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Christos Antonopoulos

Antonopoulos University of Peloponnese, Patras, Greece

Trends in Digital Twin Framework Architectures for Smart Cities: a case study in Smart Mobility

Abstract: The main aim of this speech is to present an innovative approach to addressing the challenges of smart mobility exploiting digital twins within the METACITIES initiative. This issue has received increased interest due to the increasing complexity of urban transportation systems, coupled with the urgent need to improve efficiency, safety, and sustainability in cities. The work presented in this speech is part of the project METACITIES, an Excellence Hub that spans a large geographical area, that of Southeastern Europe. The focus on this talk will be on the approach of the Greek innovation ecosystem of METACITIES involves leveraging Digital Twin technology to create intelligent replicas of urban mobility environments, enabling real-time monitoring, analysis, and decision-making. Through use cases such as "Smart Parking", "Environmental Behavior Analysis on Traffic Incidents", and "Emergency Management", we demonstrate how Digital Twins can optimize traffic flow, mitigate environmental impact, and enhance emergency response; these use cases will be tested in small scale, before deciding on implementation at a larger and more expensive scale. The final outcome is the METACITIES Architecture for Smart Mobility, which will be part of an Open Digital Twin Framework capable of evolving a Smart City into a Meta-City.

Keywords: digital twin; smart mobility; smart cities; metacities; smart parking; urban mobility