Special Issue

Symmetry in Deep Learning Networks and Its Applications in the Real World

Message from the Guest Editors

Deep learning networks have been widely applied in real-world engineering problems. Some effective deep learning networks have typical symmetric structures. For example, the encoder and decoder in U-Net networks have symmetry, as well as the generator and discriminator in GANs. Actual engineering problems are usually based on nonlinear data or models. Nonlinear models typically exhibit symmetry, nonconvexity, and multiple equivalent solutions. Symmetry problems involve the deep integration and clever application of mathematical principles, physical laws, and engineering design. By conducting in-depth research and utilizing the symmetry of deep learning networks, more efficient and powerful deep learning models can be designed to achieve better application results in practical engineering applications.

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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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