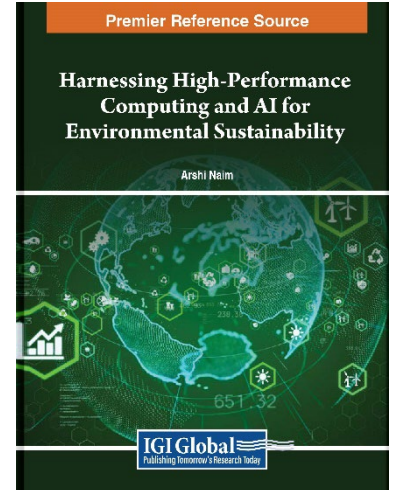


Harnessing High-Performance Computing and AI for Environmental Sustainability

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Description:

The world is addressing the insistent challenge of climate change, and the need for innovative solutions has become paramount. In this period of technical developments, artificial intelligence (AI) has emerged as a powerful instrument with enormous prospects to combat climate change and other environmental subjects. AI's ability to process vast amounts of data, identify patterns, and make intelligent predictions offers unprecedented opportunities to tackle this global crisis. High-Performance Computing (HPC) or super-computing environments address these large and complex challenges with individual nodes (computers) working together in a cluster (connected group) to perform massive amounts of computing in a short period. Creating and removing these clusters is often automated in the cloud to reduce costs. Computer networks, communication systems, and other IT infrastructures have a growing environmental footprint due to significant energy consumption and greenhouse gas emissions. To address this seemingly self-defeating conundrum, and create a truly sustainable environment, new energy models, algorithms, methodologies, platforms, tools, and systems are required to support next-generation computing and communication infrastructures.

Harnessing High-Performance Computing and AI for Environmental Sustainability navigates through AI-driven solutions from sustainable agriculture and land management to energy optimization and smart grids. It unveils how AI algorithms can analyze colossal datasets, offering unprecedented insights into climate modeling, weather prediction, and long-term climate trends. Integrating AI-powered optimization algorithms revolutionizes energy systems, propelling the transition towards a low-carbon future by reducing greenhouse gas emissions and enhancing efficiency. This book is ideal for educators, environmentalists, industry professionals, and researchers alike, and it explores the ethical dimensions and policies surrounding AI's contribution to environmental development.

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