Orcasound: A citizen science tool for whale research

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A crucial part of studying southern resident killer whales is finding them and quickly alerting experts to send boats out to collect fecal samples or prey fragments to better understand what the whales are eating.

Hydrophones, underwater microphones used to locate whales, are especially useful at night or in poor weather when sighting networks are ineffective. Computer algorithms are playing a growing role in analyzing hydrophone audio data, but human listeners can complement and enhance these algorithms.

A research project known as Orcasound has produced a web application that will enable citizen scientists to listen to livestreaming audio from hydrophones near the San Juan Islands to identify killer whales and other novel sounds.

Scott Veirs, a bioacoustian based in Seattle and lead researcher of the Orcasound project, will describe the new web app and the value of citizen science at the Acoustical Society of America's 176th Meeting, held in conjunction with the Canadian Acoustical Association's 2018 Acoustics Week in Canada, Nov. 5-9 at the Victoria Conference Centre in Victoria, Canada.

Citizen scientists have been useful at detecting whales and noticing unusual activity, such as the presence of other animals or noise from shipping traffic. The aim of Orcasound is to provide an inexpensive and user-friendly way for people interested in the study and conservation of

marine life to participate in research, Veirs said. The question at the heart of the project, he added, is how to organize and train people listening to the streaming audio to be better detectors of whales. The Orcasound project also saves audio data to online cloud storage servers for later analysis—by both humans and algorithms.

Each node in the network uses an inexpensive Raspberry Pi computer with additional audio hardware. The computers run the Linux operating system and open-source software to encode and send audio using standard data formats made popular by online video streaming services like YouTube. This minimizes costs while maximizing browser compatibility and ease of use. "We want to make it really easy for citizen scientists to listen to signals," said Veirs.

Future versions of the app will feature a button that users can click when they hear something interesting, which will help annotate the data for algorithms to analyze later. Although there may be somewhat of a friendly rivalry between machines and humans in this arena, the Orcasound app aims to bring synergy between citizen scientists and sophisticated algorithms.

  More information: Presentation #2pAO1, "Orcasound app: An open-source solution for streaming live ocean sound to citizen scientists and cloud-based algorithms," by Scott Veirs will be take place Tuesday, Nov. 6, 1:00 p.m. in the Esquimalt room of the Victoria Conference Center in Victoria, British Columbia, Canada. More information on the project can be found at www.orcasound.net

Provided by Acoustical Society of America