Green Intelligence

Artificial Intelligence and Remote Sensing for Climate Change Mitigation and Ecosystem Conservation

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Editors

DeepScience

Green Intelligence: Artificial Intelligence and Remote Sensing for Climate Change Mitigation and Ecosystem Conservation

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Preface

Currently, straddling what many refer to as the human-influenced epoch of "the Anthropocene" we are in a unique place where two paths are advanced. The first is a way toward transitioning to an under-explored territory of ecological decline where biodiversity vanishes, such cataclysmic weather events leave cities uninhabitable and our food system has morphed into untenable distribution chains. On the other is a once-in-a-generation chance at transformation, using artificial intelligence (AI) not to simply lessen ecological damage but to regenerate and re-envision our kinship with earth.

Yet it seemed critical that an immediate response be provided, which is why we offer this book *Green Intelligence: Artificial Intelligence and Remote Sensing for Climate Change Mitigation and Ecosystem Conservation*. It compiles new discoveries, analytic frameworks and models for understanding, thinking about, organising and deploying AI to help accelerate the emergence of planetary intelligence and enable the application of prudential judgement in navigating this next geologic epoch. Sustainable, or what we can Call Green Intelligence as DfMA is not simply the next generation of High-Tech interventions. This is about developing technologies that resonate with natural rhythms, which are vigilant, adaptive, and look ahead instead of backwards.

Organized into thirteen interdisciplinary chapters, the book explores how AI and its subfields have evolved to tackle a growing list of environmental challenges; from The Rise of Green Intelligence where Earth observation data by geospatial technologies together with artificial intelligence algorithms are utilized in unlocking secrets hidden within complex earth and planetary systems, thereby holding potential promise for enhancing sustainability on-the-ground, to applied chapters on real-world applications on remote sensing, biodiversity conservation, smart agriculture, urban sustainability and climate forecasting. We delve into the frontlines of AI-powered cities (*Urban Ecosystems and AI-Driven Cities),* and reflect on the promise and pitfalls of integrating Indigenous knowledge systems (*Indigenous Knowledge Meets Artificial Intelligence*) and citizen science initiatives into AI ecosystems.

At its core, this book also confronts vital questions: Can AI truly align with ecological ethics? What are the risks of algorithmic biases in environmental contexts? How do we ensure AI systems remain accountable, inclusive, and regenerative?

Green Intelligence is written for a diverse readership scientist, environmentalists, data practitioners, educators, policymakers, and students who are

seeking not only answers but also inspiration. It aims to foster an informed dialogue at the intersection of technology, ecology, and society.

The final chapters imagine the road ahead: from designing symbiotic AI technologies that work with, rather than against, nature, to building frameworks for governance and policy in the green tech revolution. The concluding vision *Towards a Regenerative Intelligence* calls for a future in which artificial intelligence serves not as a tool of domination, but as a companion in the co-evolution of sustainable and just ecosystems.

We hope this book is a stepping-stone to inspire deeper exploration, collaboration and ethical innovation for life on earth.

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