Special Issue

Symmetry in Sensing, Computing and Intelligence for Cyber–Physical Systems

Message from the Guest Editors

Cyber–physical systems (CPSs) are complex integrations of computing, communication, and control that merge cyber and physical components to enhance overall system performance. Symmetry, which is inherent in various aspects of CPSs, plays a vital role in achieving efficiency, coherence, and balance across system operations. By leveraging symmetry, CPSs can streamline processes, optimize resource allocation, and enhance system responsiveness, making it a valuable tool in tackling the system's inherent challenges. CPSs encounter several significant challenges. This Special Issue seeks contributions that explore how symmetry can address the challenges of CPSs, with topics including, but not limited to, the following: Theoretical models and frameworks of symmetry in CPSs; Symmetry-aware algorithms for sensing, computing, and communication to improve system performance; Applications of AI in exploiting symmetry for system optimization and resilience; Case studies demonstrating the impact of symmetry in solving CPS challenges, such as scalability, interoperability, and security; Cross-disciplinary methods for integrating symmetry into CPS design and implementation.

Guest Editors

Dr. Chao Wang

Dr. Zhiqin Zhu

Dr. Jian Sun

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Symmetry
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
symmetry@mdpi.com

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About the Journal

Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

Editor-in-Chief

Prof. Dr. Sergei Odintsov
1. ICREA, 08010 Barcelona, Spain
2. Institute of Space Sciences (IEEC-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

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