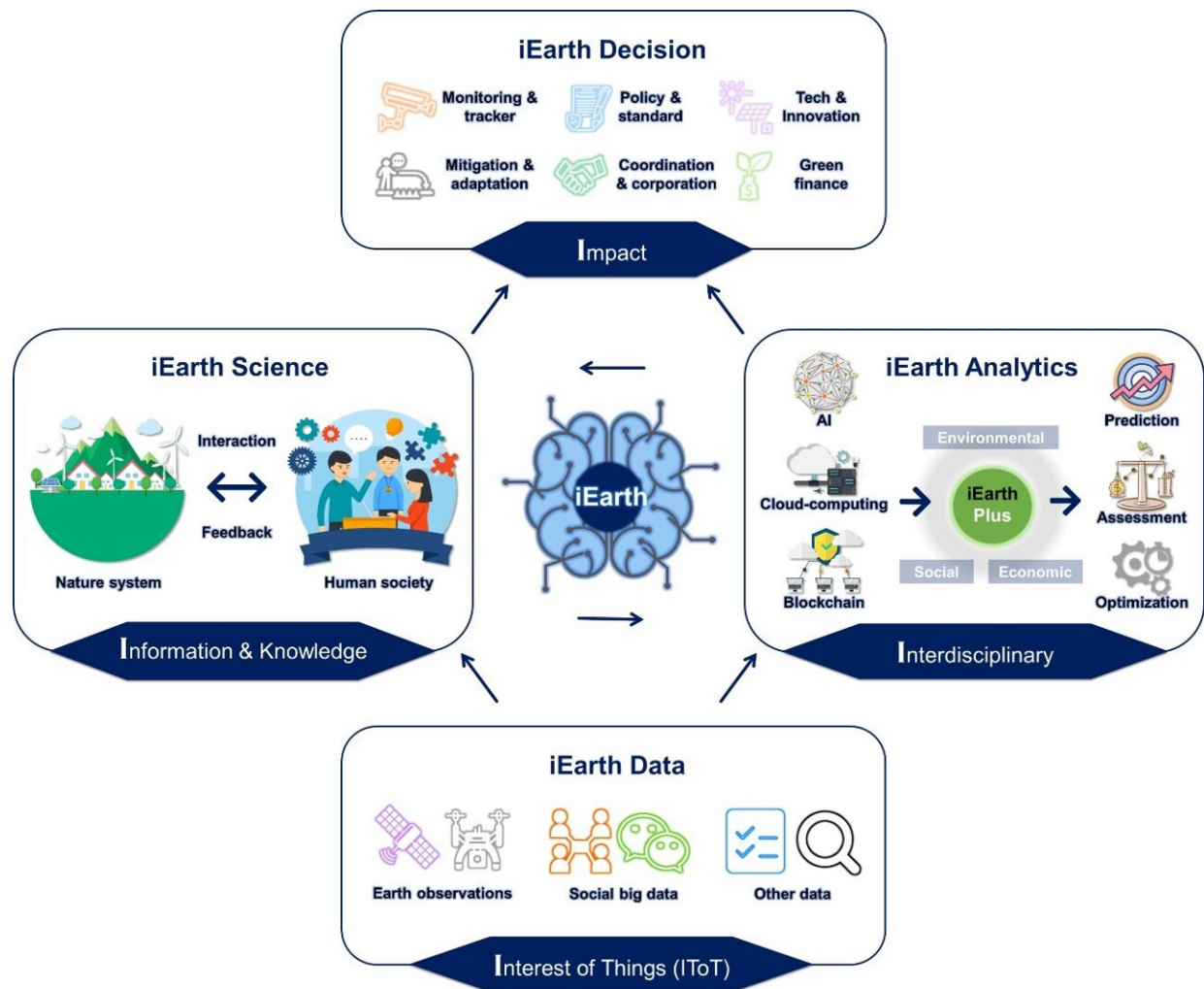# An interdisciplinary framework in the era of big data and AI for sustainable development

July 19 2023



onceptualized framework of intelligent Earth (iEarth). Credit: Science China Press

The United Nations Sustainable Development Goals (SDGs) hold the key to humanity's future existence and growth.

In a bid to optimize the implementation of these SDGs, Professor Peng Gong's team from the University of Hong Kong and Professor Huadong Guo's team from the Chinese Academy of Sciences have collaboratively introduced an innovative "iEarth" framework. This interdisciplinary framework is powered by Big Earth Data science and seeks to amalgamate various interdisciplinary methodologies and expertise.

It aims to quantify the processes of Earth systems and human civilization, uncover the intricate interplay between natural ecosystems and human society, foster cross-disciplinary ideologies and solutions, and furnish explicit evidence and valuable scientific knowledge for sustainable development.

The inception of the iEarth concept springs from intelligent Mapping (iMap), and its further development is influenced by a spectrum of disciplinary and interdisciplinary studies. The team distinguishes four primary themes within the iEarth framework: iEarth data, iEarth science, iEarth analytics, and iEarth decision.

iEarth data comprises all data related to Earth systems, encapsulating natural systems and human societies. iEarth science delves into a multidisciplinary exploration of the natural system, human society, and their mutual interaction and feedback, focusing on the diverse traits of objects when interconnected.

iEarth analytics presents a methodology inclusive of detection, prediction, assessment, and optimization for achieving SDGs by leveraging the "iEarth+" model, which is dedicated to transcending disciplinary boundaries and actively connecting Earth observations with other disciplines.

iEarth decision supports the implementation of SDGs by monitoring progress, pinpointing drivers, simulating pathways, and performing cost-benefit evaluations. The holistic iEarth framework thus consolidates multi-source data, interdisciplinary knowledge, and advanced technology to establish a comprehensive data-science-analytics-decision support system for fostering sustainable environmental, social, and economic prosperity.

The 'intelligence' in the iEarth framework is characterized by its potential for active learning and knowledge synthesis through Big Earth Data models powered by Artificial Intelligence (AI). Consequently, the iEarth framework can also be seen as an AI model anchored on Big Earth Data. According to the team, the successful implementation of the iEarth framework necessitates significant investment in both hard and soft infrastructures.

With an aim to reinforce the vision and boost the capability of iEarth for sustainable development, the team has outlined key research directions, practical implications, and educational curricula. The ultimate objective is to shape and build an interdisciplinary and synergistic framework for research, practice, and education that helps in preserving our living planet.

The paper is published in the journal *National Science Review*.

Citation: An interdisciplinary framework in the era of big data and AI for sustainable development (2023, July 19) retrieved 29 April 2024 from https://phys.org/news/2023-07-interdisciplinary-framework-era-big-ai.html