

Smart Campus Digital Twin: Basic Framework - Current State, Trends and Challenges

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Abstract : This study presents an analysis of the Digital Twin concept applied to the academic environment, focusing on the development of a Digital Twin Smart Campus Framework. Using bibliometric analysis methodologies and literature review, the research investigates the evolution and applications of the Digital Twin in educational contexts, comparing these findings with the advances of Industry 4.0. It was identified gaps in the existing literature and highlighted the need to adapt Digital Twin principles to meet the specific demands of a smart campus. By integrating Industry 4.0 concepts such as automation, Internet of Things, and real-time data analytics, we propose an innovative framework for the successful implementation of the Digital Twin in academic settings. The results of this study provide valuable insights for university campus managers, allowing for a better understanding of the potential applications of the Digital Twin for operations, security, and user experience optimization. In addition, our framework offers practical guidance for transitioning from a digital campus to a digital twin smart campus, promoting innovation and efficiency in the educational environment. This work contributes to the growing literature on Digital Twins and Industry 4.0, while offering a specific and tailored approach to transforming university campuses into smart and connected spaces, high demanded by Society 5.0 trends. It is hoped that this framework will serve as a basis for future research and practical implementations in the field of higher education and educational technology.

Keywords : smart campus, digital twin, industry 4.0, education trends, society 5.0

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