

Editorial Board Members

Joaquim Filipe 

Polytechnic Institute of Setúbal, Setúbal, Portugal

Ashish Ghosh

Indian Statistical Institute, Kolkata, India

Raquel Oliveira Prates 

Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil

Lizhu Zhou

Tsinghua University, Beijing, China

More information about this series at <http://www.springer.com/series/7899>

Mayank Singh · Vipin Tyagi ·
P. K. Gupta · Jan Flusser ·
Tuncer Ören · V. R. Sonawane (Eds.)

Advances in Computing and Data Sciences

5th International Conference, ICACDS 2021
Nashik, India, April 23–24, 2021
Revised Selected Papers, Part II

Editors

Mayank Singh
Consilio Research Lab
Tallinn, Estonia

P. K. Gupta
Jaypee University of Information
Technology
Waknaghat, Himachal Pradesh, India

Tuncer Ören
University of Ottawa
Ottawa, ON, Canada

Vipin Tyagi
Jaypee University of Engineering
and Technology
Guna, Madhya Pradesh, India

Jan Flusser
Institute of Information Theory
and Automation
Prague, Czech Republic

V. R. Sonawane
MVPS's Karmaveer Adv. Baburao
Ganpatrao Thakare College of Engineering
Nashik, Maharashtra, India

ISSN 1865-0929 ISSN 1865-0937 (electronic)
Communications in Computer and Information Science
ISBN 978-3-030-88243-3 ISBN 978-3-030-88244-0 (eBook)
<https://doi.org/10.1007/978-3-030-88244-0>

© Springer Nature Switzerland AG 2021, corrected publication 2021

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Computing techniques like big data, cloud computing, machine learning, and the Internet of Things (IoT) etc. are playing a key role in the processing of data and retrieving of advanced information. Several state-of-art techniques and computing paradigms have been proposed based on these techniques. This volume contains papers presented at 5th International Conference on Advances in Computing and Data Sciences (ICACDS 2021) held during April 23–24, 2021, by MVPS'S Karmaveer Adv. Baburao Ganpatrao Thakare College of Engineering, Nashik, Maharashtra, India. Due to the COVID-19 pandemic, ICACDS 2021 was organized virtually. The conference was organized specifically to help bring together researchers, academicians, scientists, and industry experts and to derive benefits from the advances of next generation computing technologies in the areas of advanced computing and data sciences.

The Program Committee of ICACDS 2021 is extremely grateful to the authors who showed an overwhelming response to the call for papers, with over 781 papers submitted in the two tracks of Advanced Computing and Data Sciences. All submitted papers went through a double-blind peer-review process, and finally 103 papers were accepted for publication in the Springer CCIS series. We are thankful to the reviewers for their efforts in finalizing the high-quality papers.

The conference featured many distinguished personalities like Vineet Kansal, Pro-Vice Chancellor, A. P. J. Abdul Kalam Technical University, India; Komal Bhatia, J. C. Bose University of Science and Technology, India; Tuncer Ören, University of Ottawa, Canada; Aparna Pandey, Gulf Medical University, UAE; Shailendra Mishra, Majmaah University, Saudi Arabia; Robert Siegfried, Aditerna GmbH, Germany; Anup Girdhar, Sedulity Group, India; Arun Sharma, Indira Gandhi Delhi Technical University for Women, India; Sarika Sharma, Symbiosis International (Deemed University), India; Shashi Kant Dargar, University of KwaZulu-Natal, South Africa; and Prathmesh Churi, NMIMS University, India, among many others. We are very grateful for the participation of all speakers in making this conference a memorable event.

The Organizing Committee of ICACDS 2021 is indebted to Smt. Neelimatai V. Pawar, Sarchitnis, MVPS, India, for the confidence that she gave to us during organization of this international conference, and all faculty members and staff of MVPS'S Karmaveer Adv. Baburao Ganpatrao Thakare College of Engineering (KBTCOE), India, for their support in organizing the conference and for making it a grand success.

