Of Big Data Ms. Amruta P. Korde	CPS-206
47	Elevating Healthcare Systems through Decentralized Applications : Securing Data on the Cloud with Blockchain Integration Ms. Geeta N. Brijwani, Dr. Prafulla E Ajmire, Dr. Mohammad Atique Mohammad Junaid, Ms. Varkhajewani (Ms. Pragati V. Thawani), Mr. Talib Khan,Mr. Durgesh Shailesh Pawar	CPS-210
48	"An Approach for Text Generation with Advanced Methods, Tools, Techniques and Models with its Challenges: A Survey" Mr. Prafull S. Mankar, Dr. Avinash B. Manwar	CPS-216
49	Artificial Intelligence : A Review on Evolutionand Future Trends Rajeshwari Y. Chawke	CPS-221
50	Heart disease riskprediction through Artificial Neural Networks Swati S. Khandalkar , Shwetam. Barhate, M .P. Dhore	CPS-226
51	Review Paper On Chatbot For College Vaishnavi G. Mokalkar, Wrundali P. Shende, Nikita C. Dalal, Sakshi P. Thakare, Dr. V. B. Kute	CPS-233
52	IOT Based Home Security and Automation System Omika M. Deshmukh, Vishakha H. Kherde, Mr. B. R. Jalamkar	CPS-236
53	Key Role of Physical Unclonable Functions in Enhancement On Every IoT Node and Device Authentication Dr. Shilpa B. Sarvaiya, Dr. D.N. Satange	CPS-239
54	Studying The Effectiveness of Current Cyber Security Measures Ku. Sneha K. Kabire	CPS-244
55	Exploring How Blockchain Improves Security, Scalability, and Efficiency Jaykumar Meshram, Dr. Dinesh Satange, Dr. Swapnil Deshpande, Neetu Amlani	CPS-248
56	An Analytical Study of Various Web Content Mining Techniques and Information Retrieval Narendra. M. Jathe	CPS-254
57	Data Mining In The University Library Mrs. Pratiksha G. Kakade	CPS-259
58	Novel Frameworks for Web Development Implementing Artificial Intelligence Dr. Meena S. Doibale	CPS-264

Deepfakes and Its Influence on Trust and Perception

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Abstract:

The rapid advancement of deepfake technology presents unprecedented challenges to our understanding, trust, and grasp of reality. This study delves into the intricate impacts of deepfakes on society, with a specific focus on their influence on perceptions of reality and trust dynamics. Deepfakes evoke concerns regarding their potential to undermine confidence in media, institutions, and interpersonal connections by seamlessly blending fabricated con-tent with authentic footage. This research elucidates how cognitive biases and heuristics con-tribute to the dissemination of misinformation and disinformation, shedding light on the psy-chological mechanisms that render individuals susceptible to manipulation by deepfakes. Fur-thermore, it explores the potential ramifications of deepfake proliferation across various sec-tors, encompassing cybersecurity, media, politics, and entertainment. The paper serves as a call to action, urging us to uphold the principles of truth and transparency in an increasingly digitized world through vigilance, resilience, and unwavering commitment.

Keywords:

Deepfake, Perception, Cognitive biases, Trust, Cybersecurity, Misinformation.

