

Digital Twin for Retail Store Security

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Abstract : Digital twins are emerging as a strong technology used to imitate and monitor physical objects digitally in real time across sectors. It is not only dealing with the digital space, but it is also actuating responses in the physical space in response to the digital space processing like storage, modeling, learning, simulation, and prediction. This paper explores the application of digital twins for enhancing physical security in retail stores. The retail sector still relies on outdated physical security practices like manual monitoring and metal detectors, which are insufficient for modern needs. There is a lack of real-time data and system integration, leading to ineffective emergency response and preventative measures. As retail automation increases, new digital frameworks must control safety without human intervention. To address this, the paper proposes implementing an intelligent digital twin framework. This collects diverse data streams from in-store sensors, surveillance, external sources, and customer devices and then Advanced analytics and simulations enable real-time monitoring, incident prediction, automated emergency procedures, and stakeholder coordination. Overall, the digital twin improves physical security through automation, adaptability, and comprehensive data sharing. The paper also analyzes the pros and cons of implementation of this technology through an Emerging Technology Analysis Canvas that analyzes different aspects of this technology through both narrow and wide lenses to help decision makers in their decision of implementing this technology. On a broader scale, this showcases the value of digital twins in transforming legacy systems across sectors and how data sharing can create a safer world for both retail store customers and owners.

Keywords : digital twin, retail store safety, digital twin in retail, digital twin for physical safety

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