Editorial

Sustainability, scalability, intelligent networking, and user-centered digital experiences are increasingly shaping contemporary research agendas. The four papers discussed in this editorial reflect these priorities by addressing environmentally responsible material design, enterprise software modernization, advanced routing strategies for next-generation networks, and personalized learning in digital education systems. Although diverse in application, these studies share a common emphasis on optimization, adaptability, and practical implementation under real-world constraints.

The first paper responds to the global demand for sustainable mobility by examining bamboo as an alternative material for bicycle frame construction through finite element analysis and topology optimization. By developing a detailed three-dimensional FEA model and simulating multiple loading scenarios, the study evaluates the structural integrity, durability, and design efficiency of bamboo frames. Beyond mechanical performance, the research situates bamboo within a broader environmental context, comparing its ecological footprint to that of conventional materials such as steel and aluminum. The findings highlight bamboo's favorable strength-to-weight ratio, natural vibration damping, and renewability, reinforcing its viability as a sustainable engineering material for eco-friendly transportation [1].

The second contribution addresses a pressing challenge in enterprise software engineering: managing mixed Java versions during large-scale system upgrades. Focusing on the transition from legacy Java 8 to modern long-term support versions such as Java 17, the paper proposes a Jenkins-based CI/CD pipeline capable of handling multiple Java versions without reliance on containerization technologies. Through a Spring Boot enterprise application case study, the approach demonstrates improved automation, reduced regression risk, and enhanced developer productivity. By aligning with real organizational constraints, this work offers a reproducible and extensible solution for enterprises navigating complex software modernization efforts [2].

Advances in wireless communication and autonomous networking are explored in the third paper, which proposes a bio-inspired directional routing strategy for MANETs in a 6G context. The approach integrates an updated Tunicate Swarm Algorithm with cross-layer interaction to overcome issues such as local optima entrapment and routing overhead. By enabling information exchange between network layers and optimizing parameters at the medium access control level, the proposed method enhances routing efficiency in directional antenna-enabled networks. Simulation results confirm superior performance compared to existing routing schemes, demonstrating the potential of biologically inspired optimization combined with cross-layer design in next-generation ad hoc networks [3].

The fourth paper focuses on improving user experience and learning outcomes in E-learning systems through personalized content recommendation. By analyzing user interactions, preferences, and behavioral patterns, the proposed model aims to deliver tailored educational content that enhances student engagement and performance. Experimental results show substantial improvements in prediction accuracy after retraining, indicating the effectiveness of adaptive learning models. This work underscores the importance of personalization and user-centered design in building intelligent E-learning platforms capable of supporting diverse learner needs [4].

Together, these four studies illustrate how optimization-driven and adaptive approaches are being applied across engineering, computing, networking, and education. From sustainable material design and enterprise software pipelines to intelligent routing in future networks and personalized digital learning environments, each contribution addresses contemporary challenges with practical, data-informed solutions. Collectively, they highlight a broader shift

toward systems that are not only technically efficient but also environmentally responsible, scalable, and responsive to user needs, providing valuable directions for future research and application.

References:

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