We would also like to thank N. S. Patil, N. B. Desale, and S. P. Jadhav, KBTCOE, India; Sameer Kumar Jasra, University of Malta, Malta; Hemant Gupta, Carleton University, Canada; Nishant Gupta and Archana Sar, MGM CoET, India; Arun Agarwal, University of Delhi, India; Kunj Bihari Meena, Neelesh Jain, Nilesh Patel, and Kriti Tyagi, JUET Guna, India; Vibhash Yadav, REC Banda, India; Sandhya Tarar, Gautam Buddha University, India; Vimal Dwivedi, Abhishek Dixit, and Vipin

Deval, Tallinn University of Technology, Estonia; Sumit Chaudhary, Indrashil University, India; Supraja P., SRM Institute of Science and Technology, India; Lavanya Sharma, Amity University, Noida, India; Sheshang Degadwala, Sigma Institute of Engineering, India; Poonam Tanwar and Rashmi Agarwal, MRIIS, India; Rohit Kapoor, SK Info Techies, Noida, India; and Akshay Chaudhary and Tarun Pathak, Consilio Intelligence Research Lab, India, for their support.

Our sincere thanks to Consilio Intelligence Research Lab, India; the GISR Foundation, India; SK Info Techies, India; and Print Canvas, India, for sponsoring the event.

August 2021

Mayank Singh
Vipin Tyagi
P. K. Gupta
Jan Flusser
Tuncer Ören
V. R. Sonawane

Organization

Steering Committee

Alexandre Carlos Brandão Ramos	UNIFEI, Brazil
Mohit Singh	Georgia Institute of Technology, USA
H. M. Pandey	Edge Hill University, UK
M. N. Hooda	BVICAM, India
S. K. Singh	IIT BHU, India
Jyotsna Kumar Mandal	University of Kalyani, India
Ram Bilas Pachori	IIT Indore, India
Alex Norta	Tallinn University of Technology, Estonia

Chief Patron

Neelimatai V. Pawar	Sarchitnis, Maratha Vidya Prasarak Samaj, India
---------------------	---

Patrons

Tushar R. Shewale (President)	Maratha Vidya Prasarak Samaj, India
Manikrao M. Boraste Sabhapati	Maratha Vidya Prasarak Samaj, India

Honorary Chairs

N. S. Patil (Education Officer and Principal)	MVPS's KBTCOE, India
N. B. Desale (Vice-principal)	MVPS's KBTCOE, India

General Chairs

Jan Flusser	Institute of Information Theory and Automation, Czech Republic
Mayank Singh	Consilio Research Lab, Estonia

Advisory Board Chairs

Shailendra Mishra	Majmaah University, Saudi Arabia
P. K. Gupta	JUIT Solan, India
Vipin Tyagi	JUET Guna, India

Technical Program Committee Chairs

Tuncer Ören	University of Ottawa, Canada
Viranjay M. Srivastava	University of KwaZulu-Natal, South Africa
Ling Tok Wang	National University of Singapore, Singapore
Ulrich Klauck	Aalen University, Germany
Anup Girdhar	Sedulity Group, Delhi, India
Arun Sharma	Indira Gandhi Delhi Technical University for Women, India

Conference Chair

V. R. Sonawane	MVPS's KBTCOE, India
----------------	----------------------

Conference Co-chair

S. P. Jadhav	MVPS's KBTCOE, India
--------------	----------------------

Conveners

Sameer Kumar Jasra	University of Malta, Malta
Hemant Gupta	Carleton University, Canada

Co-conveners

V. C. Shewale	MVPS's KBTCOE, India
Ghanshyam Raghuvanshi	Manipal University, India
Prathamesh Churi	NMIMS, Mumbai, India
Lavanya Sharma	Amity University, Noida, India

Organizing Chairs

Shashi Kant Dargar	University of KwaZulu-Natal, South Africa
V. S. Pawar	MVPS's KBTCOE, India

Organizing Co-chairs

Abhishek Dixit	Tallinn University of Technology, Estonia
Vibhash Yadav	REC Banda, India
Nishant Gupta	MGM CoET, India

