Special issue on "**Digital Twins for Complex Systems**"

https://www.mdpi.com/journal/BDCC/special_issues/Digital_Twins_for_Complex_Systems

Introduction

In the current Big Data era, digital information pervades most Complex Systems. This is especially due to the wide integration of the Internet of Things in several sectors. This integration gives the opportunity to enhance business performance and achieve business competitiveness. Such opportunities are now pushed forward by the rise of Digital Twins that have become more affordable and promise to drive the future of complex systems.

A Digital Twin (DT) is a digital representation of a physical entity, system, or event. It mirrors a distinctive object, process, building, or human, regardless of whether that thing is tangible or non-tangible in the real world. DTs can leverage the advancement in Artificial Intelligence, Machine Learning, Cognitive Computing, Edge and Cloud Computing, and Augmented and Virtual Reality, to offer a great amount of business potential by predicting the future instead of analyzing the past of complex systems allowing us to evolve towards ex-ante business practices. To achieve these benefits, we must face the following challenges: accurate representation of physical objects; automatic evolution in real-time; runtime connectivity; process collaboration; conflict detection and resolving; human interaction; safety and security. In doing so, we must provide conceptualizations of DTs, define new DT engineering methodology, develop user-friendly software for the development of DT solutions, and foster the adoption of DT within complex systems.

The objective of this Special Issue is to gather empirical, experimental, methodological, and theoretical research reporting original and unpublished results contributing to the definition, design, implementation, and application of DT, shedding light on the continuous enhancement of complex systems integrating DTs, and that present possible solutions to open challenges, that proposes software solutions, practical experiences, use-cases, and case studies.

Topics

Potential topics include, but are not limited to:

- Conceptual Modelling of Digital Twins
- Management of Digital Twins for Complex Systems
- Engineering Digital Twins Solutions
- Digital Twin Conceptualization
- Digital Twin Platforms
- Safety and Security in Adopting Digital Twins
- Accurate Representation of Physical Objects, Processes, and Complex Systems
- Framework Definition for Digital Twins
- Development of Digital Twin Platforms
- Quality Assurance of Digital Twins
- Enactment of Digital Process Twins
- Collaboration among Digital Twins
- Interaction and cooperation between Digital Twins and Humans
- Complex System Architectures for Digital Twins
- Smart Cities and Digital Twins
- Artificial Intelligence Approaches for Digital Twins
- Methods and Techniques for the Development of Digital Twins Solutions

- Edge/Fog/Cloud Computing for Digital Twins
- Practical Validation and Case Studies of Digital Twins
- Digital Twin Enhanced Business Processes
- Cognitive Computing for Digital Twins
- Augmented and Virtual Reality for Digital Twin
- digital twin platforms
- Internet of Things
- business processes
- Artificial Intelligence
- cognitive computing
- complex systems
- machine learning
- augmented reality
- virtual reality

Guest Editors

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Deadline

Deadline for manuscript submissions: **30 May 2023**

Manuscript Submission Information

Manuscripts should be submitted online at **www.mdpi.com** by **registering** and **logging in to this website**. Once you are registered, **click here to go to the submission form**. Manuscripts can be submitted until the deadline. All submissions that pass pre-check are peer-reviewed. Accepted papers will be published continuously in the journal (as soon as accepted) and will be listed together on the special issue website. Research articles, review articles as well as short communications are invited. For planned papers, a title and short abstract (about 100 words) can be sent to the Editorial Office for announcement on this website.

Submitted manuscripts should not have been published previously, nor be under consideration for publication elsewhere (except conference proceedings papers). All manuscripts are thoroughly refereed through a single-blind peer-review process. A guide for authors and other relevant information for submission of manuscripts is available on the **Instructions for Authors** page. *Big Data and Cognitive Computing* is an international peer-reviewed open access quarterly journal published by MDPI.

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