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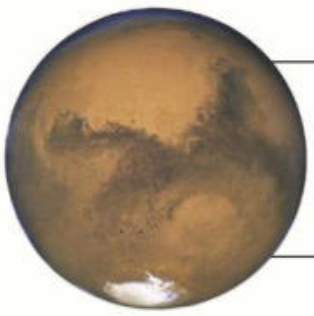

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The world-first study opens the door to more effective methods of monitoring the movements of endangered species

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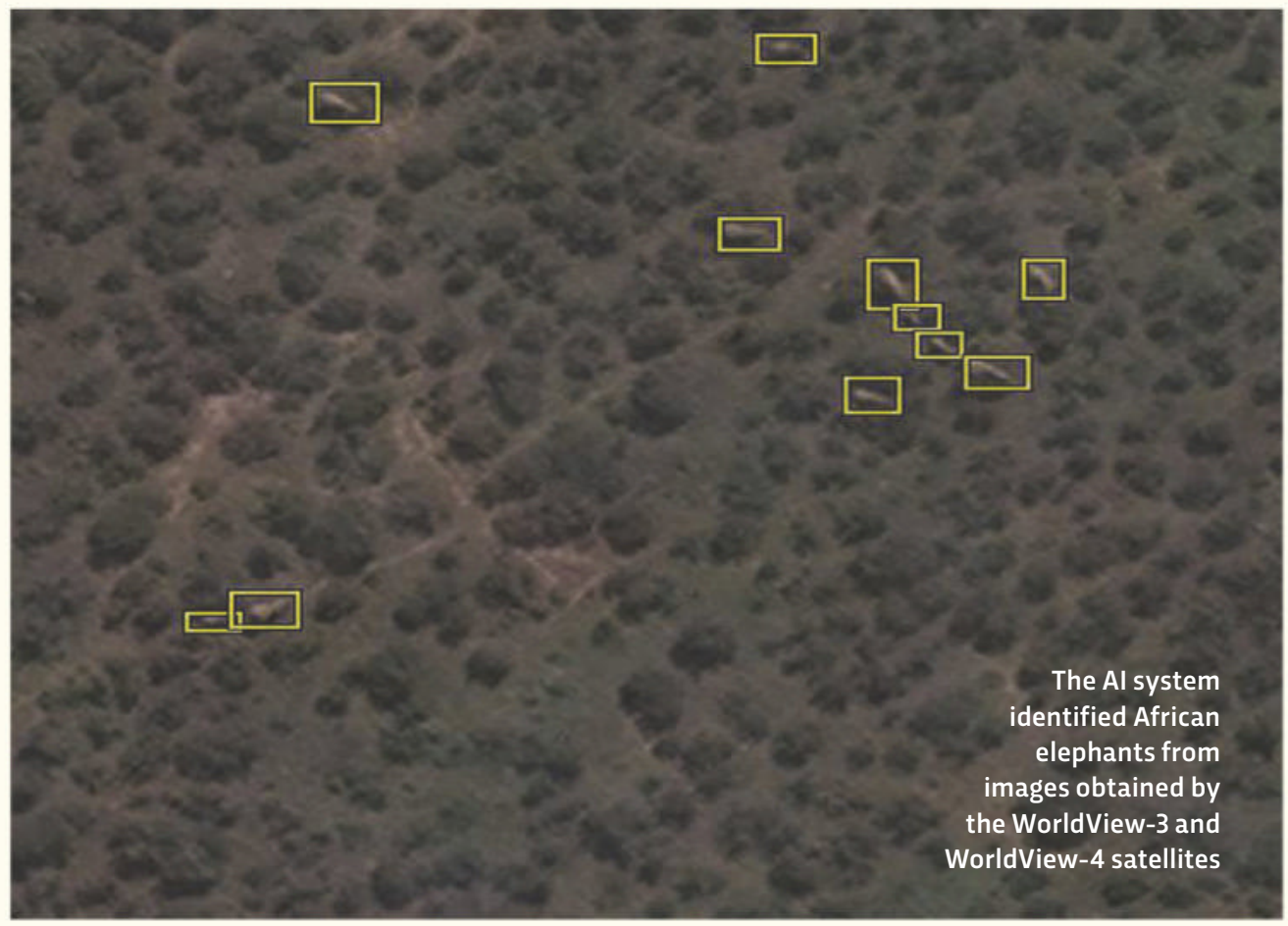
Satellites are able to cover large areas, and can monitor regions that are inaccessible from the ground



The AI system identified African elephants from images obtained by the WorldView-3 and WorldView-4 satellites

An international team of scientists from the University of Bath, the University of Oxford and the University of Twente in the Netherlands have successfully used satellite-based cameras coupled with deep-learning algorithms to track the movements of African elephants.

The population of African elephants has plummeted over the last few decades, thanks to poaching and loss of habitat. The species is now classified as endangered, with just 50,000 individuals left in the wild.

Currently, conservationists monitor the populations of endangered and under-threat animals such as elephants by counting them one-by-one from low-flying aeroplanes. But in this study, the team used an automated artificial intelligence system created by Dr Olga Isupova, a computer scientist at the University of Bath, to analyse high-resolution images of the elephants as they moved through forests and grasslands. The images had been captured by the commercially run WorldView-3 and WorldView-4 observation satellites. They found that their system was able to examine the images and identify the animals with the same accuracy as humans analysts.

Although the combination of satellite imagery and deep-learning has previously been used to identify marine animals, this study marks the first time the technique has been used to monitor animals moving through a mixed landscape that includes areas of open grassland, woodland and scrub.

“Accurate monitoring is essential if we’re to save the species. We need to know where the animals are”

“This type of work has been done before with whales, but of course the ocean is all blue, so counting is a lot less challenging. As you can imagine, a heterogeneous [diverse] landscape makes it much harder to identify animals,” said Isupova. “Accurate monitoring is essential if we’re to save the species. We need to know where the animals are and how many there are,” she added.

The team chose to run their pilot study using African elephants, as they are the largest land animals and therefore the easiest to spot. However, the researchers are hopeful that the technology will be successful in observing other species in the future.

“Satellite imagery resolution increases every couple of years, and with every increase we will be able to see smaller things in greater detail. Other researchers have managed to detect black albatross nests against snow. No doubt the contrast of black and white made it easier, but that doesn’t change the fact that an albatross nest is one-eleventh the size of an elephant,” said Isupova. “We need to find new state-of-the-art systems to help researchers gather the data they need to save species under threat.”