

Special Issue

Symmetry/Asymmetry in Artificial Intelligence with Application

Message from the Guest Editor

In artificial intelligence (AI), Symmetry and asymmetry play a critical role across multiple domains: from the design of neural architectures that exploit group symmetries to data representations that capture invariances and optimization strategies that leverage balanced or unbalanced structures. Symmetry enables robustness, generalization, and interpretability, while asymmetry often introduces flexibility, expressivity, and adaptivity. This Special Issue aims to bring together research that investigates these dual aspects in machine learning, data science, optimization, and applied domains. Topics of interest include symmetry-inspired models such as equivariant neural networks, asymmetry-aware architectures for graph and sequence learning, algebraic and geometric methods for symmetry detection, and real-world applications ranging from physics-informed AI to social systems, bioinformatics, and computer vision. By highlighting both the harmonies and tensions between symmetry and asymmetry, this Issue seeks to deepen our understanding of fundamental AI principles and to foster new methodologies that harness these ideas for practical impact.

Guest Editor

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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.

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