

AI EAVESDROPS ON DOLPHINS AND DISCOVERS SIX UNKNOWN CLICK TYPES



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COMPUTER PROGRAM PICKED OUT THE NOISES FROM UNDERWATER RECORDINGS OF 52 MILLION ECHOLOCATION SIGNALS



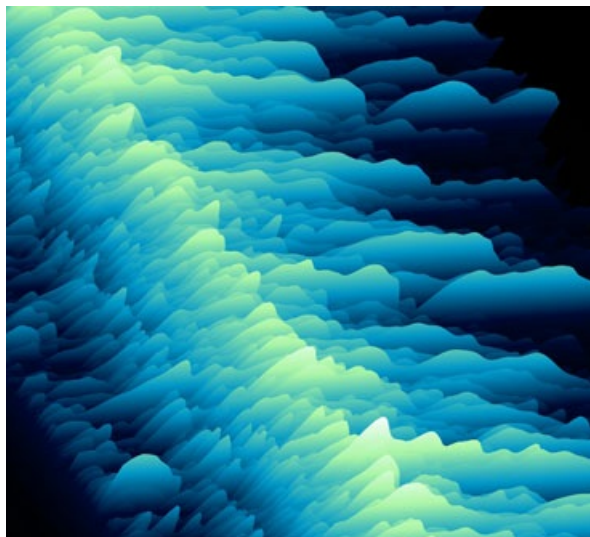
LISTENING IN: A computer code picked out six new types of dolphin clicks from several months' worth of underwater sound recordings.
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A new computer program has an ear for dolphin chatter.

The algorithm uncovered six previously unknown types of dolphin echolocation clicks in underwater recordings from the Gulf of Mexico, researchers report online December 7 in *PLOS Computational Biology*. Identifying which species produce the [newly discovered click varieties](#) could help scientists better keep tabs on wild dolphin populations and movements.

Dolphin tracking is traditionally done with boats or planes, but that's expensive, says study coauthor Kaitlin Frasier, an oceanographer at the Scripps Institution of Oceanography in La Jolla, Calif. A cheaper alternative is to sift through seafloor recordings — which pick up the echolocation clicks that dolphins make to navigate, find food and socialize. By comparing different click types to recordings at the surface — where researchers can see which animals are making the noise — scientists can learn what different species sound like, and use those clicks to map the animals' movements deep underwater.

But even experts have trouble sorting recorded clicks, because the distinguishing features of these signals are so subtle. “When you have analysts manually going through a dataset, then there’s a lot of bias introduced just from the human perception,” says Simone Baumann-Pickering, a biologist at the Scripps Institution of Oceanography not involved in the work. “Person A may see things differently than person B.” So far, scientists have only determined the distinct sounds of a few species.



FEELING CHATTY: A new algorithm scoured the acoustic signals (illustrated) of 52 million dolphin clicks to find new types of echolocation signals. K. FRASIER

To sort clicks faster and more precisely, Frasier and her colleagues outsourced the job to a computer. They fed an algorithm 52 million clicks recorded over two years by near-seafloor sound sensors across the Gulf of Mexico. The algorithm grouped echolocation clicks based on similarities in speed and pitch — the same criteria human experts use to classify clicks. “We don’t tell it how many click types to find,” Frasier says. “We just kind of say, ‘What’s in here?’”

The algorithm picked out seven major kinds of clicks, which the researchers think are made by different dolphin species. Frasier’s team recognized one class as being made by a species called Risso’s dolphin. The scientists suspect that another group of clicks, most common in recordings near the Green Canyon south of Louisiana, was produced by short-finned pilot whales that frequent this region. Another type resembles sounds from the eastern Pacific Ocean that a dolphin called the false killer whale makes.

To confirm the identifications, the researchers now need to compare their computer-generated categories against surface observations of these dolphins, Frasier says.

The algorithm’s click classes may not match up with dolphin species one-to-one, says Baumann-Pickering. If that were the case, “we would expect to see a heck of a lot more categories, really, based on the number of species that ought to be in that area,” she says. That absence suggests that some closely related species produce highly similar clicks the algorithm didn’t tease apart.

Still, “it would be great to be able to confidently assign certain species to each of the different click types, even if more than one species is assigned to a single click type,” says Lynne Hodge, a marine biologist at Duke University who wasn’t involved in the work. More precisely monitoring dolphins with seafloor recordings could provide new insight into how these animals respond to environmental problems such as oil spills and the long-term effects of climate change.

CITATIONS

K. Frasier *et al.* [Automated classification of dolphin echolocation click types from the Gulf of Mexico](#) *PLoS Computational Biology*. Published online December 7, 2017. doi: 10.1371/journal.pcbi.1005823.

FURTHER READING

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S. Perkins. [Learning to listen](#). *Science News*. Vol. 167, May 14, 2005, p. 314.

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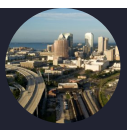
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An algorithm uncovered the new types of echolocation sounds among millions of underwater recordings from the Gulf of Mexico. LISTENING IN A computer code picked out six new types of dolphin clicks from several months' worth of underwater sound recordings.

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