International Journal of Mathematical, Engineering and Management Sciences
Vol. 10, No. 3, 598-600, 2025
https://doi.org/10.33889/IJMEMS.2025.10.3.031

Ram Arti Publishers

Special Issue on Contemporary Research Studies in Operations Research, Business Analytics, and Business Intelligence

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(Received on March 1, 2025; Accepted on March 3, 2025)

Editorial

Globally, enterprises are undergoing significant transformation in line with developments based on industrial revolution by leveraging extensive computing resources, data capture technologies, information processing systems, and advanced data science models that span analytics, optimization, and algorithmic intelligence. The global market's increasing demand, diverse resource supply options, global competition, and environmental protection needs are driving organizations to adopt sustainable strategies. These involve utilizing information technology and analytics more effectively, innovating manufacturing and service support systems, and employing novel problem-solving methods.

The awareness of these challenges and opportunities inspired the theme of the joint event: 56th Annual Convention of ORSI (2023-ORSI) and the 10th International Conference on Business Analytics and Intelligence (2023-ICBAI), held at Indian Institute of Science, Bangalore, India, from December 18 to 20, 2023. The Operational Research Society of India (ORSI) Karnataka, the Department of Management Studies, IISc Bangalore, and the Analytics Society of India (ASI), DCAL, IIM Bangalore jointly organized this event.

The joint event aimed to establish a premier platform for knowledge sharing among distinguished practitioners, academics, and researchers from industry and academia, focusing on the current applications of Operations Research (OR), Business Analytics (BA), and Business Intelligence (BI). The conference received over 655+ paper submissions, with 455 selected for presentation. 66 papers were deemed particularly interesting, and authors of 13 promising articles were invited to submit extended versions for a special issue of International Journal of Mathematical, Engineering and Management Sciences (IJMEMS). After rigorous peer review, eight papers were accepted for publication in this special issue, addressing common challenges in Operations Research, Business Analytics, and Business Intelligence.

This Special Issue of the IJMEMS explores recent developments in Operations Research, Business Analytics, and Business Intelligence. It presents cutting-edge trends and substantial contributions to key areas such as Scheduling problems, Transshipment problems, E-commerce, Nanofluids, Blockchain Technology, Generative AI, Augmented Analytics, Machine Learning, and real-time Anomaly Detection.

This Special Issue delves into following eight topics:
Unmasking Content Clarity: Advancements in Defining, Measuring and Enhancing Readability: The authors present a novel method using natural language processing and Generative AI to quantitatively evaluate readability and comprehension. This approach surpasses traditional readability indices, offering substantial benefits for content creation and knowledge management in fields like education, business, technical support, and policy platforms.

Strategic Insights into Blockchain Adoption in Automotive Supply Chains: A Comparative AHP-TOPSIS and TISM-MICMAC Analysis The authors explore blockchain adoption in the automotive industry using a multidisciplinary approach involving AHP, TOPSIS, TISM, and MICMAC analyses. This study identifies key enablers and their relationships, offering actionable insights and practical recommendations for automotive managers considering blockchain adoption.

Avoid Maximum Cost Method for Solving Linear Fractional Transshipment Problem: The authors introduce a mathematical model for the linear fractional transshipment problem (LFTP) and suggest "Avoid Maximum Cost Method" to obtain an initial basic feasible solution for LFTP. This study conducts a comparative analysis with existing methods to demonstrate the efficiency of the proposed approach.

Mathematical Study of Dispersion of Nano Biosensors in an Artery with Multiple Stenosis: This work examines nano-biosensors in a diseased artery with multiple stenoses, determining the temperature, velocity of nanofluid, and transport coefficients. The results lay the groundwork for developing nano-biosensors to diagnose, treat, and manage cardiovascular disease. The mathematical model had possible scope for target detection and drug delivery at stenosed sites.

Integrating Generative AI in Business Intelligence: A Practical Framework for Enhancing Augmented Analytics: This study offers a practical framework for integrating generative AI (Gen AI) into Business Intelligence (BI). By adopting it, businesses can maximize GenAI and BI's potential, enhancing analytics, operations, and fostering a collaborative, data-driven culture.

Data Monetization Through Cross Industry Collaboration in Retail Banking: This paper examines how data sharing between banks and e-commerce platforms, facilitated by data monetization, can improve banking customer experiences. This study proposes a framework using propensity models to identify promising customers and offer personalized products and promotions.

Development of Dispatching Rule based Heuristic Algorithms for Real-Time Dynamic Scheduling of Non-identical Parallel Burn-in Ovens with Machine Eligibility Restriction: This study tackles a realistic problem in semiconductor manufacturing by scheduling non-identical parallel Burn-in ovens. The study proposes 25 heuristic algorithms for real-time dynamic scheduling with machine eligibility restrictions. Through empirical and statistical analysis, this study identifies top-performing algorithms.

A Hybrid Framework for Real-Time Data Drift and Anomaly Identification Using Hierarchical Temporal Memory and Statistical Tests: This paper introduces a hybrid framework combining Hierarchical Temporal Memory and Sequential Probability Ratio Test for real-time data drift detection and anomaly identification. Retraining and false positives were minimized, outperforming traditional methods in experiments.

Challenges and Future Directions

1. **Enhanced Decision-Making**: Addressing uncertainty and complexity in decision-making processes to improve outcomes.
2. **Regulatory Frameworks**: Conducting further research to establish flexible yet robust regulatory structures that can effectively adapt to the rapid evolution of blockchain technology.
3. **Optimization Algorithms**: Developing efficient algorithms to solve linear fractional transshipment problem with multi-objective linear fractional functions.
4. **AI in Business Intelligence**: Investigating long-term impacts of AI-enabled Business Intelligence tools on data-driven decision-making and organizational performance.
5. **Ethical AI Considerations**: Addressing ethical concerns such as data privacy, fairness, and biases in AI systems to ensure responsible use.
6. **Digital Collaboration Frameworks**: Developing frameworks that integrate digital footprints and cross-industry collaboration data to enhance strategic partnerships.
7. **Advanced Scheduling Algorithms**: Creating advanced meta-heuristic algorithms using efficient dispatching rule-based heuristics for dynamic scheduling of non-identical parallel batch processing machines with eligibility constraints.
8. **Hybrid Anomaly Detection**: Proposing a hybrid framework that combines multivariate extension of Hierarchical Temporal Memory with multivariate Sequential Probability Ratio Test for enhanced anomaly detection.
9. **Advanced Text Generation**: Utilizing advanced text generation techniques like prompt engineering and fine-tuning to produce more readable and engaging content.

We extend our sincere appreciation to all contributing authors for their significant contributions and anonymous reviewers for their dedication and sincere evaluation of submissions. Their timely and excellent responses have been truly gratifying.

Additionally, we would like to express our heartfelt thanks to Professor Mangey Ram, Editor-in-Chief of the International Journal of Mathematical, Engineering and Management Sciences, for his support in accepting this special issue and providing unwavering backing from its inception.

Guest Editors