Organizing Secretaries

Akshay Kumar	CIRL, India
Rohit Kapoor	SKIT, India
M. P. Kadam	MVPS's KBTCOE, India

Creative Head

Tarun Pathak

Consilio Intelligence Research Lab, India

Program Committee

A. K. Nayak

Computer Society of India, India

A. J. Nor'aini

Universiti Teknologi MARA, Malaysia

Aaradhana Deshmukh

Alaborg University, Denmark

Abdel Badeeh Salem

Ain Shams University, Egypt

Abdelhalim Zekry

Ain Shams University, Egypt

Abdul Jalil Manshad Khalaf

University of Kufa, Iraq

Abhhishek Verma

Indian Institute of Information Technology and
Management, Gwalior, India

Abhinav Vishnu

Pacific Northwest National Laboratory, USA

Abhishek Gangwar

Center for Development of Advanced Computing,
India

Aditi Gangopadhyay

IIT Roorkee, India

Adrian Munguia

AI MEXICO, USA

Amit K. Awasthi

Gautam Buddha University, India

Antonina Dattolo

University of Udine, Italy

Arshin Rezazadeh

University of Western Ontario, Canada

Arun Chandrasekaran

National Institute of Technology Karnataka, India

Arun Kumar Yadav

National Institute of Technology Hamirpur, India

Asma H. Sbeih

Palestine Ahliya University, Palestine

Brahim Lejdel

University of El-Oued, Algeria

Chandrabhan Sharma

University of the West Indies, West Indies

Ching-Min Lee

I-Shou University, Taiwan

Deepanwita Das

National Institute of Technology Durgapur, India

Devpriya Soni

Jaypee Institute of Information Technology, India

Donghyun Kim

Georgia State University, Georgia

Eloi Pereira

University of California, Berkeley, USA

Felix J. Garcia Clemente

Universidad de Murcia, Spain

Gangadhar Reddy

RajaRajeswari College of Engineering, India

Ramireddy

Hadi Erfani

Islamic Azad University, Iran

Harpreet Singh

Alberta Emergency Management Agency, Canada

Hussain Saleem

University of Karachi, Pakistan

Jai Gopal Pandey

CSIR-Central Electronics Engineering Research
Institute, Pilani, India

Joshua Booth

University of Alabama in Huntsville, Alabama

Khattab Ali

University of Anbar, Iraq

Lokesh Jain

Delhi Technological University, India

Manuel Filipe Santos

University of Minho, Portugal

Mario José Diván

National University of La Pampa, Argentina

Megat Farez Azril Zuhairi

Universiti Kuala Lumpur, Malaysia

Mitsunori Makino	Chuo University, Japan
Moulay Akhloufi	Université de Moncton, Canada
Naveen Aggarwal	Panjab University, India
Nawaz Mohamudally	University of Technology, Mauritius
Nileshkumar R. Patel	Jaypee University of Engineering and Technology, India
Nirmalya Kar	National Institute of Technology Agartala, India
Nitish Kumar Ojha	Indian Institute of Technology Allahabad, India
Paolo Crippa	Università Politecnica delle Marche, Italy
Parameshachari B. D.	GSSS Institute of Engineering and Technology for Women, India
Patrick Perrot	Gendarmerie Nationale, France
Prathamesh Chur	SVKM's NMIMS Mukesh Patel School of Technology Management and Engineering, India
Pritee Khanna	Indian Institute of Information Technology, Design and Manufacturing Jabalpur, India
Purnendu Shekhar Pandey	Indian Institute of Technology (Indian School of Mines) Dhanbad, India
Quoc-Tuan Vien	Middlesex University, UK
Rubina Parveen	Canadian All Care College, Canada
Saber Abd-Allah	Beni-Suef University, Egypt
Sahadeo Padhye	Motilal Nehru National Institute of Technology, India
Sarhan M. Musa	Prairie View A&M University, Texas, USA
Shamimul Qamar	King Khalid University, Saudi Arabia
Shashi Poddar	University at Buffalo, USA
Shefali Singhal	Madhuben & Bhanubhai Patel Institute of Technology, India
Siddeeq Ameen	University of Mosul, Iraq
Sotiris Kotsiantis	University of Patras, Greece
Subhasish Mazumdar	New Mexico Tech, New Mexico
Sudhanshu Gonge	Symbiosis International University, India
Tomasz Rak	Rzeszow University of Technology, Poland
Vigneshwar Manoharan	Bharath Corporate, India
Xiangguo Li	Henan University of Technology, China
Youssef Ouassit	Hassan II University, Morocco

