How machine learning and game theory are trumping poachers

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One of the basic fundamentals of artificial intelligence is game theory. So, while algorithms are best at repeating a task, game theory is what imparts them the guise of intelligence. Computational analysis using mathematical models is then used to do predictive analysis and appear human-like. Take the case of computers playing chess or Jeopardy. The only way they have been able to beat humans in these games have been their power to decide dominant strategies amidst the vast trove of information available to them. But is AI only good at playing Chess? Increasingly, AI systems are being used to penetrate real-life functions, and game theory and mathematical modeling are what is making them beat Turing tests and compete with humans.

Competition is not the only trait that AI is being imparted with. In most areas, AI is being used as a complement to human intelligence and the best instance of this can be witnessed in the savannas

of Africa. Earlier this year, Vulcan technologies announced its domain awareness system (DAS) to revolutionise wilderness management across the continent. The new system, currently under testing in Lewa, Kenya, uses the existing resources like animal trackers, camera traps, weather and movement of anti-poaching teams to create real-time interactive GPS maps. More important, the company claims that it would be able to use poaching instances from the past to prevent incidences of happening in the future. While this may all seem too good to be true, it is highly likely that the team may successfully be able to do this. Take the case of researchers at the University of Southern California, who have developed an artificial intelligence software Protection Assistant for Wildlife Security (PAWS), which uses game theory and mathematical modeling techniques to help forest rangers increase their chances of saving wildlife.

PAWS takes into account details of past poaching and the patrol area to suggest routes which minimise resource use and maximise poacher apprehension. The researchers first created PAWS in 2013 and tested the application in Uganda and Malaysia in 2014 and now are adding CAPTURE (Comprehensive Anti-Poaching Tool with Temporal and Observation Uncertainty Reasoning), that predicts attacking probability even more accurately.

Although NGOs and increased surveillance have curbed these practices, poaching in the forests of Asia and Africa still remain high. According to Save the Elephant Foundation, the population of forest elephants fell by 62% between 2002-2011. The organisation estimates that over a 100,000 were killed between 2010-2012. In the case of rhinos, the situation was no different. According to Save the Rhino, although poaching had declined in 2016 to 1,054 as compared to 1,175 in 2015, the numbers were still higher than 2013 figures.

One cannot expect a sudden drop in figures with coming of advanced techniques. As more poaching incidences get recorded and reported, and researchers work out kinks in their model, one can expect technology—not just AI, but trackers, drones, and camera traps—to make a difference where human monitoring couldn't.

The impact would not only be felt in Africa, but also in India, where the government has been making efforts to curb incidences of tiger and leopard poaching. Figures from Wildlife Protection Society of India indicate 132 tiger-deaths last year, of which 50 were documented—double the number last year, while 436 leopards died, of which 154 were documented an increase of 27 from last year.