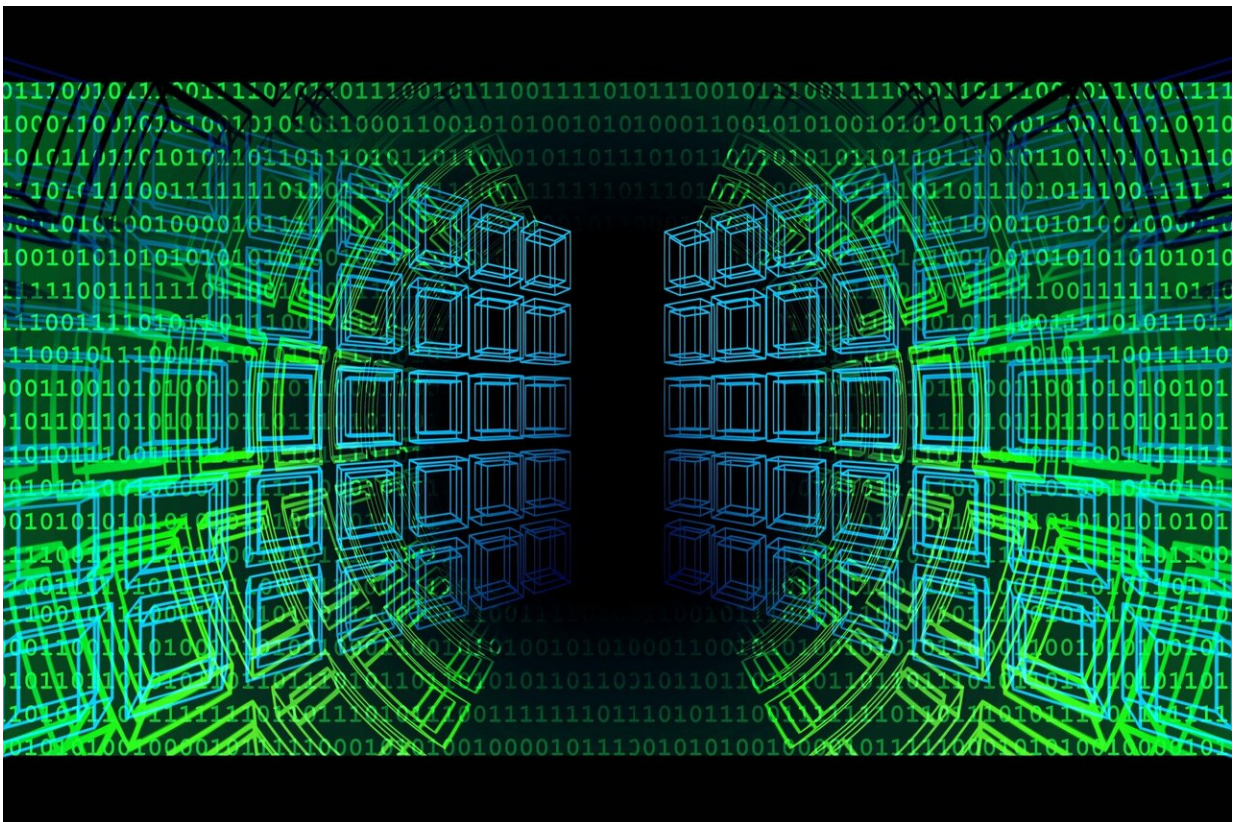


Biased artificial intelligence needs human help to avoid harmful climate action, say researchers

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Bias in the collection of data on which artificial intelligence (AI) computer programs depend can limit the usefulness of this rapidly

growing tool for climate scientists predicting future scenarios and guiding global action, according to a new paper by researchers at the University of Cambridge, published in *npj Climate Action* .

AI computer programs used for [climate science](#) are trained to trawl through complex data sets looking for patterns and insightful information. However, missing information from certain locations on the planet, time periods, or societal dynamics create "holes" in the data that can lead to unreliable climate predictions and misleading conclusions.

Primary author and Cambridge Zero Fellow Dr. Ramit Debnath said that individuals with access to technology, such as scientists, teachers, professionals and businesses in the Global North are more likely to see their climate priorities and perceptions reflected in the digital information widely available for AI use.

By contrast, those without the same access to technology, such as Indigenous communities in the Global South, are more likely to find their experiences, perceptions and priorities missing from those same digital sources.

Debnath said, "When the information on climate change is over-represented by the work of well-educated individuals at high-ranking institutions within the Global North, AI will only see climate change and climate solutions through their eyes."

"Biased" AI has the potential to misrepresent climate information. For example, it could generate ineffective weather predictions or underestimate carbon emissions from certain industries, which could then misguide governments trying to create policy and regulations aimed at mitigating or adapting to climate change.

AI-supported climate solutions that spring from biased data are in danger

of harming under-represented communities, particularly those in the Global South with scant resources. These are often the same communities that also find themselves most vulnerable to the [extreme weather events](#) caused by climate change such as floods, fires, heat waves and drought.

That is a combination which could lead to "societal tipping events," the paper warns.

However, these "data holes" can be filled by human knowledge. The authors advocate for a human-in-the loop design to offer AI [climate change](#) programs with a sense check on which data is used and the context in which it is used, in an effort to improve the accuracy of predictions and the usefulness of any conclusions.

The authors mention popular AI chatbot model ChatGPT, which has recently taken the world by storm for its ability to communicate conversationally with human users. On ChatGPT, the AI can ask its human users follow-up questions, admit mistakes, challenge incorrect premises and reject inappropriate requests.

This "human-in-the-loop" style AI allows bias to be noticed and corrected, the authors said. Users can input critical social information, such as existing infrastructure and market systems, to allow the AI to better anticipate any unintended socio-political and economic consequences of climate action.

Co-author Cambridge Zero Director and climate scientist Professor Emily Shuckburgh said, "No data is clean or without prejudice, and this is particularly problematic for AI, which relies entirely on [digital information](#)."

In highlighting the importance of globally inclusive data sets, the paper

also promotes [broadband internet access](#) as a public necessity, rather than a private commodity, to engage as many users as possible in the design of AI for contemporary conversations about climate action.

The paper concludes that human-guided technology remains instrumental in the development of socially responsible AI.

Less-biased AI will be critical to our understanding of how the climate is changing, and consequently in guiding realistic solutions to mitigate and adapt to the on-going climate crisis, the authors said.

Professor Shuckburgh, who also leads the UK's Centre for Doctoral Training on the Application of AI to the study of Environmental Risks (AI4ER), said, "Only with an active awareness of this data injustice can we begin to tackle it, and consequently, to build better and more trustworthy AI-led climate solutions."

More information: Harnessing human and machine intelligence for planetary scale climate action, *npj Climate Action* (2023). [DOI: 10.1038/s44168](#)

Provided by University of Cambridge

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