

Lecture Notes in Networks and Systems 1037

Vijay Singh Rathore  
Vincenzo Piuri  
Rosalina Babo  
Vivek Tiwari *Editors*

# Emerging Trends in Expert Applications and Security


Proceedings of ICE-TEAS 2024, Volume 2

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# Lecture Notes in Networks and Systems

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Vijay Singh Rathore · Vincenzo Piuri ·  
Rosalina Babo · Vivek Tiwari  
Editors

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Proceedings of ICE-TEAS 2024, Volume 2

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# Preface

The 3rd International Conference on Emerging Trends in Expert Applications and Security (ICE-TEAS 2024) was held at Jaipur Engineering College and Research Centre, Jaipur, India, during 15–17 March 2024 in hybrid mode. The conference was organized collectively by the “Department of Computer Science Engineering, Department of Information Technology and Department of Artificial Intelligence and Data Science” of JECRC, Jaipur, in association with Springer Nature for publication (LNNS Series), and supported by CSI Jaipur Chapter, ACM Professional Chapter Jaipur, and GR Foundation, Ahmedabad. The conference addressed recent technological developments, specifically the “Expert Applications and its Security”.

Technology has transformed with great speed in the last few decades, resulting in the development of Expert Applications making life more effortless. The conference raised awareness about issues related to emerging technologies as well as increased threats in expert applications and security, which will aid in the creation of better solutions for society. The COVID-19 pandemic has impacted us more than any other event in most of our lifetimes. Companies, associations, and destinations globally are trying to navigate their way through this crisis, balancing the short-term need with a long-term strategy. While we are all in the same storm, we must realize that we are in different boats, and therefore different solutions and strategies are necessary.

To understand another dimension of the conference abbreviation, it would be better to understand the word “ICE”, which means “the solid state of frozen water”, i.e. proposing and discussing the scientific thoughts frozen in the mind by analysing all its pros and cons in advance. Also TEAS, means “Hot drink infused with dried crushed herbs and leaves which brings freshness” depicting that the scientific ideas come up with the fresh noble solution for expert application by discussing with the scientists, researchers globally during the Technical Sessions and the TEA breaks resulting the frozen ideas get melted with the proposed solutions. The issues can be addressed with proper planning and utmost care to benefit the concerned. Here, through the conference “ICE-TEAS 2024”, the “frozen idea” (ICE) of the rising threats in the expert applications, would be discussed, analysed, and probably solved, during various Tea Sessions (and Tea Breaks) of the conference.

ICE-TEAS 2024 was organized keeping these dimensions at preference. The conference aimed to provide an international platform to the researchers, academicians, industry representatives, government officials, students, and other stakeholders in the field to explore the opportunities, to disseminate and acquire beneficial knowledge from the various issues deliberated in the paper presented on different themes in the conference. The Technical Program Committee and Advisory Board of ICE-TEAS 2024 include eminent academicians, researchers, and practitioners globally.

The conference received incredible response from both delegates and students in reference to research paper presentations. More than 400 papers were received out of which 72 were selected after impartial plagiarism checks and rigorous peer-review processes. All 72 papers have been included in two different volumes (Vol-1, Vol-2) each containing 36 papers which were presented in 12 different technical sessions. The conference was in hybrid mode wherein about 30% participants came to attend the conference physically from across the globe and the rest 70% joined virtually to present their paper as well as to hear the exemplary speakers across the globe. We had international participants and delegates from countries like Italy, Serbia, Norway, Portugal, USA, Vietnam, Ireland, Netherland, Romania, and Poland are few.

We deeply appreciate all our authors for having confidence in us and considering ICE-TEAS 2024 a platform for sharing and presenting their original research work. We also express our sincere gratitude to the focused team of Chairs, Co-chairs, International Advisory Committee, and Technical Program Committee. We are very much thankful to Mr. Aninda Bose (Senior Publishing Editor, Springer Nature, India) for providing continuous guidance and support. Our heartfelt thanks to all the reviewers and Technical Program Committee Members for cooperation and efforts in the peer-review process. We are indeed very much thankful to everyone associated directly or indirectly with the conference, organizing a firm team and leading it towards grand success.

We hope that it meets the expectations. We are very much grateful to the Patrons, General Chair, Conference Chairs, Delegates, participants, researchers for their thought-provoking contributions. We extend our heartiest thanks and best wishes to all the concerned(s).