Sponsor

Consilio Intelligence Research Lab, India

Co-sponsors

GISR Foundation, India
Print Canvas, India
SK Info Techies, India

Contents – Part II

Predicting Seasonal Vaccines and H1N1 Vaccines Using Machine Learning Techniques	1
<i>Sourav P. Adi, Keshav V. Bharadwaj, and Vivek Bettadapura Adishesha</i>	
Handling Class Imbalance in Electroencephalography Data Using Synthetic Minority Oversampling Technique	12
<i>Vibha Patel, Jaishree Tailor, and Amit Ganatra</i>	
Dissemination of Firm’s Market Information: Application of Kermack-Mckendrick SIR Model	22
<i>Renji George Amballoor and Shankar B. Naik</i>	
Improving Image-Based Dialog by Reducing Modality Biases	33
<i>Jay Gala, Hrishikesh Shenai, Pranjal Chitale, Kaustubh Kekre, and Pratik Kanani</i>	
Dependency Parser for Hindi Using Integer Linear Programming	42
<i>R. Sai Kesav, B. Premjith, and K. P. Soman</i>	
Medical Records Management Using Distributed Ledger and Storage	52
<i>Samia Anjum, R. Ramaguru, and M. Sethumadhavan</i>	
Detection of Depression and Suicidal Ideation on Social Media: An Intrinsic Review	63
<i>Sanat Madkar, Tanay Maheshwari, Mann Merani, Rahil Merchant, and Pankti Doshi</i>	
Frequency Based Feature Extraction Technique for Text Documents in Tamil Language	76
<i>M. Mercy Evangeline, K. Shyamala, L. Barathi, and R. Sandhya</i>	
An Approach of Devanagari License Plate Detection and Recognition Using Deep Learning.	85
<i>Pankaj Raj Dawadi, Manish Pokharel, and Bal Krishna Bal</i>	
COMBINE: A Pipeline for SQL Generation from Natural Language	97
<i>Youssef Mellah, Abdelkader Rhouati, El Hassane Ettifouri, Toumi Bouchentouf, and Mohammed Ghaouth Belkasm</i>	
Recognition of Isolated Gestures for Indian Sign Language Using Transfer Learning	107
<i>Kinjal Mistree, Devendra Thakor, and Brijesh Bhatt</i>	

A Study of Five Models Based on Non-clinical Data for the Prediction of Diabetes Onset in Medically Under-Served Populations	116
<i>Rohit Srivastava, Sandeep Kumar, Vivudh Fore, and Ravi Tomar</i>	
Representation and Visualization of Students' Progress Data Through Learning Dashboard	125
<i>Anagha Vaidya and Sarika Sharma</i>	
Denoising of Computed Tomography Images for Improved Performance of Medical Devices in Biomedical Engineering	136
<i>Harjinder Kaur, Deepti Gupta, and Mamta Juneja</i>	
Image Dehazing Through Dark Channel Prior and Color Attenuation Prior. . .	147
<i>Jacob John and Prabu Sevugan</i>	
Predicting the Death of Road Accidents in Bangladesh Using Machine Learning Algorithms	160
<i>Md. Abu Bakkar Siddik, Md. Shohel Arman, Afia Hasan, Mahmuda Rawnak Jahan, Majharul Islam, and Khalid Been Badruzzaman Biplob</i>	
Numerical Computation of Finite Quaternion Mellin Transform Using a New Algorithm.	172
<i>Khinal Parmar and V. R. Lakshmi Gorty</i>	
Predictive Modeling of Tandem Silicon Solar Cell for Calculating Efficiency.	183
<i>S. V. Katkar, K. G. Kharade, N. S. Patil, V. R. Sonawane, S. K. Kharade, and R. K. Kamat</i>	
Text Summarization of an Article Extracted from Wikipedia Using NLTK Library	195
<i>K. G. Kharade, S. V. Katkar, N. S. Patil, V. R. Sonawane, S. K. Kharade, T. S. Pawar, and R. K. Kamat</i>	
Grapheme to Phoneme Mapping for Tamil Language	208
<i>M. Geerthana Anusha, D. Govind, and Vijay Krishna Menon</i>	
Comparative Study of Physiological Signals from Empatica E4 Wristband for Stress Classification	218
<i>Varun Chandra, Ankit Priyarup, and Divyashikha Sethia</i>	
An E-Commerce Prototype for Predicting the Product Return Phenomenon Using Optimization and Regression Techniques	230
<i>Vidya Rajasekaran and R. Priyadarshini</i>	

