

Moves to automate identification of Saimaa ringed seals

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Moves are being made to automate the identification of Saimaa ringed seals. This would bring new kinds of real-time information on how the extremely endangered species behaves, the movements of individual seals, and what happens to them. The final aim of an ongoing study at the LUT on machine vision is to get a biometric passport for each individual Saimaa ringed seal. This happens on the basis of the unique fur patterns of each individual seal, using computer-based smart calculation and digital image processing. The aim is to store the information in a so-called Saimaa ringed seal database.

Until now, identification of Saimaa Ringed Seal has been done manually, by placing transmitters in the fur of the [seals](#). Manual identification is nevertheless time consuming and difficult. Furthermore, the transmitters can interfere with the animal's activities to some degree.

"Now the purpose is to help the identification of the seals in such a way that the fur can be found in the pictures, so that the fur of each seal becomes its biometric passport. The Saimaa [ringed seal](#) can be in any position, which means that we need to achieve identification that is independent of position, using a computer's [machine vision](#) application. First we need to locate the seal in a picture. After that we need to classify, or identify, which individual out of about 300 Saimaa ringed seals is involved", says Heikki Kälviäinen, Professor of Computer Science and Engineering at the Laboratory of Machine Vision and Pattern Recognition.

According to Professor Kälviäinen, initial research results indicate that the automatic identification of Saimaa ringed seal is fully feasible. Automating the identification is first tested in a testing environment from several photographs of about 300 seals. Researchers have a total of more than 1,000 such pictures. Once the automated system is ready, final identification is made on the basis of game and wild animal camera pictures.

Cooperation with biologists

Kälviäinen says that the Saimaa ringed seal research group of the University of Eastern Finland contacted him last year to ask for help in studying the automated monitoring of the seals.

"We definitely also need biologists in the research. They can say what parts of the furs show that the individual seals are different. In nature the challenge is that it can be dark, and the background of the picture can blend in to the seal. A seal can also be in a position in which it is hard to identify."

Automation would make it easier for biologists studying the Saimaa ringed seal to know if an individual animal appearing in an area is new or, for instance, what an individual seal that has died had done before dying. When individuals are identified electronically, it will also be possible to confirm the mating of the seals more easily than before.

"Biologists also know where cameras should be placed in nature. One can never know for sure what a situation is like in nature. At the moment we are engaging in basic research, but ultimately the goal is to find a computer-based automated solution for the identification of the seals that is as flexible as possible. Learning the database system takes a long time, but once it is learned, the information will come fast in real time", Kälviäinen emphasises.

Automatic identification of wild animals is an area of research that is constantly growing around the world. For instance, there are efforts to automatically identify whales, lizards, antelopes, and seals. In this way it has been possible to find out that a blind seal has been able to swim hundreds of kilometres.

"When we succeed in this, in the future we may be able to produce a second database for the identification of relatives of the Saimaa Ringed Seal, the Ladoga ringed seal. There are a few thousand of them, and they have a slightly different fur pattern. There are also plans for a shared follow-up project with the University of Eastern Finland so that the automated monitoring system for the seals could be taken into use."

Provided by Lappeenranta University of Technology

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