Editorial

Theory and Practice in Data Analysis, Machine Learning, and Visualization

Guest Editor: William Steingartner

And

The Future of Digital Transformation in Business Processes

Guest Editor: Mirjana Radović-Marković

Special Report:

Mester, Gyula: Ranking of Artificial Intelligence Researchers in Serbia for 2025

Theory and Practice in Data Analysis, Machine Learning, and Visualization

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We are preparing this special issue to present recent advances in informatics that bridge theoretical concepts with practical, data-driven methodologies. The contributions included in this issue reflect current research trends in signal processing, machine learning, data analysis, and visualization, addressing challenges that arise when working with complex, noisy, and high-dimensional data.

The special issue brings together works that emphasize both methodological rigor and applicability to real-world problems, ranging from human–computer interaction and biomedical signal analysis to exploratory data analysis and correlation modeling. By combining perspectives from applied machine learning and graph-based data visualization, the issue aims to highlight innovative approaches to extracting meaningful information from data and to stimulate further research at the intersection of theory, experimentation, and application.

After careful consideration, we invited experts whose research aligns with this vision. The resulting contributions demonstrate diverse yet complementary approaches to modeling, analyzing, and interpreting complex data, underscoring the interdisciplinary character of contemporary informatics research.

1. The paper **"Motion Intention Prediction Using Wireless Surface EMG Sensors"** by J. Ľach, N. Ferenčík, W. Steingartner, L. Bednarčíková, T. Bálint, and R. Hudák focuses on the prediction of finger motion intention based on surface electromyography (sEMG) signals. The authors investigate signal preprocessing techniques, time–frequency feature extraction, and the application of supervised machine learning models, including Support Vector Machines, Random Forests, and XGBoost. The paper highlights the inherent challenges related to noise and variability in sEMG data and discusses strategies aimed at improving prediction accuracy and robustness for practical applications in prosthetics, rehabilitation, and human–computer interaction.

2. The paper **"Correlation n-star Graphs"** by A. Dudáš and B. Modrovičová addresses the problem of systematically identifying and interpreting correlation structures in multidimensional datasets. The authors introduce correlation n-star graphs as a novel graph-based visualization model that supports the automatic detection of correlation classes and the organization of attributes into hierarchies. The work covers the conceptual design of the model, its Python-based implementation, and an experimental evaluation on benchmark datasets, demonstrating both qualitative and quantitative benefits for correlation analysis and exploratory data mining.

===== About guest editor =====

Prof. **William Steingartner**, PhD, is an Associate Professor at the Faculty of Electrical Engineering and Informatics of the Technical University of Košice, Slovakia. His research is oriented toward formal semantics and formal languages, theoretical computer science, and software engineering. He is a member of the board of the Slovak Society of Applied Cybernetics and Informatics (SSACI) and president of the branch of SSACI. Email: william.steingartner@tuke.sk, ORCID ID: 0000-0002-2852-9403.

The Future of Digital Transformation in Business Processes

Guest Editor: Mirjana Radović-Marković

This special issue aims to showcase the latest advances and future directions in informatics, featuring cutting-edge research across diverse areas of computer science. It provides a platform for exploring both theoretical concepts and practical implementations, fostering collaboration and the sharing of insights.

3. The paper entitled **"Artificial Intelligence Driven Digital Transformation: Mediating the Relationship between Artificial Intelligence Readiness and Business Process Efficiency"** by Maimoona Salam, Mirjana Radović-Marković, Muhammad Shoaib Farooq, Dušan Marković, and Miloš Vučeković offers a timely and conceptually robust contribution to the growing literature on artificial intelligence and digital transformation. The study goes beyond examining artificial intelligence readiness (AIR) as a standalone capability and convincingly demonstrates that its impact on business process efficiency (BPE) is realized primarily through artificial intelligence–driven digital transformation (AIDT). By empirically validating AIDT as a mediating mechanism using data from 227 firms and PLS-SEM analysis, the authors show that AI-related investments translate into operational efficiency only when embedded within a coherent, organization-wide transformation strategy. A key strength of the paper lies in its integration of tangible and intangible dimensions of AI readiness, including infrastructure, data capabilities, human capital, and organizational culture, thereby extending the resource-based view in the context of AI-enabled transformation. The findings emphasize that firms with higher AI capabilities are better positioned to align strategic digital transformation initiatives with efficiency-oriented business processes, ultimately gaining a competitive advantage.

4. The paper entitled **"Impact of Education and Digital Literacy as Factors of Employment in the Republic of Serbia"** by Vujičić, Slađana; Momčilović, Oliver; Nedeljković, Miroslav; Milić, Marko; and Branislava Narančić provides an important and timely contribution to understanding workforce development in knowledge-based economies. The study empirically examines the impact of formal education and digital competencies on employability in Serbia, highlighting the critical role of education in equipping individuals with professional knowledge and key skills necessary to navigate a rapidly changing labor market. The findings confirm a significant relationship between both education and digital literacy and employment, with education having a slightly stronger individual effect, while the combination of education and digital literacy creates a robust model for predicting stable employment outcomes. The paper highlights the synergy between education and digital literacy, showing that higher education levels improve digital skills and employability. It emphasizes the need to integrate digital competencies into formal education and training, providing policymakers with insights on investing in education and digital literacy to foster a skilled, adaptable workforce and support sustainable economic development.

5. The paper "**Technological Aspects of Online Banking in Serbia: User Experiences Across Devices, Usage Trends and Strategic Implications for Managers and IT Professionals"**, authored by Lukić Nikolić, Jelena; Dudić, Branislav; Labus, Pero; and Mittelman, Alexandra, examines users' perceptions of online banking applications in the Republic of Serbia, with a focus on efficiency, availability, and ease of contact. Based on an empirical study conducted on a sample of 181 online banking users, the authors analyze differences in user experience across devices (mobile phones versus computers/laptops), as well as the effects of usage duration and frequency of use. The results indicate that there are no statistically significant differences in perceptions of the examined factors, suggesting a generally uniform user experience among different user groups. The findings provide important implications for managers and IT professionals i n the banking sector, highlighting the consistency of user experiences and offering guidance for further improvement of the design and functionality of online banking applications.

===== About guest editor =====

Prof. Dr. **Mirjana Radović Marković** is a distinguished professor in China with extensive experience in education, digital literacy, and workforce development. She examines how education and digital competencies enhance employability and support sustainable economic growth. Prof. Dr. Radović Marković has authored numerous peer-reviewed articles, book chapters and 31 monographs, contributing significantly to her field. Her research bridges theory and practice, providing insights for policymakers, educators, and industry leaders. She is a member of five national and five regional and global academies of sciences. She actively promotes international collaboration and knowledge exchange. Prof. Marković has supervised many master's and doctoral students, emphasizing critical thinking and innovation. She organizes conferences and workshops to foster interdisciplinary dialogue. Her achievements have been recognized with multiple awards for academic excellence and societal impact. Prof. Radović Marković continues to advance research and policy in education and digital innovation worldwide. E-mail: mirjana.radovic.markovic@bba.edu.rs, Orchid ID 0000-0003-2002-8732.