1. Introduction

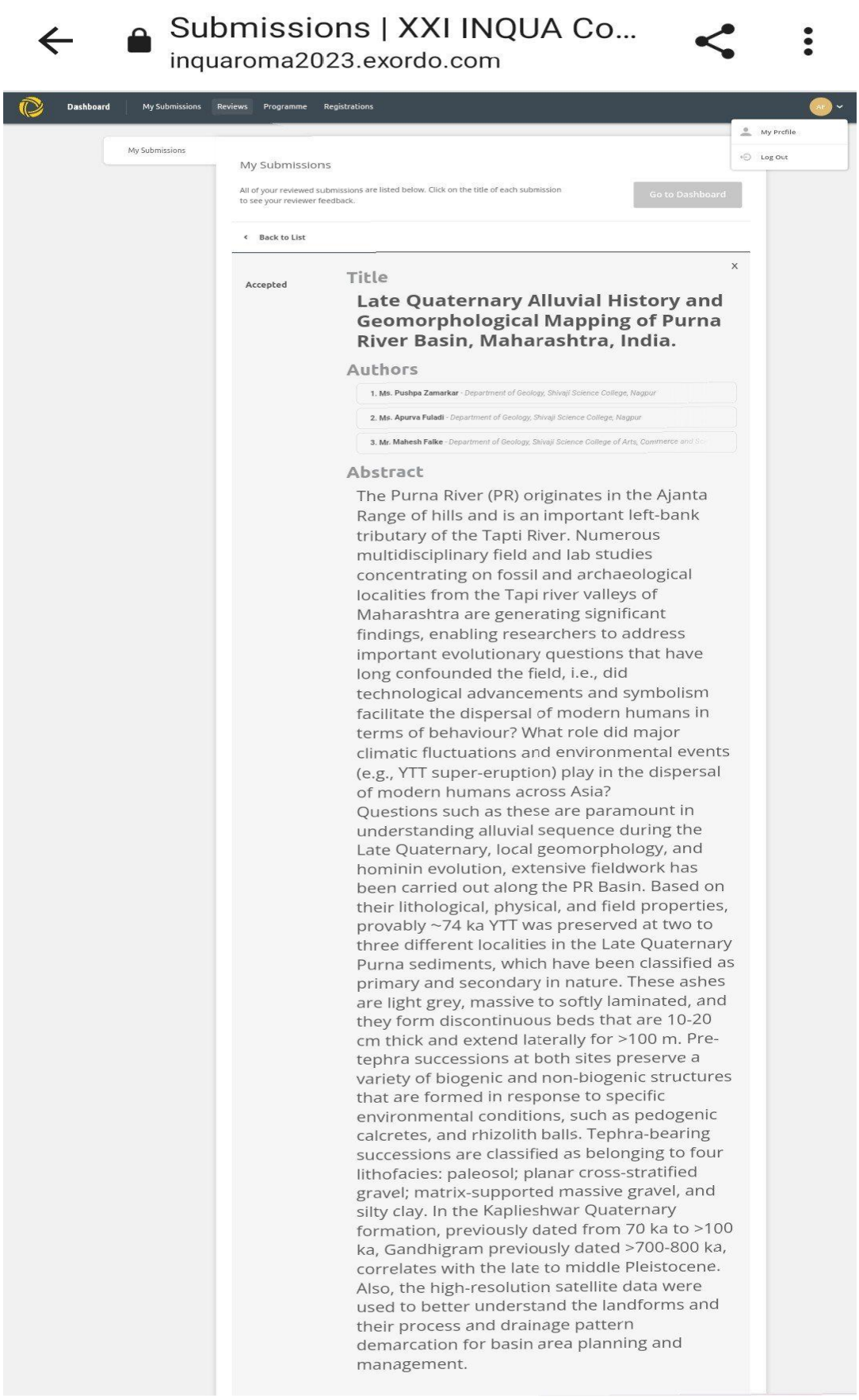
In an era characterized by the proliferation of digital media and the advancement of artificial intelligence, the emergence of deepfake technology has introduced a fresh dimension to dis-cussions surrounding perception, truth, and trust. Deepfakes, which are synthetic media gen-erated by artificial intelligence (AI), can seamlessly alter or overlay audio and visual content, often to the extent that discerning between fake and authentic recordings becomes challeng-ing. While this technological innovation offers new avenues for creative expression and enter-tainment, it also raises significant concerns regarding the authenticity of media sources and the accuracy of information.