Crop Yield Prediction for India Using Regression Algorithms.	241
<i>Devansh Hiren Timbadia, Sughosh Sudhanvan, Parin Jigishu Shah, and Supriya Agrawal</i>	
A Novel Framework for Multimodal Twitter Sentiment Analysis Using Feature Learning.	252
<i>Jamuna S. Murthy, Amulya C. Shekar, Drishti Bhattacharya, R. Namratha, and D. Sripriya</i>	
An Iterative Approach Based Reversible Data Hiding with Weight Update for Dual Stego Images.	262
<i>C. Shaji and I. Shatheesh Sam</i>	
Lower and Upper Bounds for ‘Useful’ Renyi Information Rate.	271
<i>Pankaj Prasad Dwivedi and D. K. Sharma</i>	
Sign Language Recognition Using Convolutional Neural Network	281
<i>Mihir Gandhi, Priyam Shah, Devansh Solanki, and Prasanna Shete</i>	
Prediction of Stock Price for Indian Stock Market: A Comparative Study Using LSTM and GRU	292
<i>Shwetha Salimath, Triparna Chatterjee, Titty Mathai, Pooja Kamble, and Megha Kolhekar</i>	
Early Prediction of Cardiovascular Disease Among Young Adults Through Coronary Artery Calcium Score Technique.	303
<i>Anurag Bhatt, Sanjay Kumar Dubey, and Ashutosh Kumar Bhatt</i>	
Confidentiality Leakage Analysis of Database-Driven Applications	313
<i>Angshuman Jana and Anwesha Kashyap</i>	
Comparative Learning of on Request Direction-Finding Procedures in WSNs	324
<i>Rakesh Kumar Saini, Mayank Singh, and Nishant Gupta</i>	
ECG Based Stress Detection in Automobile Drivers Using Long Short-Term Memory (LSTM) Network	333
<i>Ramyashri B. Ramteke and Vijaya R. Thool</i>	
Evaluation of Soil Moisture for Estimation of Irrigation Pattern by Using Machine Learning Methods	343
<i>Abhishek Khanna and Sanmeet Kaur</i>	
Sentiment Analysis in Online Learning Environment: A Systematic Review	353
<i>Sarika Sharma, Vipin Tyagi, and Anagha Vaidya</i>	

Image Splicing Forgery Detection Techniques: A Review	364
<i>Kunj Bihari Meena and Vipin Tyagi</i>	
A Predictive Model for Classification of Breast Cancer Data Sets	389
<i>S. Venkata Achuta Rao and Pamarthi Rama Koteswara Rao</i>	
Impact of COVID-19 on the Health of Elderly Person	404
<i>Ravindra Kumar</i>	
The Determinants of Visit Frequency and Buying Intention at Shopping Centers in Vietnam	412
<i>Dam Tri Cuong and Nguyen Thanh Long</i>	
Correction to: Frequency Based Feature Extraction Technique for Text Documents in Tamil Language	C1
<i>M. Mercy Evangeline, K. Shyamala, L. Barathi, and R. Sandhya</i>	
Author Index	423

