

Editorial

The pursuit of technological advancement continues to reshape the boundaries of modern research, with recent developments illuminating new paths across software engineering, environmental sustainability, and maritime innovation. The selected research papers in this issue provide thought-provoking insights into how emerging technologies are being harnessed to solve complex challenges in their respective domains. From enhancing automated code comprehension to paving the way for a carbon-neutral economy and transforming maritime navigation through autonomous systems, these studies reflect the interdisciplinary nature and global relevance of contemporary scientific inquiry.

Recent efforts in automated code comprehension have leveraged advances in neural networks to bridge the gap between syntactic code structure and its semantic interpretation. This study introduces an enhanced hybrid method that combines code2vec embeddings with representations derived from large language models (LLMs), integrating both the structural and contextual understanding of Python code. Multiple fusion strategies are examined—such as concatenation, weighted sums, and attention mechanisms—to synthesize the strengths of each representation. The work emphasizes the advantages of this integrated approach for improving tasks like code search, documentation generation, and intelligent software development tools, ultimately pointing toward more robust and efficient development workflows [1].

In the context of global carbon neutrality goals, the exploration of recycled carbon fuels such as e-methane has emerged as a viable path forward. The study evaluates the feasibility of establishing international value chains for e-methane, focusing on optimal production site placement, resource accessibility, and the development of harmonized greenhouse gas (GHG) accounting rules. A notable contribution is the proposed carbon footprint (CFP) calculation method, which has been adopted in the ISO 6338-1:2024 standard. Additionally, the work highlights Japan's "Clean Gas Certificate" initiative as a case study, illustrating practical steps toward responsible certification and commercialization. These efforts address the crucial need for environmental accountability and standardization in carbon fuel markets during the 2030–2050 transition period [2].

Technological innovations in the maritime sector are being revolutionized by the emergence of Maritime Autonomous Surface Ships (MASS). Utilizing the Technological Innovation Systems (TIS) framework, this research dissects the complex ecosystem around MASS, examining market barriers and proposing strategies for successful deployment. By synthesizing insights from scholarly literature and expert interviews, the study identifies economic and systemic challenges, notably the high cost-benefit threshold, and responds with strategic recommendations such as niche market cultivation, engagement of early adopters, and hybridization models. These insights are instrumental in charting a roadmap for the mainstream adoption of autonomous maritime technologies in global shipping industries [3].

Collectively, these research contributions underline the vital interplay between technological innovation, environmental stewardship, and systemic transformation. They serve not only to advance their individual fields but also to inspire collaborative approaches to solving globally significant problems. The forward-looking perspectives offered here reaffirm the critical role of interdisciplinary research in driving sustainable and intelligent progress.

References:

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