Special Issue

Scalable Algorithms for Large-Scale Graph Neural Networks

Message from the Guest Editor

Graph Neural Networks (GNNs) have emerged as powerful tools for learning from graph-structured data, with applications spanning social network analysis, recommendation systems, bioinformatics, and knowledge graphs. However, as real-world graphs grow to unprecedented scales—with millions of nodes and billions of edges—traditional GNN architectures face significant challenges in scalability, efficiency, and adaptability. This Special Issue focuses on innovative algorithmic solutions designed to overcome these barriers, enabling GNNs to operate effectively in large-scale and dynamic environments. We invite contributions that explore novel methods for scaling GNNs, including but not limited to the following topics: sampling techniques, distributed and parallel training strategies, model compression, efficient attention mechanisms, hardware-aware optimization, and scalable inference frameworks. By bringing together cutting-edge research on scalable GNN algorithms, this Special Issue aims to advance the state of the art and foster next-generation graph learning systems that can handle the complexity and scale of modern graph data.

Guest Editor

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Message from the Editor-in-Chief

Algorithms are the core of computational mathematics and computer science. The whole area has been considered from different perspectives, which has led to the development of several sub-communities. The aim is to bring together researchers and practitioners from different areas of computational mathematics and computer science and to offer a platform for interdisciplinary applications in different areas of science and technology. In this way, *Algorithms* may become a forum for the exchange of new stimulating ideas between the different sub-communities working in the area of algorithms and their applications and the presentation of high-quality novel algorithmic approaches.

Editor-in-Chief

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