Sensors and Materials

Special Issue on Spatial Intelligence, Digital Twins, and AI-driven Smart Systems
for Next-generation Built Environment

In the rapidly evolving landscape of the built environment, spatial information and digital twin technologies have emerged as fundamental enablers of digital transformation. These technologies are no longer confined to traditional construction and infrastructure domains but are increasingly integrated with advanced artificial intelligence (AI), data-driven decision-making systems, and cyber-physical environments.

Recent advances in generative AI, large language models (LLMs), multimodal intelligence, edge computing, and immersive technologies (AR/VR/XR) are reshaping how spatial data is processed, interpreted, and utilized. The convergence of these emerging technologies is creating a new paradigm of intelligent, autonomous, and adaptive built environments extending beyond architecture, engineering, and construction (AEC) into urban systems, mobility, energy, public services, and digital ecosystems.

In this special issue, we aim to provide a comprehensive platform for cutting-edge research, innovative methodologies, and real-world applications that explore the integration of spatial intelligence, digital twins, and next-generation AI technologies. We particularly encourage interdisciplinary contributions that bridge engineering, computer science, data science, and policy domains.

Scope

Topics of interest include, but are not limited to

- Spatial information systems, GIS, GeoAI, and geospatial analytics
- Digital twins for infrastructure, cities, and cyber-physical systems
- Integration of BIM, CIM, and GIS platforms
- Artificial intelligence and machine learning in smart environments
- Generative AI, large language models (LLMs), and foundation models
- Multimodal AI, vision-language systems, and sensor fusion
- IoT, edge computing, and real-time data integration
- Immersive technologies (AR/VR/XR) and metaverse applications
- Human–AI interaction and intelligent decision-support systems
- Data governance, AI ethics, and trustworthy AI systems
- Privacy-preserving machine learning and secure data infrastructures
- Blockchain/Web3 for data integrity, provenance, and decentralized systems
- Sustainability, resilience, and carbon-aware digital infrastructure

- Smart cities, digital public infrastructure, and urban informatics
- Applications in construction, transportation, energy, healthcare, and public services
- Case studies, pilot projects, and large-scale implementations
- Challenges, limitations, and future research directions

Submission Due Date **now open for submission**

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