Jaipur, India

Prof. Dr. Vijay Singh Rathore  
PC Chair and Convenor,  
ICE-TEAS 2024

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We are extremely grateful to Prof. Milan Tuba, Singidunum University Belgrade, Serbia, as Chief Guest, Shri V. Saravana Kumar, IAS Secretary, Department of Science and Technology, Dr. Mamta Rani Agarwal, Advisor-I AICTE, Dr. Pilli Emmanuels Shubhakar, MNIT Jaipur as Inaugural Guests.

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We deeply appreciate all our authors for having confidence in us and considering ICE-TEAS 2024 a platform for sharing and presenting their original research work. We also express our sincere gratitude to the focused team of Chairs, Co-chairs, Reviewers, International Advisory Committee, and Technical Program Committee.

No task in this world can be completed successfully without the support of your team members. We would like to extend our heartfelt appreciation to our Organizing Secretary Prof. Sanjay Gaur, Head CSE, JECRC; Co-organizing Secretaries Dr. Vijeta Kumawat, Deputy HoD-CSE, Dr. Smita Agarwal Head IT, Dr. Manju Vyas Head AI, and DS and Dr. Neeraj Singh Head CSE(AI) for their seamless contribution towards systematic planning and execution of the conference and making it a grand success altogether.

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Jaipur, India

Prof. Dr. Vijay Singh Rathore  
PC Chair and Convenor,  
ICE-TEAS 2024

# About This Book

This book is Volume 2 of the Proceedings of International Conference ICE-TEAS 2024 at JECRC, Jaipur. It high-quality and peer-reviewed papers from the 3rd International Conference on Emerging Trends in Expert Applications and Security (ICE-TEAS 2024) held at the Jaipur Engineering College and Research Centre Jaipur, Rajasthan, India, during 15–17 March 2024, which addressed various facts of evolving technologies in Expert Applications and analysis of the threats associated with them and eventually proposing solutions and security to those threats.

Technology advancements have broadened the horizons for Expert Applications proliferation that covers varied domains, namely design, monitoring, process control, medical, knowledge, finance, commerce and many more. However, no technology can offer easy and complete solutions owing to technological limitations, difficult knowledge acquisition, high development and maintenance cost, and other factors. Hence, the emerging trends and rising threats and proposing adequate security in Expert Applications are also issues of concern.

Keeping this ideology in mind, the book offers insights that reflect the advances in these fields across the globe and also the rising threats. Covering a variety of topics, such as Expert Applications and Artificial Intelligence/Machine Learning, Advance Web Technologies, IoT, Big Data, Cloud Computing in Expert Applications, Information and Cyber Security Threats and Solutions, Multimedia Applications in Forensics, Security and Intelligence, advancements in App Development, Management Practices for Expert Applications, Social and Ethical Aspects in Expert Applications through Applied Sciences. It will surely help those who are in the industry and academia and working on cutting-edge technology for the advancement of next-generation communication and computational technology to shape real-world applications. The book is appropriate for researchers as well as professionals. The researchers will be able to save considerable time by getting authenticated technical information on expert applications and security at one place. The professionals will have a readily available rich set of guidelines and techniques applicable to a wide class of engineering domains.

# Contents

<b>Security and Privacy Preservation of Multimedia Objects Over the Internet of Multimedia of Things (IoMT)</b> .....	1
Hemant Sahu, N. K. Joshi, and Swati V. Chande	
1 Introduction .....	2
2 Literature Review .....	3
3 Methodology .....	6
3.1 Proposed Process .....	6
3.2 Model Selection and Training .....	8
4 Result Analysis .....	11
4.1 Analysis of Improved Hybrid Feedforward Classifier .....	15
4.2 Federated Learning .....	17
4.3 Proposed Solution System Model .....	18
5 Conclusion .....	19
References .....	20
<b>Smart Farming: An IOT-Enabled Precision Agriculture System for Soil Prediction</b> .....	23
K. Shankar and M. Moorthi	
1 Introduction .....	24
2 Background Study .....	25
3 Methodology .....	26
4 Implementation Results .....	28
5 Conclusion .....	32
References .....	33
<b>Advancements and Perspectives in Digital Image Watermarking</b> .....	35
Mohit Saini, Dipika Gupta, Manish Kumar, and Vaibhav Shamrao Ingale	
1 Introduction .....	35
2 Literature Review .....	37
2.1 Research Questions .....	37
2.2 Search Process .....	37
2.3 Inclusion and Exclusion Criteria .....	37

