

The Intersection of AI and Climate Science in Enhancing Earth's Future Resilience

I'm honoured to join the multidisciplinary team at the Institute for Artificial Intelligence and Big Data (AIBIG) since March 2023. As a climate scientist who has been utilising high-performance computing in my research for the past nine years, it is my privilege to shed light on the pivotal role that Artificial Intelligence (AI) plays in addressing the pressing issues of the environment, climate and sustainability, and how AI holds the potential to shape the future of our planet.

Intersection between the AI surge and increased climate awareness

AI is not a recent phenomenon, but it surged in popularity since the release of ChatGPT in November 2022. Demands for AI technologies across various sectors have grown exponentially, and the environmental sector is no exception. Fortunately, the surge in the AI revolution coincides with the increased awareness of climate change among the mass public. More countries and companies recognise the implications of climate change on the physical environment as well as its impact on the economic and social well-being of their nations, prompting them to accelerate the quest for sustainability with the aid of AI.

AI's applications in earth and environmental science

AI's applications in earth and environmental science are multifaceted. For instance, AI's immense number-crunching ability is pivotal in numerical climate modelling, allowing us to simulate past and future climate scenarios and assess the impacts of climate change. With the growing volume of environmental data encompassing atmospheric, oceanic and space profiles collected from a range of satellite constellations to Internet-of-Things sensors worldwide, AI techniques such as machine learning and deep learning can be applied to these data to predict extreme weather events, thus providing early warnings and enhancing disaster preparedness.

AI-driven solutions

Looking ahead, the role of AI in the environment, climate, and sustainability is poised to become even more critical. As we face the challenges of a rapidly changing climate, depleting natural resources, and a growing global population, AI-driven innovations will be essential in driving solutions to these complex issues. Coupling multidisciplinary research efforts with AI's potential will pave the way for a more resilient and sustainable future for the Earth. The ability to adeptly navigate and utilise AI tools and methodologies has become an invaluable asset in tackling the intricacies of environmental challenges.

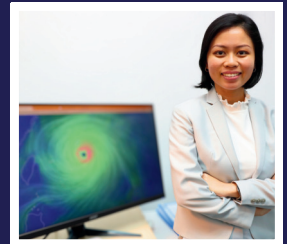
Future of work: Scientific and technical expertise

That said, there is a rising demand for professionals who possess a blend of domain knowledge and technical skills. Beyond conventional scientific training, individuals in this field are now expected to gain proficiency in programming languages, data analytics, and machine learning frameworks. The integration of technical expertise with domain knowledge facilitates a more holistic and efficient approach to problem-solving. This dual proficiency not only aids in the creation and implementation of advanced AI models but also ensures the translation of scientific insights into practical solutions.

The dynamic landscape of environmental science and sustainability necessitates a workforce capable of leveraging AI technologies to innovate and contribute significantly to the global initiative in addressing environmental issues.

At AIBIG, we leverage the convergence of science and technology, and we are committed to fostering a collaborative environment that nurtures both scientific and technical acumen to pioneer transformative solutions for a sustainable future.

Author Profile



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Dr Marianne Leong (or Dr Mae for short) is an interdisciplinary scientist in earth and data science. She obtained her Bachelor's degree in Natural Resources Science at Universiti Malaysia Kelantan and pursued her PhD in Earth and Environment (Atmospheric Science) at the University of Leeds, UK.

Using high-performance computing, she unravels intricate land-atmosphere interactions through numerical modelling and conducts in-depth analyses of climate data to assess physical climate changes. With over nine years of interdisciplinary professional experience, her work has earned her recognition as a YSEALI woman leader in Climate Resilience and established herself as a consulting expert in Research Infrastructures for the ASEAN region. She was awarded the 'Best Student Award' in the EU-ASEAN High Performance Computing School for two consecutive years in 2021 and 2022.

Her external roles include mentoring in the Microsoft 'Code; Without Barriers' that helps women break into tech. She also serves as an Associate at a local civil engineering consultancy firm where she offers consulting on enhancing the resiliency of engineering design through climate intelligence.