Contents – Part I

An Energy-Efficient Hybrid Hierarchical Clustering Algorithm for Wireless Sensor Devices in IoT	1
<i>Nitesh Chouhan and S. C. Jain</i>	
Fund Utilization Under Parliament Local Development Scheme: Machine Learning Base Approach	15
<i>Arun Sharma and Deepa Paliwal</i>	
Implementing Automatic Ontology Generation for the New Zealand Open Government Data: An Evaluative Approach	26
<i>Paramjeet Kaur and Parma Nand</i>	
Blockchain Based Framework to Maintain Chain of Custody (CoC) in a Forensic Investigation	37
<i>Sarishma, Abhishek Gupta, and Preeti Mishra</i>	
Parameters Extraction of the Double Diode Model for the Polycrystalline Silicon Solar Cells	47
<i>T. Suganya, V. Rajendran, and P. Mangaiyarkarasi</i>	
A Light SRGAN for Up-Scaling of Low Resolution and High Latency Images.	56
<i>Archan Ghosh, Kalporoop Goswami, Riju Chatterjee, and Paramita Sarkar</i>	
Energy Efficient Clustering Routing Protocol and ACO Algorithm in WSN	68
<i>Shalini Subramani, M. Selvi, S. V. N. Santhosh Kumar, and A. Kannan</i>	
Efficient Social Distancing Detection Using Object Detection and Triangle Similarity	81
<i>Vidya Zope, Nikhil Joshi, Srivatsan Iyengar, Krish Mahadevan, and Meher Singh</i>	
Explaining a Black-Box Sentiment Analysis Model with Local Interpretable Model Diagnostics Explanation (LIME)	90
<i>Kounteyo Roy Chowdhury, Arpan Sil, and Sharvari Rahul Shukla</i>	
Spelling Checking and Error Corrector System for Marathi Language Text Using Minimum Edit Distance Algorithm	102
<i>Kavita. T. Patil, R. P. Bhavsar, and B. V. Pawar</i>	

A Study on Morphological Analyser for Indian Languages: A Literature Perspective.	112
<i>Jayashree Nair, L. S. Aiswarya, and P. R. Sruthy</i>	
Cyber Safety Against Social Media Abusing	124
<i>Yuvraj Anil Jadhav, Sakshi Jitendra Jain, Bhushan Sanjay More, Mayur Sunil Jadhav, and Bhushan Chaudhari</i>	
Predictive Rood Pattern Search for Efficient Video Compression	137
<i>Hussain Ahmed Choudhury</i>	
An Effective Approach for Classifying Acute Lymphoblastic Leukemia Using Hybrid Hierarchical Classifiers	151
<i>Sharath Sunil, P. Sonu, S. Sarath, R. Rahul Nath, and Vivek Viswan</i>	
Abnormal Blood Vessels Segmentation for Proliferative Diabetic Retinopathy Screening Using Convolutional Neural Network	162
<i>Vasavi Agarwal, Ridhi Sipani, and P. Saranya</i>	
Predictive Programmatic Classification Model to Improve Ad-Campaign Click Through Rate.	171
<i>Nisheel Saseendran and C. Sneha</i>	
Live Stream Processing Techniques to Assist Unmanned, Regulated Railway Crossings.	181
<i>Jacob John, Mariam Varkey, and M. Selvi</i>	
Most Significant Bit-Plane Based Local Ternary Pattern for Biomedical Image Retrieval	193
<i>Nilima Mohite, Manisha Patil, Anil Gonde, and Laxman Waghmare</i>	
Facial Monitoring Using Gradient Based Approach	204
<i>Arush Jain, Mani Sachdeva, and Paramita De</i>	
Overlapped Circular Convolution Based Feature Extraction Algorithm for Classification of High Dimensional Datasets	214
<i>Rupali Tajanpure and Akkalakshmi Muddana</i>	
Binary Decision Tree Based Packet Queuing Schema for Next Generation Firewall.	224
<i>Manthan Patel and P. P. Amritha</i>	
Automatic Tabla Stroke Source Separation Using Machine Learning	234
<i>Shambhavi Shete and Saurabh Deshmukh</i>	