- 2.4 Data Collection ..... 38
- 2.5 Results ..... 38
- 3 Prerequisites of Watermarking ..... 38
- 4 Applications of Watermarking ..... 40
- 5 General Watermarking Stages ..... 41
- 6 Digital Image Watermarking Techniques ..... 41
  - 6.1 Spatial Domain Watermarking ..... 41
  - 6.2 Transform Domain Watermarking ..... 41
- 7 Results ..... 42
- 8 Conclusion ..... 43
- References ..... 44
- Analysis of Cognitive Aspects in Online Education Amid the COVID-19: A Machine Learning Approach ..... 45**
- Rakhi Gupta, Siddharth, and Charanjeet Singh Tumrate
- 1 Introduction ..... 45
- 2 Dataset Segregation ..... 47
- 3 Random Forest Approach ..... 47
- 4 Gradient Boosting Approach ..... 48
- 5 Results and Discussions ..... 49
  - 5.1 Case 1—Representing Negative = (VP + P) and Positive = (Avg + G + E) ..... 49
  - 5.2 Case 2—Negative: (VP + P + Avg); Positive: (G + E) ..... 51
- 6 Conclusion ..... 53
- References ..... 54
- Survey on IoT Enabled Smart Tourism in India: Indian Tourism Service Dimensions ..... 57**
- Shivani Sharma and O. P. Rishi
- 1 Introduction ..... 58
- 2 Travel and Tourism ..... 59
- 3 Internet of Things and Smart Tourism ..... 59
- 4 IoT-Enabled Smart Tourism (IoTeST) ..... 60
- 5 India’s Digital Initiatives Enabling Smart Tourism ..... 63
- 6 Smart Tourism Using Big Data in the Indian Context ..... 64
  - 6.1 Potential for Using Big Data Analytics to Enable Smart Tourism in the Indian Context ..... 65
  - 6.2 Integrating Tourism with Smart City Programs to Enhance Visitor Experiences ..... 66
  - 6.3 Strategies to Enable Smart Tourism Implementation Across the Country ..... 67
  - 6.4 Architecture Adopted in India for the Smart Tourism Sector .... 67
- 7 Conclusion ..... 69
- References ..... 70

**AI-Driven Prediction of Medicinal Property Presence in Plants Cultivated with Nutrient-Enriched Manure** ..... 73  
 Abhirup Khanna, Sapna Jain, Tanupriya Choudhury, Ketan Kotecha, and Ayan Sar

1 Introduction ..... 74  
 2 Proposed Work ..... 75  
   2.1 SVM ..... 75  
   2.2 MLP ..... 76  
 3 Experimentation and Results ..... 77  
 4 Concept Case 1 ..... 77  
 5 Concept Case 2 ..... 79  
 6 Concept Case 3 ..... 80  
 7 Experimentation and Results ..... 81  
 References ..... 82

**Deep Learning-Based Multi-class Classification of Diabetic Retinopathy Utilizing Transfer Learning with MobileNet Architecture** ..... 83  
 Shamik Tiwari, Anurag Jain, Neelu Jyothi Ahuja, and Amar Shukla

1 Introduction ..... 83  
 2 Literature Review ..... 84  
 3 Materials and Methods ..... 84  
 4 Experiments and Results Analysis ..... 87  
 5 Conclusion ..... 91  
 References ..... 91

**Sentiment Classification of Multidomain Reviews Using Machine Learning Models** ..... 93  
 Santosh Kumar, Khushi Mundra, and Rohit Verma

1 Introduction ..... 94  
 2 Related Work ..... 94  
 3 The Proposed Approach ..... 95  
 4 Classifiers Used ..... 97  
   4.1 BayesNet ..... 97  
   4.2 Naïve Bayes ..... 97  
   4.3 Naïve Based ..... 97  
   4.4 Logistic Regression ..... 97  
   4.5 Simple Logistics Regression ..... 97  
   4.6 Sequential Minimal Optimization (SMO) ..... 98  
   4.7 Logit Boost ..... 98  
   4.8 Random Forest ..... 98  
   4.9 j48 ..... 99  
   4.10 Stochastic Gradient Descent (SGD) ..... 99  
   4.11 Multilingual Annotated Datasets ..... 99

- 4.12 SSK-GAT ..... 99
- 4.13 S2SAN ..... 100
- 5 Experimental Study ..... 100
  - 5.1 Datasets ..... 100
  - 5.2 Sentiment Classification ..... 100
- 6 Conclusion ..... 101
- References ..... 103

