

Revolutionizing Urban Planning with Digital Twin Technology for Smart Cities

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Abstract: *Digital Twin technology is paving the way for innovative urban planning and the development of smart cities. By generating dynamic, virtual models of physical systems, this technology enables urban planners and stakeholders to simulate, analyze, and enhance city operations in real-time. This paper examines the capabilities of Digital Twin technology, including predictive analytics, decision-making support, and its integration with IoT, AI, and Big Data. We explore its applications in transportation, energy optimization, environmental management, and infrastructure maintenance, while discussing challenges such as data security, interoperability, and implementation costs. The analysis highlights the transformative potential of Digital Twins to improve urban efficiency, sustainability, and resilience, providing a blueprint for future advancements in smart city planning.*

Keywords: Digital Twin, Smart Cities, Urban Development, IoT, AI, Simulation Models, Urban Infrastructure, Sustainability, Data-driven Insights, Predictive Analytics