Classification of Immunity Booster Medicinal Plants Using CNN: A Deep Learning Approach	244
<i>Md. Musa, Md. Shohel Arman, Md. Ekram Hossain, Ashraful Hossen Thusar, Nahid Kawsar Nisat, and Arni Islam</i>	
Machine Learning Model Interpretability in NLP and Computer Vision Applications.	255
<i>Navoneel Chakrabarty</i>	
Optimal Sizing and Siting of Multiple Dispersed Generation System Using Metaheuristic Algorithm.	268
<i>Lokesh Kumar Yadav, Mitresh Kumar Verma, and Puneet Joshi</i>	
Design of a Fused Triple Convolutional Neural Network for Malware Detection: A Visual Classification Approach	279
<i>Santosh K. Smmarwar, Govind P. Gupta, and Sanjay Kumar</i>	
Mobile Agent Security Using Lagrange Interpolation with Multilayer Perception Neural Network.	290
<i>Pradeep Kumar, Niraj Singhal, Mohammad Asim, Ajay Kumar, and Mahboob Alam</i>	
Performance Analysis of Channel Coding Techniques for 5G Networks.	303
<i>Mrinmayi Patil, Sanjay Pawar, and Zia Saquib</i>	
An Ensemble Learning Approach for Software Defect Prediction in Developing Quality Software Product	317
<i>Yakub Kayode Saheed, Olumide Longe, Usman Ahmad Baba, Sandip Rakshit, and Narasimha Rao Vajjhala</i>	
A Study on Energy-Aware Virtual Machine Consolidation Policies in Cloud Data Centers Using Cloudsim Toolkit	327
<i>Dipak Dabhi and Devendra Thakor</i>	
Predicting Insomnia Using Multilayer Stacked Ensemble Model	338
<i>Md. Sabab Zulfiker, Nasrin Kabir, Al Amin Biswas, and Partha Chakraborty</i>	
A Novel Encryption Scheme Based on Fully Homomorphic Encryption and RR-AES Along with Privacy Preservation for Vehicular Networks	351
<i>Righa Tandon and P.K. Gupta</i>	
Key-Based Decoding for Coded Modulation Schemes in the Presence of ISI	361
<i>Vanaja Shivakumar</i>	

Optimizing the Performance of KNN Classifier for Human Activity Recognition	373
<i>Ali Al-Taei, Mohammed Fadhil Ibrahim, and Nada Jasim Habeeb</i>	
Face Recognition with Disguise and Makeup Variations Using Image Processing and Machine Learning	386
<i>Farah Jawad Al-ghanim and Ali mohsin Al-juboori</i>	
Attention-Based Deep Fusion Network for Retinal Lesion Segmentation in Fundus Image	401
<i>A. Mary Dayana and W. R. Sam Emmanuel</i>	
Visibility Improvement in Hazy Conditions via a Deep Learning Based Image Fusion Approach	410
<i>Satbir Singh, Asifa Mehraj Baba, Md. Imtiyaz Anwar, Ayaz Hussain Moon, and Arun Khosla</i>	
Performance of Reinforcement Learning Simulation: x86 v/s ARM	420
<i>Sameer Pawanekar and Geetanjali Udgirkar</i>	
A Performance Study of Probabilistic Possibilistic Fuzzy C-Means Clustering Algorithm	431
<i>J. Vijaya and Hussian Syed</i>	
Optimized Random Forest Algorithm with Parameter Tuning for Predicting Heart Disease	443
<i>Ajil D. S. Vins and W. R. Sam Emmanuel</i>	
Machine Learning Based Techniques for Detection of Renal Calculi in Ultrasound Images	452
<i>Harsha Herle and K. V. Padmaja</i>	
Unsupervised Change Detection in Remote Sensing Images Using CNN Based Transfer Learning	463
<i>Josephina Paul, B. Uma Shankar, Balaram Bhattacharyya, and Alak Kumar Datta</i>	
Biological Sequence Embedding Based Classification for MERS and SARS	475
<i>Shamika Ganesan, S. Sachin Kumar, and K. P. Soman</i>	
Supply Path Optimization in Video Advertising Landscape	488
<i>Ujwala Musku and Prakhar Yadav</i>	
Stack-Based CNN Approach to Covid-19 Detection	500
<i>V. S. Suryaa and Z. Sayf Hussain</i>	