**Anomaly Detection in ECG Signals Through Unsupervised Machine Learning: A Novel Approach Using Hybrid Autoencoders for Medical Data Analysis** ..... 105

Arun Kumar Rai, Deepak Kumar Verma, and Rajendra Kumar Dwivedi

- 1 Introduction ..... 105
- 2 Unsupervised Anomaly Detection in ECG Signals Through Innovative Autoencoder ..... 106
- 3 Background and Research Objectives ..... 106
  - 3.1 Comparative Analysis and Gaps in Current Research ..... 107
  - 3.2 Comparative Analysis ..... 107
- 4 Research Method ..... 108
  - 4.1 Autoencoder-Based Anomaly Detection ..... 110
  - 4.2 Modeling ..... 110
- 5 Results and Discussion ..... 110
  - 5.1 Model Performance ..... 112
- 6 Conclusion ..... 114
- References ..... 114

**An Insight on Role of Artificial Intelligence for Detection of Parkinson’s Disease** ..... 117

Prachi Mall, Deepika Raina, Tanupriya Choudhury, Ketan Kotecha, and Ayan Sar

- 1 Introduction ..... 118
  - 1.1 Challenges and the Conventional Methods for Identification of Parkinson’s Disease ..... 119
  - 1.2 Role of Artificial Intelligence in PD Detection ..... 120
  - 1.3 Intelligence-Powered Diagnostic Tools ..... 122
- 2 Challenges and Future Scope ..... 123
- 3 Conclusion ..... 123
- References ..... 124

**A Generative Study of Employing Convolutional Neural Networks for Plant Categorization** ..... 127

Manmohan Singh, Ritu Jain, Sourabh Singh, Smita Sharma, Chetna Singh, Khushboo Verma, and Sonika Thapak

- 1 Introduction ..... 127
- 2 Literature Review ..... 128

- 3 The Anatomy of a Leaf ..... 128
  - 3.1 Leaf Taxonomy ..... 129
- 4 Proposed Methodology ..... 129
  - 4.1 Image Pre-processing ..... 130
  - 4.2 Feature Extraction ..... 130
- 5 Convolutional Neural Networks ..... 130
- 6 Conclusion ..... 131
- References ..... 133

**Ensembling of Transfer Learning for Enhanced Precision Agriculture in Plant Disease Classification** ..... 135

Shamik Tiwari, Tanupriya Choudhury, and Ketan Kotecha

- 1 Introduction ..... 136
- 2 Literature Review ..... 136
- 3 Methodology ..... 137
- 4 Experiments and Results ..... 140
- 5 Conclusion ..... 144
- References ..... 144

**A Novel Fast-Charging Approach and an Adaptive Control of Drives in Electric Vehicle Applications** ..... 145

F. Max Savio, A. K. Chandru, and Allampati Sriharshavardhan

- 1 Introduction ..... 145
- 2 Existing DAB Topology ..... 146
- 3 Proposed DAB Topology ..... 149
- 4 Simulation Results ..... 151
- 5 Conclusion ..... 155
- References ..... 155

**Bibliometric Review of Artificial Intelligence in Credit Risk** ..... 157

Vibhuti Jain, Tanupriya Choudhury, Ruchi Mehrotra, Taruna Anand, Namrata Prakash, and Rajesh Tiwari

- 1 Introduction ..... 158
- 2 Using Classification to Filter Datasets ..... 158
- 3 Achieving Accuracy Through Advanced Machine Learning ..... 159
- 4 Proposing New Approaches to Build Models ..... 160
- 5 Method ..... 161
- 6 Results ..... 161
- 7 Conclusion ..... 166
- References ..... 167

**Smart Fields, Smart Yields: Technologies Driving Precision Agriculture Revolution a Survey** ..... 169

Deepti Singh, Arvind Kumar, and Minakshi Chauhan

- 1 Introduction ..... 169
- 2 Literature Review ..... 170
- 3 Core Technologies in Precision Agriculture ..... 172



- 3.1 Drones and Unmanned Aerial Vehicles (UAVs) ..... 172
- 3.2 Internet of Things (IoT) ..... 173
- 3.3 Artificial Intelligence and Machine Learning ..... 173
- 4 Advanced Sensing Technologies ..... 174
  - 4.1 Soil Sensors ..... 174
  - 4.2 Crop Health Imaging ..... 174
- 5 Data Management and Integration ..... 174
  - 5.1 Cloud Computing ..... 174
  - 5.2 Farm Management Software ..... 175
- 6 Issues in Using IoT, UAV and Machine Learning for Precision Farming ..... 175
- 7 Conclusion ..... 176
- References ..... 176