The influence of deepfakes extends across various domains, including politics, journalism, interpersonal communication, and entertainment. Growing apprehensions about the potential of deepfake technology to propagate misinformation, sow discord, and undermine public trust have intensified as it becomes more accessible and sophisticated. Indeed, the wide-spread utilization of deepfakes has prompted urgent inquiries into the ethical, social, and psy-chological implications of these fabrications, as well as the development of countermeasures aimed at mitigating their adverse effects.

The objective of this endeavor is to elucidate the intricate interplay between perceptual reali-ties, trust dynamics, and deepfakes. Drawing upon insights from psychology, communication studies, computer science, and sociology, our aim is to illuminate how deepfakes impact indi-viduals' trust in media, institutions, and interpersonal connections through a multidisciplinary exploration. Additionally, we probe into the cognitive biases and heuristics that render indi-viduals susceptible to manipulation by deepfakes and facilitate the dissemination of false in-formation.

Moreover, this paper delves into the multifaceted consequences of deepfake proliferation across diverse domains. From the manipulation of political discourse to the erosion of journal-istic integrity, and from the destabilization of public trust to the exacerbation of cybersecurity vulnerabilities, the effects of deepfakes are far-reaching and profound. Through comprehen-sive analysis of these implications, we strive to inform strategies for confronting the challeng-es posed by deepfakes and safeguarding trust in the digital era.

This study advocates for a holistic approach to mitigating the adverse effects of deepfakes in light of these considerations. Proposing technical solutions, advocating for ethical standards in content creation, enhancing media literacy, and fostering critical thinking skills are among the measures recommended to navigate the complex landscape of deepfake-induced realities. Together, we can address the concerns raised by deepfakes, preserve the integrity of infor-mation dissemination, and uphold trust in an increasingly digitized society.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Title
Late Quaternary Alluvial History and Geomorphological Mapping of Purna River Basin, Maharashtra, India.
Authors
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Abstract
The Purna River (PR) originates in the Ajanta Range of hills and is an important left-bank tributary of the Tapti River. Numerous multidisciplinary field and lab studies concentrating on fossil and archaeological localities from the Tapi river valleys of Maharashtra are generating significant findings, enabling researchers to address important evolutionary questions that have long confounded the field, i.e., did technological advancements and symbolism facilitate the dispersal of modern humans in terms of behaviour? What role did major climatic fluctuations and environmental events (e.g., YTT super-eruption) play in the dispersal of modern humans across Asia?
Questions such as these are paramount in understanding alluvial sequence during the Late Quaternary, local geomorphology, and hominin evolution, extensive fieldwork has been carried out along the PR Basin. Based on their lithological, physical, and field properties, provably ~74 ka YTT was preserved at two to three different localities in the Late Quaternary Purna sediments, which have been classified as primary and secondary in nature. These ashes are light grey, massive to softly laminated, and they form discontinuous beds that are 10-20 cm thick and extend laterally for >100 m. Pre-tephra successions at both sites preserve a variety of biogenic and non-biogenic structures that are formed in response to specific environmental conditions, such as pedogenic calcretes, and rhizolith balls. Tephra-bearing successions are classified as belonging to four lithofacies: paleosol; planar cross-stratified gravel; matrix-supported massive gravel, and silty clay. In the Kaplieshwar Quaternary formation, previously dated from 70 ka to >100 ka, Gandhigram previously dated >700-800 ka, correlates with the late to middle Pleistocene. Also, the high-resolution satellite data were used to better understand the landforms and their process and drainage pattern demarcation for basin area planning and management.

