ENERGY/ENVIRONMENT

To catch wildlife poachers, computer scientists turn to AI

Using an artificial intelligence application that develops the most effective patrol routes, a team of researchers from the University of Southern California are proving that technology has a role to play in protecting wildlife.

By **Story Hinckley**, Staff / April 24, 2016

Members of the Pilanesberg National Park Anti-Poaching Unit (APU) stand guard as conservationists and police investigate the scene of a rhino poaching incident in South Africa's North West Province, in this file picture taken April 19, 2012.

Mike Hutchings/Reuters

A team of computer scientists may have developed a surprising way to curb wildlife poaching.

Funded by the National Science Foundation (NSF), a team of computer scientists at the University of Southern California (USC) have developed a model for “green security games” that use game theory to protect wildlife from poachers. Game theory uses mathematical equations “to predict the behavior of adversaries and plan optimal approaches for containment,” explains NSF, which would allow park rangers to patrol parks and wildlife sanctuaries more effectively.

“In most parks, ranger patrols are poorly planned, reactive rather than pro-active and habitual,” Fei Fang, a Ph.D. candidate in the computer science department at USC and a researcher involved with the project, tells NSF. “We need to provide actual patrol routes that can be practically followed.”


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Ms. Fang, along with research leader Milind Tambe, a professor of computer science and systems engineering at USC, developed an artificial intelligence application called Protection Assistant for Wildlife Sanctuary (PAWS) in 2013 and they have spent the last few years testing its success in Uganda and Malaysia. Both of these countries are in desperate need of

patrol assistance, as the Uganda Wildlife Authority notes that "the killing of elephants for ivory generally shot up over the last four years," and three of the largest ivory seizures in the last few years took place in Malaysia.

Fang and Tambe say that PAWS allows guards to be more effective without requiring additional resources by creating patrol routes that specifically target the most threatened areas yet also randomize routes to make them unpredictable.

"These routes need to go back to a base camp and the patrols can't be too long. We list all possible patrol routes and then determine which is the most effective," adds Fang. "If the poachers observe that patrols go to some area more often than others, then the poachers place their snares elsewhere."

The PAWS application learns from experience, altering suggested patrol routes based on past successful efforts. The system can also synthesize the routes with the most animal traffic, where poachers will likely visit more often.

This is not the first tech innovation aimed at catching poachers. In February, The Washington Post reported on a growing number of robotic animals used by American wildlife law enforcement to catch illegal poachers in the act. And for a few years, engineers and conservationists have been working together to develop a conservation drone that could monitor illegal activity from above. Fang and Tambe acknowledge some shortcomings of the technology, but they say PAWS has already had demonstrated success.

"This research is a step in demonstrating that AI can have a really significant positive impact on society," Tambe tells NSF, "and allow us to assist humanity in solving some of the major challenges we face."

Research teams at USC are also exploring how game theory and artificial intelligence can assist other environmental conflicts, such as illegal logging in Madagascar.

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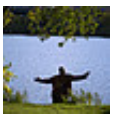

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