**Integrating Handwritten Digit Recognition with Learning Management Systems for Evaluated Answer Scripts ..... 179**

K. Suresh Kumar and K. Divya Bharathi

- 1 Introduction ..... 180
- 2 Related Work ..... 180
- 3 Preliminaries ..... 181
  - 3.1 Pre-processing ..... 181
  - 3.2 Feature Extraction ..... 182
  - 3.3 PCA—The Algorithm ..... 183
- 4 Background ..... 184
  - 4.1 Implementation ..... 184
  - 4.2 Training ..... 184
  - 4.3 Multilayer Perceptron ..... 185
  - 4.4 Convolution Neural Network ..... 185
  - 4.5 Digital Image Processing ..... 185
- 5 System Architecture ..... 186
  - 5.1 Proposed Methodology ..... 186
- 6 Screenshots Before GUI Implementation ..... 187
- 7 Screenshot After GUI Implementation ..... 188
- 8 Conclusion ..... 188
- References ..... 189

**Virtual Education in Management Institutions: Investigating Its Influence on Student Satisfaction and Academic Achievements in Higher Education ..... 191**

Girish Kumar Bhasin and Manisha Gupta

- 1 Introduction ..... 192
- 2 Literature Review ..... 194
  - 2.1 Educators Assistance ..... 194
  - 2.2 Student Engagement and Motivation ..... 195
  - 2.3 Technology Assistance ..... 195
  - 2.4 Course Design and Content ..... 196

- 2.5 Administrative Assistance ..... 197
- 2.6 Student’s satisfaction ..... 198
- 2.7 Student Satisfaction and Performance ..... 198
- 2.8 Satisfaction as Mediator ..... 199
- 3 Theoretical Framework ..... 200
- 4 Research Methodology ..... 200
  - 4.1 Research Objective ..... 200
  - 4.2 Research Method and Design ..... 201
  - 4.3 Structural Dimensions ..... 201
  - 4.4 Materials ..... 202
  - 4.5 Procedure ..... 202
- 5 Results ..... 202
  - 5.1 Exploratory Factor Analysis (EFA) ..... 202
  - 5.2 Structural Model ..... 203
- 6 Discussion ..... 210
- 7 Implications of the Study ..... 213
- 8 Limitations of the Study’s Future Goals ..... 215
- References ..... 215

**Conflict Between Artificial Intelligence and Traditional Designers:  
How Artificial Intelligence Transforms the Design Process ..... 219**

Keshav Dev Gupta, Rishi Pandey, Devendra Nath Pathak,  
Rakesh Ranjan, and Vijay Gupta

- 1 Introduction ..... 220
- 2 Research Methodologies ..... 221
- 3 Comparative Analysis ..... 221
- 4 Results and Discussion ..... 222
  - 4.1 AI-Based Solution Strategies for the Design  
and Construction Industry ..... 222
  - 4.2 Results ..... 224
- 5 Conclusions ..... 226
- References ..... 227

**Enhancing License Plate Recognition with Dehazing and Machine  
Learning ..... 229**

T. Prathishkumar, M. Malathi, S. Venkatesa Perumal, R. Raj Surya,  
R. Soundariya, and S. Ritika

- 1 Introduction ..... 229
- 2 Related Works ..... 230
- 3 Dehazing Algorithm ..... 231
  - 3.1 Evaluating Climate Light ..... 232
  - 3.2 Transmission Map Calculation ..... 232
- 4 Vehicle Number Plate Detection ..... 235
- 5 Workflow ..... 238
- 6 Conclusion ..... 239
- References ..... 240

**An Analysis of the Increasing Trend of Digital Transformation of Business in India: Case Study Approach** ..... 241  
 Veenus Gehlot, Poonam Rajharia, and Madhu Bala Kaushik

1 Introduction ..... 241  
 2 Literature Review ..... 242  
 3 Research Methodology ..... 244  
 4 Analysis and Discussion ..... 245  
 5 Discussion ..... 246  
 6 Conclusion ..... 247  
 References ..... 247

**Deep Learning-Based Classification of Plant Leaf Diseases Using Advanced Particle Swarm Optimization** ..... 251  
 Jyoti Nagpal and Lavika Goel

