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AI in nature conservation: powerful tool or dangerous shortcut?

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Conservationists analyse overwhelming volumes of ecological data in their work. For example, they might need to process decades of weather data or the movements of millions of insects. Up until now, these scientists and decision makers have had to manually find and sort information, then use statistical tools which often oversimplify the source information.

Artificial intelligence (AI) tools now promise to help with all that. But can they deliver on the promise?

They are far from perfect. It's been shown that they can confidently make up information and amplify hidden biases in their training data. And different AI tools have different uses, strengths and weaknesses. They need to be chosen carefully.

AI featured among the top 10 emerging issues in biodiversity conservation in South Africa in a recent horizon scan that we undertook. As part of a group of 14 experts in biodiversity conservation, we drew on discussions within our diverse professional networks, literature and news trends to identify issues likely to emerge and intensify over the next 5-10 years.

The issues fell into three main groups: technological disruption; regulatory complexity; and infrastructure impacts.

Among them, AI featured as both an opportunity and a risk for future biodiversity conservation.

AI opportunities

Our scan brought to the surface the power and pitfalls of AI in the kind of work we do.

One potential use of AI is in tracking. Tracking animals and insects at scale is essential for conservation decisions. Birds and whales migrate across the planet every year, and insect numbers change through the seasons in the billions. Image recognition AI can process camera trap data to help populate databases such as [Wildlife Insights](#) and provide information about animal behaviour to help predict the [impacts of global processes like climate change](#) and industrial development on biodiversity.

Mass monitoring also records people sharing those landscapes with animals. This surveillance can be used to detect illegal wildlife harvesting (poaching) or avoid [human-animal conflict](#).

Land use is another area of conservation where AI offers opportunities. Using economic data together with landscape information, custom AI models can be trained to [predict deforestation](#), allowing preventive action, or [choose land](#) with high conservation value for the best price.

Ecosystem complexity needs to be summarised and condensed into maps and categories to inform broad landscape-level decisions. Using AI increases the amount of data that can be summarised.

Chatbots are one kind of AI tool that can distil information from huge amounts of text. For example, they can be used to monitor product listings and [detect illegal wildlife trade online](#) the moment it occurs. They can read hundreds of scientific publications to help decide which species are at [risk of extinction](#). They can draw on many different sources to create environmental impact assessments; the basis of land development decisions, offering a tempting shortcut around a time-consuming reporting task.

But we also identified downsides and risks.

The risks

Local communities living off the land might experience the mass surveillance as an intrusion. Alienation of local communities in this way could cause them to oppose conservation governance and [sabotage technology](#) in the field to [protect their privacy](#).

Another challenge is that the technology itself has limitations. Using AI for tracking animals means specially training image and audio identification systems to work with each ecosystem and piece of hardware. An AI model is only as good as the effort that was put into teaching it. For example, training a model on recordings from a city might cause it to “hear” pigeons everywhere, producing a confident but incomplete list of birds from natural area data.

Another worry about AI is that replacing human involvement could lead to job losses. When used for animal identification, it could contribute to an ongoing [decline in taxonomy knowledge](#) which is more severe in biodiversity-rich, low-income countries in Africa. That knowledge is essential for improving and correcting AI systems.

Read more: *Counting Uganda's lions: we found that wildlife rangers do a better job than machines*

We also found reasons for concern in land use applications.

The risk is that using AI tools for map making could disconnect the map from reality on the ground by replacing human judgment in the field and favouring data sources compatible with AI methods. A skilled ecologist surveying an ecosystem will notice unexpected things that were not specified during the planning stage. For example, speaking with local people may reveal planned farming expansion or harvesting wildlife activities. An AI system would miss this critical context because it can only read information that has been digitised.

AI can't see animals that evade cameras or identify animals that were not expected to occur in that location (images that it was not trained on). It also can't speak to humans to discover their intentions or uncover ecological wisdom passed down from their ancestors.

Read more: *First fossil hyena tracks found in South Africa – how expert animal trackers helped*

Chatbots too need to be used with caution. They can generate or embed fictional information. Even when drawing on real information, they often reflect bias in their training data, favouring research and perspectives from well-represented institutions in the global north, where publications have historically been dominated by men in high-income universities.

Uncritical use of chatbot-generated recommendations could lead to poor environmental decisions. For example, it might suggest planting trees without considering diverse ecosystems like Africa's savannah grasslands.

Using chatbots as a shortcut to summarise knowledge and inform conservation decisions in Africa will reinforce colonial systems and marginalise indigenous communities and knowledge.

Careful use of AI

Strong regulation of the use of AI in environmental science is therefore a moral and legal imperative. The sector needs clear safeguards, standards and oversight mechanisms to prevent faulty or inappropriate AI outputs from influencing decisions. It needs:

- validation protocols to catch fabricated information
- limitations to prevent chatbots from overriding human knowledge and perspectives
- mandatory disclosure of AI prompt histories

- standards for describing training datasets so that appropriate models can be selected.

The explosion of AI presents a powerful opportunity for conservation if we use the right tools with care. If we replace human judgment with unchecked automation, we risk becoming tools of the very systems we built.

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