Special Issue

Application of Digital Twins in Industry 5.0

Message from the Guest Editors

Industry 5.0 (I5.0) represents a paradigm shift where humans and manufacturing machines, utilizing digital technology capabilities, collaborate more closely. Digital twins, virtual replicas of physical assets and processes, play a crucial role in I5.0 by facilitating real-time monitoring, predictive maintenance, and the optimization of production processes. In production, Digital Twins can provide an instantaneous and simultaneous replicative view of production as it is occurring and predict potential issues and their probabilities, leading to more efficient and effective operations, increased safety, and reduced downtime. Moreover, digital twins enhance human–machine interaction by providing AI-assisted advice as needed for operators interacting with complex equipment and processes, ultimately improving decision-making and empowering workers to contribute their expertise more effectively in collaborative environments. Overall, digital twins are instrumental in realizing the vision of Industry 5.0 by fostering synergy between humans and machines for smarter, more efficient and effective manufacturing.

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