1 Introduction ..... 252  
 2 Proposed Methodology ..... 253  
 2.1 Pre-processing Layer ..... 253  
 2.2 Advanced Optimization Layer ..... 254  
 2.3 Classification Layer ..... 255  
 3 Experimental Setup and Results ..... 255  
 3.1 Data Description ..... 256  
 3.2 Hyperparameters ..... 257  
 3.3 Performance Evaluation of Deep Learning Architecture Using the Hybrid CNN-aPSO Approach ..... 257  
 4 Conclusion and Future Scope ..... 258  
 References ..... 260

**Deep Fish: An Approach to Fish Species Identification Through Deep Learning Techniques** ..... 261  
 Penumalli Jithya Reddy, M. Malathi, and AG. Noorul Julaiha

1 Introduction ..... 262  
 2 Background ..... 264  
 3 Methodologies ..... 267  
 4 Discussions ..... 270  
 5 Conclusion ..... 270  
 References ..... 271

**Membrane Chip Technology Aids in the Early Detection of Blood Cancer Using Biomarkers** ..... 273  
 M. Moorthi, V. Nivaskumar, C. Senthilkumar, M. Arun, K. Shankar, K. Immanuvel Arokia James, M. Sushmitha, and K. Sureshkumar

1 Introduction ..... 274  
 2 Background Study ..... 275

3	Methodology .....	276
3.1	Preparation of Protein and SDS-PAGE Gel Electrophoresis .....	276
3.2	Western Blot Assay .....	278
3.3	Chip Design .....	279
4	Implementation Results .....	280
5	Conclusion .....	281
	References .....	282
	<b>An Analytical Perspective of Missing Values in Machine Learning .....</b>	<b>285</b>
	Darshanaben Pandya, Abhijeetsinh Jadeja, Sanjay Gour, Saumil B. Trivedi, Hansaben Haribhai Patel, and Pradyumansinh Udaysinh Jadeja	
1	Introduction .....	286
2	Effect of Omitted Values in Machine Learning .....	287
3	Basic Approaches to Deal with Missing Values in ML .....	289
4	Approaches to Deal with Missing Values in Python Programming .....	289
5	Approaches to Deal with Missing Values in R Programming .....	289
6	Analytical Perspective .....	291
7	Conclusion .....	293
	References .....	294
	<b>Harnessing AI Mining Methodologies to Anticipate the Probability of Gestational Diabetes Mellitus Occurrence .....</b>	<b>295</b>
	P. Hemavathy, M. Sangeetha Priya, P. Sundaravadivel, E. S. Vinothkumar, and K. Suresh Kumar	
1	Introduction .....	296
2	Literature Review .....	296
2.1	Data Preprocessing .....	298
3	Methodology .....	299
4	Results .....	300
5	Conclusion and Future Work .....	302
	References .....	302
	<b>Sign Language Detection Using Deep Learning and Tensorflow .....</b>	<b>305</b>
	Anuj Kumar Pandey and Pritee Parwekar	
1	Introduction .....	305
2	Prior Studies .....	306
3	Proposed Work .....	307
3.1	Dataset .....	308
3.2	Training the Model .....	308
3.3	Testing the Model .....	310
3.4	Operations Performed .....	310
3.5	Experimental Results .....	311
4	Conclusion and Future Scope .....	312
	References .....	312

**Significance of Sentiment Analysis with Text-Based Mining**

**Approach** ..... 315

Darshanaben Pandya, Abhijeetsinh Jadeja, Mohammad Akram Khan,  
Saamil B. Trivedi, Maurya Amardeep Ramnath, and Borate Pooja Satish

