

Special Issue

Applications of Symmetry/Asymmetry and Machine Learning

Message from the Guest Editor

Symmetry and asymmetry are fundamental concepts that underpin a wide range of natural and artificial systems. In the era of data-driven discovery, the integration of these principles with machine learning has opened new avenues for both theoretical exploration and practical innovation. This Special Issue aims to bring together recent advances at the intersection of symmetry/asymmetry and machine learning, demonstrating how structural regularities and irregularities can be harnessed to improve generalization, robustness, and interpretability. Topics of interest include, but are not limited to, symmetric model architecture design/application, asymmetry-aware feature learning, group-equivariant neural networks and variants, partial multilabel learning, symmetry breaking in optimization, and applications across computer vision, bioinformatics, biometrics, signal processing, and beyond. By highlighting diverse methodologies and applications, this issue seeks to provide a comprehensive perspective on how symmetry-related insights can inspire novel machine learning solutions and deepen our understanding of complex systems.

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.

Editor-in-Chief

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