

Automated bird species recognition is challenging because of subtle differences in appearance and high variation in background and pose between the kea (first image) and the kākā (second image).

Is it a kākā or a kea?

The future for bird-spotting is artificial intelligence, says Otago University's **Tapabrata Chakraborti**.

Imagine you are a tourist taking a walk through a native forest and you see a small bird hopping about in the treetops. Not sure what it is, you take a quick snap on your phone and up pops the species name, images, information about its conservation status, and, because it's an endemic species, your sighting of a male tomtit will be automatically logged to a citizen science website and the information instantly shared with ornithologists around the world.

Our unique New Zealand birdlife is a national taonga and of interest to experts and enthusiastic amateurs alike. With the capabilities of modern handheld devices (tablets and smart phones), it should – in theory – be possible for anyone to become a “birder”.

Researchers in the Computer Science Department of University of Otago are working towards this kind of digital birding future. For the past two years, they have been developing automated computer recognition and, if it all goes according to plan, the only equipment you will need for bird-spotting in the future will be your smartphone or tablet.

But first Tapabrata Chakraborti, with his supervisors Dr Brendan McCane and Dr Steven Mills, must find a reliable way of identifying birds from photographs. They are using artificial intelligence, machine learning techniques, and the development of robust applications to do just this.

First they must develop new algorithms that can advance tech-automated recognition of species from images. It's a bit like facial recognition for humans, but the algorithms analyse all of bird's body and features, not just its face.

“The main challenge is to develop algorithms that can learn the subtle differences between similar looking birds, like kākā and kea, with minimum training samples,” explains Tapabrata.

“The future and final goal of the project would be to translate these algorithms to a user-friendly app that can operate as a digital birder based on camera-acquired images. These can then be integrated with existing bird apps.

“The user would take a camera picture of the bird in real life on a mobile device and the app would suggest the name of the bird in question.”

An experienced user, such as an ornithologist or a citizen scientist, may also contribute labelled images to the dataset to enhance the performance in time, says Tapabrata.

The same algorithms may also be generalised, with some modifications, to recognise other species – for example plants or insects.

The project recently won the Diane-Campbell Hunt Memorial Award, 2017 for contribution to ecological conservation in New Zealand, and its findings have been well-received internationally.

Te Papa and the Department of Conservation have supported the project by contributing from their repository of bird images.

*If you would like to know more about this project, you can get in touch with Tapabrata through his website <https://tapabrata-chakraborti.github.io>.