Performance Analysis of Various Classifiers for Social Intimidating Activities Detection	512
<i>Mansi Mahendru and Sanjay Kumar Dubey</i>	
Technique for Enhancing the Efficiency and Security of Lightweight IoT Devices	528
<i>Santosh P. Jadhav, Georgi Balabanov, and Vladimir Poulkov</i>	
Performance Improvement in Deep Learning Architecture for Phonocardiogram Signal Classification Using Spectrogram	538
<i>R. Sai Kesav, M. Bhanu Prakash, Krishanth Kumar, V. Sowmya, and K. P. Soman</i>	
Performance Analysis of Machine Learning Techniques in Device Free Localization in Indoor Environment.	550
<i>K. S. Anusha, R. Ramanathan, and M. Jayakumar</i>	
D-Leach: An Energy Optimized Deterministic Sub-clustering and Multi-hop Routing Protocol for Wireless Sensor Networks.	561
<i>Subhash Chandra Gupta and Mohammad Amjad</i>	
Robust Image Watermarking Using Support Vector Machine and Multi-objective Particle Swarm Optimization	571
<i>Kapil Jain and Parmalik Kumar</i>	
Generalized Intuitionistic Fuzzy Entropy on IF-MARCOS Technique in Multi-criteria Decision Making	592
<i>Rishikesh Chaurasiya and Divya Jain</i>	
Feature Selection in Machine Learning by Hybrid Sine Cosine Metaheuristics	604
<i>Nebojsa Bacanin, Aleksandar Petrovic, Miodrag Zivkovic, Timea Bezdan, and Milos Antonijevic</i>	
Rainfall Prediction Using Logistic Regression and Support Vector Regression Algorithms.	617
<i>Srikantaiah K. C and Meenaxi M. Sanadi</i>	
Collaborative Recommender System (CRS) Using Optimized SGD - ALS . . .	627
<i>Gopal Behera and Neeta Nain</i>	
Violence Detection from CCTV Footage Using Optical Flow and Deep Learning in Inconsistent Weather and Lighting Conditions	638
<i>R. Madhavan, Utkarsh, and J. V. Vidhya</i>	
Speech Based Multiple Emotion Classification Model Using Deep Learning	648
<i>Shakti Swaroop Patneedi and Nandini Kumari</i>	

A Legal-Relationship Establishment in Smart Contracts: Ontological Semantics for Programming-Language Development	660
<i>Vimal Dwivedi and Alex Norta</i>	
Aspect Based Sentiment Analysis – An Incremental Model Learning Approach Using LSTM-RNN	677
<i>Alka Londhe and P. V. R. D. Prasada Rao</i>	
Cloud Based Exon Prediction Using Maximum Error Normalized Logarithmic Algorithms	690
<i>Md. Zia Ur Rahman, Annabathuni Chandra Haneesh, Bhimireddy Shanmukha Sai Reddy, Sala Surekha, and Putluri Srinivasareddy</i>	
Unsupervised Learning of Visual Representations via Rotation and Future Frame Prediction for Video Retrieval.	701
<i>Vidit Kumar, Vikas Tripathi, and Bhaskar Pant</i>	
Application of Deep Learning in Classification of Encrypted Images	711
<i>Geetansh Saxena, Girish Mishra, and Noopur Shrotriya</i>	
Ear Recognition Using Pretrained Convolutional Neural Networks	720
<i>K. R. Resmi and G. Raju</i>	
An Adaptive Service Placement Framework in Fog Computing Environment.	729
<i>Pankaj Sharma and P. K. Gupta</i>	
Efficient Ink Mismatch Detection Using Supervised Approach	739
<i>Garima Jaiswal, Arun Sharma, and Sumit Kumar Yadav</i>	
Author Index	747