

Special Issue

Symmetry and Asymmetry in Computer Vision and Machine Learning

Message from the Guest Editors

Symmetry is fundamental in science and increasingly central to computer vision and machine learning, guiding architectures from convolutional networks to attention mechanisms and group-equivariant models. Asymmetry in real-world data provides essential cues for recognition, segmentation, and reasoning. Symmetry and asymmetry appears naturally in many engineering scenarios: repeated patterns on conveyor belts, periodic textures on mineral surfaces, rotational or mirror structures in mechanical components, and translation-invariant features in large-scale monitoring scenes. asymmetric cracks in steel plates, irregular gangue and foreign objects in raw coal, uneven wear on mining machinery, or non-uniform textures in concrete structures. Leveraging these symmetries and asymmetries can significantly improve detection stability, model robustness, and computational efficiency. This Special Issue focuses on how symmetry and asymmetry can be used to build better computer vision and machine learning systems, both in theory and in real-world industrial environments.

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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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