1 Introduction ..... 316

2 Sentiment Analysis with Text-Based Mining Approaches ..... 317

3 Objective of Study ..... 319

4 Hypothesis ..... 319

5 Approach for Study ..... 319

6 Data Analyses ..... 320

7 Analysis of Hypothesis ..... 320

8 Conclusion ..... 322

References ..... 322

**A Study to Explore the Altered State of Consciousness Using  
Brain–Computer Interface (BCI)** ..... 325

Pradeep Kumar Sharma, Pankaj Dadheech, and Mukesh Kumar Gupta

1 Introduction ..... 325

2 Literature Survey ..... 327

3 Framework of an Altered State of Consciousness Using  
Brain–Computer Interface (BCI) ..... 328

4 Research Gap ..... 332

5 Conclusion ..... 332

References ..... 333

**Fuel Cell Electric Vehicle Characterization and Analysis of Battery  
SoC for Different Drive Cycle** ..... 335

S. Rajalingam, J. Abdul Rahman, D. Jeevanandham,  
and S. Kanagamalliga

1 Introduction ..... 335

2 Methodology ..... 336

    2.1 Vehicle Selection and Instrumentation ..... 337

    2.2 Drive Cycle Selection ..... 337

    2.3 Data Collection and Analysis ..... 338

    2.4 Battery SoC Analysis ..... 338

    2.5 Sensitivity Analysis and Validation ..... 338

3 Results and Discussion ..... 338

4 Conclusion ..... 342

References ..... 343

**Artificial Neural Network-Based Steganography: Techniques,  
Applications, and Challenges** ..... 345

Prashant Rajput and Kunwar Toyesh Singh Vaisla

1 Introduction ..... 345

2 Introduction to Artificial Neural Networks [1, 2] ..... 346

- 2.1 Application of Artificial Neural Networks in Steganography [1, 2] ..... 347
- 3 Objectives ..... 348
- 4 Steganography Principles [1, 3, 4] ..... 349
- 5 Steganography Methods and Their Limitations [1, 3, 4] ..... 350
- 6 Artificial Neural Networks Architecture [1, 2] ..... 351
- 7 ANN Training Methods [1, 2] ..... 353
- 8 ANN-Based Steganography Methodologies [1, 3, 4] ..... 354
- 9 ANN Architectures Suitable for Steganographic Applications [1, 2] ... 356
- 10 ANN-Based Steganography Techniques Versus Traditional Methods ..... 357
- 11 Applications of ANN-Based Steganography in Secure Communication, Digital Watermarking, and Data Hiding ..... 359
- 12 ANN-Based Steganography in Real-World Scenarios [1, 2] ..... 360
- 13 Analysis of Security Considerations and Vulnerabilities Associated with ANN-Based Steganography [1, 2] ..... 361
- 14 Discussion of Challenges Such as Robustness Against Detection, Capacity Limitations, and Perceptual Quality Preservation ..... 363
- 15 Future Trends and Advancements in ANN-Based Steganography ..... 364
- 16 Conclusion ..... 366
- References ..... 367
- Autonomous Transmission Route Planning of Large Sport Utility Vehicle Using Ensemble RNN-Based Reinforcement Learning ..... 369**
- K. Karthikeyan, S. Karthik, K. Periyakaruppan, and M. S. Kavitha
- 1 Introduction ..... 369
- 2 Related Works ..... 370
- 3 Proposed Method ..... 371
  - 3.1 Ensemble RNNs ..... 371
  - 3.2 Adaptive Route Planning Using Ensemble RNN and RL ..... 373
- 4 Results and Discussion ..... 374
- 5 Conclusion ..... 379
- References ..... 379
- Tracking Individual in Kedarnath Trek Using LoRaWAN Technology ..... 381**
- Pushpak Kumawat, Tanmay Newatia, Sankalp Tiwari, Adarsh Rai, and Pritee Parwekar
- 1 Introduction ..... 382
- 2 Related Work ..... 382
- 3 Proposed Model ..... 384
  - 3.1 Methodologies and Implementation ..... 385
- 4 Experimental Setup ..... 387
  - 4.1 Hardware and Software Components ..... 387
- 5 Results and Discussion ..... 388
- 6 Conclusion ..... 390
- References ..... 390

**Surveying High-Performance Global Connectivity: Routing Technologies and Computation Challenges in LEO Satellite-Based Networks for IoT Solutions** ..... 391  
Pramod Tripathi, Kalyan Sasidhar, Esan Panchal, Keyur Jani, and Shruti Yagnik

1 Introduction ..... 392

2 Routing Network Model ..... 392

2.1 Space Domain ..... 392

2.2 Topological Categories ..... 393

2.3 Inter-satellite Links (ISL) ..... 396

3 SDN-Based Routing Approach ..... 397

3.1 Fuzzy-CNN-Based Multi-task Routing for Integrated Satellite-Terrestrial Networks [18] ..... 397

3.2 FybrLink: Efficient QoS-Aware Routing in SDN-Enabled Future Satellite Networks [6] ..... 398

3.3 SDN-Based End-to-End Fragment-Aware Routing for Elastic Data Flows in LEO Satellite-Terrestrial Network [17] ..... 398