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Identification of Suitable Sites for Artificial Recharge Measures in the Part of Dhodana Mini- watershed, Deccan Basaltic Terrain, Maharashtra State, India

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Groundwater is challenging to assess, plan and manage groundwater since it is an invisible resource. The goal of this paper is to address drinking water issues in the basaltic terrain of Maharashtra state, India, by implementing an integrated approach for artificial recharge structures. The lithological, geochemical and physical properties of basaltic lava flows differ. Basalts show complex hydrogeological setup because of the multi-layered aquifer system and change in the thickness of lava flows. Many areas of the Deccan basaltic terrain experienced groundwater level depletion due to excessive groundwater withdrawal, particularly for irrigating perennial crops. There is not enough groundwater available for irrigation and drinking in the northern part of Amravati district of Maharashtra state due to overexploitation of the resource. The severe lack of drinking water in the area is caused by the unfavourable hydrogeological conditions and rising demand for drinking and domestic water. In the Dhodana mini-watershed, Amravati district, groundwater recharge structures are suggested as a solution to this issue. This mini-watershed is located in the run-off zone of the Chargarh River Basin and on a topographic high. Many groundwater recharge facilities, such as cement plugs, recharge shafts, gabion structures, underground bandharas (UGB) and desilting of village tanks, are built to address this problem. Both the nearby agricultural wells and public water supply sources have shown a significant increase in groundwater level followed by the construction of these artificial recharge facilities. In order to address the issue of water shortage in the Deccan basaltic terrain, an integrated strategy that incorporates clusters of artificial recharge structures is therefore essential.

Keywords: Artificial recharge, Groundwater, Deccan basalt, Recharge structures.

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Abstract DnC- 23090000014

Hypsometric integral analysis of Asirgarh Deccan volcanics, Burhanpur district, Madhya Pradesh: A remote sensing and GIS approach

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The hypsometric analysis is a useful technique for identifying both the tectonic development of a river basin and the susceptibility of the watershed to erosion. It is also used to define integrated watershed management which includes water conservation, soil conservation and the selection of suitable sites for artificial groundwater recharge structures. The landform development of the watershed is described using this concept. The primary objective of this work was to examine the use of software from a Geographic Information System to identify and evaluate the hypsometric integrals of Asirgarh deccan volcanics in the Burhanpur district of Madhya Pradesh. Data from the SRTM-DEM as well as topographical maps generated by the Survey of India have been used during this process. This demonstrated that the primary causes of soil erosion in these sub-watersheds were the incision of channel beds, the movement of topsoil and bedrock material down slope, the removal of the soil mass and the cutting of stream banks. These alterations in the landforms were also shown in the study area. The hydrologic response of Asirgarh Deccan volcanic that have reached their mature stages will have a low rate of erosion unless there are very high intensity storms that contribute to high runoff peaks.

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OP 58

Medicinally Important Leeches in Churani Region Melghat

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Department of Zoology Science College Pauni

Abstract: Leeches have traditionally been used for bloodletting. The use of medicinal leeches is preferred because of their ability to bite deeply and cause prolonged bleeding,even after detachment.Different species of leeches secrete varying compounds with differing hematological actions.In 2004 the FDAapproved the use of medicinal leeches in reconstructive and plastic surgery.The medicinal leech is an excellent example of the use of invertebrates in the treatment of human disease.leeches secrete more than 20 identified bioactive substances such as antistasin,eglins,guamerin,hirudin,saratin,bdellins.they have analgesic,anti-inflammatory,platelet inhibitory, anticoagulant and thrombin regulatory functions.hirudotherapy technique is cheap,effective,easy to apply. Leeches can be found almost anywhere in churani region where there are suitable damp areas.mostly they are sanguivorous, that is they feed as blood sucking parasites on preferred hosts.these leeches can ingest several times their own weight in blood at one meal.after feeding the leech retires to a dark spot to digest its meal.Digestion is slow and this enables the leech to survive during very long fasting periods.

Keywords: Medicinal leeches, Hirudotherapy, bioactive compound.

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This is to Certify that Dr. Shital Deshmukh, Assistant professor, Zoology, Science College Pauni has successfully delivered Oral Presentation on the Title *"Medicinally Important Leeches in churani region Melghat"* during the 2nd International Conference on Advance Interdisciplinary Research (ICAIR-2023), Jointly organised by Digvijai Nath Post Graduate College, Gorakhpur, UP & Science Tech Institute, Lucknow, UP, India on April 07-09, 2023. His/her credit hours is 14.75.

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