

A Blakiston's fish owl
in Hokkaido
Photo: Courtesy of Wild Bird
Society of Japan

Call Recognition Software to Protect Biodiversity

Call recognition software developed in Japan is contributing to efforts to protect and boost the population of the endangered Blakiston's fish owl and may be applied to other creatures with characteristic sounds in the future.

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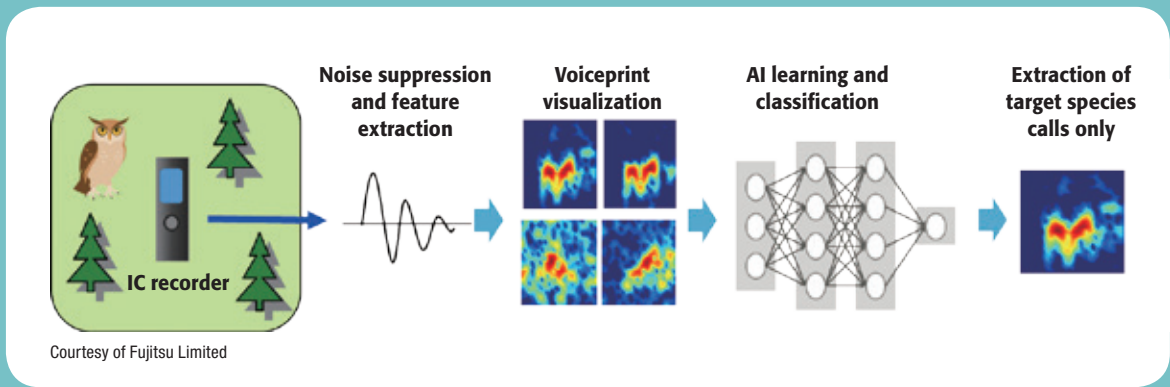
BLAKISTON'S fish owl is the world's largest species of owl, having a wing span of 180 cm. The owl's numbers in Hokkaido, one of the few places the species lives, have decreased in recent years due to factors such as deforestation and a decline in the population of fish on which the owl preys. Blakiston's fish owl has been designated as a "Critically Endangered" species on the Red List of the Ministry of the Environment, indicating it is at extremely high risk of extinction.

A program that extracts the calls of Blakiston's fish owls from recorded sound data with high accuracy has been developed to survey the habitats of this rare bird. Fujitsu Kyushu Network Technologies Limited, a part of the Fujitsu Group, has led the research and development of the program. The Fujitsu Group formulated their "Fujitsu Group Biodiversity Action

Principles" for contributing to biodiversity preservation through information and communications technology (ICT) in 2009, a year prior to the Tenth Meeting of the Conference of the Parties (COP10) to the Convention on Biological Diversity (CBD) that was held in Japan. They are engaged in a variety of activities in accordance with these principles.

Mutsumi Saito of Fujitsu Kyushu Network Technologies explains, "One of the activities of the Fujitsu Group has been to support the work of the Wild Bird Society of Japan to protect birds. The program development started when the employees involved with this organization came to discuss the project with my department, which is in charge of sound processing technology for cell phones and smartphones."

In the past, when conducting surveys of Blakiston's fish owl, the Wild Bird Society of Japan would



dispatch people to actually go into the forest at night and check for their calls with their own ears. This method was not only work-intensive, but also came with the risk of encountering brown bears, so about ten years ago, they started to place IC recorders at numerous locations in the owls’ habitats and check the recorded sounds. While this method removed the need to walk in the forest at night, checking the recorded sounds by replaying them took an enormous amount of time and false detections were common. Saito was asked to develop a program that could automate this work.

“In the beginning, we used music editing software to confirm the calls of Blakiston’s fish owls, but it took time and effort,” says Saito. “We then developed original software to visualize the recorded sound

data as voiceprints, and used AI [artificial intelligence] to accurately extract the owls’ calls from several candidates.”

Back then, an enormous number of sound samples was needed to train the AI, so they worked together with the Kushiro City Zoo to record about 5,000 distinct samples of calls, which was then used as learning data. The developed program is not only capable of completing in a few minutes the work that previously took people one hour, but is so accurate that it can even extract faint calls coming from more than 1 km away from the IC recorder.

In 2014, the Wild Bird Society of Japan used this program to conduct a wide-area habitat survey over more than half a year in a timber production forest owned by a paper-making company in Hokkaido. The results proved that the area was frequently used by Blakiston’s fish owls and contributed to better preservation of their habitat as operations and large-scale felling in the area during breeding season are no longer conducted.

Saito says, “If we’re able to collect even more sound data, I’m sure we can expect an even more accurate analysis, which might, for example, allow us to identify individuals and determine where the calls are coming from. Moreover, by adapting the recording technology, it can be used to survey a diverse range of wildlife, such as marine animals, not only birds. In the future, I hope to see this technology used in a variety of fields, such as environmental assessment.”



Mutsumi Saito of Fujitsu Kyushu Network Technologies
Photo: Takashi Sasaki