3.4 Multi-objective Optimization in Multi-QoS Routing Strategy for Software-Defined Satellite Network [19] ..... 398

4 Machine Learning-Based Routing Approaches ..... 399

4.1 Deep Learning Aided Routing for Space-Air-Ground Integrated Networks Relying on Real Satellite, Flight and Shipping Data [20] ..... 399

4.2 Distributed Routing Strategy Based on Machine Learning For LEO Satellite Network [21] ..... 400

4.3 A Machine Learning Approach for Routing in satellite Mega-Constellations [22] ..... 400

4.4 Machine Learning-Based Satellite Routing for SAGIN IoT Networks [23] ..... 400

4.5 A Two-Hops State-Aware Routing Strategy Based on Deep Reinforcement Learning for LEO Satellite Networks [24] ..... 401

5 Mathematical Formulations Used for Routing Approaches ..... 401

5.1 FSA-Based Link Assignment and Routing in Low Earth Orbit Satellite Networks [14] ..... 401

5.2 Novel Optimized Routing Algorithm for LEO Satellite IP Networks [25] ..... 402

5.3 On Multicast Routing Using Rectilinear Steiner Trees for LEO Satellite Networks [26] ..... 402

6 Traffic-Based Routing Approaches ..... 402

6.1 LEO Satellite Communication Networks—A Routing Approach [27] ..... 403

6.2 Routing in ISL Networks Considering Empirical IP Traffic [28] ..... 403

- 6.3 Routing Strategies for Maximizing Throughput in LEO Satellite Networks [10] ..... 403
- 6.4 Multiservice On-Demand Routing in LEO Satellite Networks [5] ..... 404
- 6.5 Reverse Detection-Based QoS Routing Algorithm for LEO Satellite Constellation Networks [4] ..... 404
- 7 Implementation Details ..... 404
- 8 Miscellaneous Approaches ..... 404
  - 8.1 Secure Routing in LEO Satellite Network ..... 404
  - 8.2 Percolation-Based Routing in LEO Network ..... 405
  - 8.3 Load Balancing Routing Strategies for Leo Satellite Network ..... 406
  - 8.4 Distributed Routing for LEO Satellite Network ..... 407
  - 8.5 Path Analysis-Based Routing Approaches in LEO Satellite Network ..... 408
  - 8.6 Energy-Aware Routing Protocol in LEO Satellite Network ..... 408
  - 8.7 A Multicast Routing Algorithm for LEO Satellite IP Networks [8] ..... 409
  - 8.8 MLSR: A Novel Routing Algorithm For Multilayered Satellite IP Networks [36] ..... 409
  - 8.9 Dynamic Fault-Tolerant Routing Based on FSA for LEO Satellite Networks [7] ..... 409
- 9 Conclusion ..... 409
- References ..... 410
- Salutem Officia: Health Services Application** ..... 413
 

Jagarlamudi Saai Pavan and Pritee Parwekar

  - 1 Introduction ..... 414
    - 1.1 Objectives of an Application ..... 414
  - 2 Description and Scope ..... 415
    - 2.1 Problem Description ..... 415
    - 2.2 Proposed System ..... 417
    - 2.3 Feasibility Study ..... 417
  - 3 Methodology ..... 418
  - 4 Designs ..... 419
  - 5 Conclusion ..... 419
  - References ..... 425
- Detecting Deviations: Anomaly Detection in Healthcare IoT Data Streams Using Advanced Machine Learning Techniques** ..... 427
 

Arun Kumar Rai, Deepak Kumar Verma, and Rajendra Kumar Dwivedi

  - 1 Introduction ..... 428
  - 2 Harnessing Machine Learning for Anomaly Detection in Patient Data ..... 429
  - 3 Literature Survey ..... 430



4 Research Method ..... 432

    4.1 Categories of Anomalies in Medical Data ..... 433

    4.2 Anomaly Detection in Real-Time Monitoring  
        and Decision-Making Processes ..... 435

5 Results and Discussion ..... 436

6 Conclusion ..... 437

References ..... 437

**Enhanced Risk Assessment of Human Health Through Gated  
Dual-Path RNN and Gravitational Search Algorithm ..... 441**

M. A. Shanthi, S. Karthik, R. Sabitha, and M. S. Kavitha

1 Introduction ..... 442

2 Related Works ..... 442

3 Proposed Method ..... 443

4 Validation ..... 447

5 Discussion ..... 451

6 Conclusion ..... 451

References ..... 451

**Author Index ..... 453**

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