

Shining a light on the global fishing industry

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Dal Biology PhD student Kristina Boerder contributed to the development of Global Fishing Watch, a website that uses satellite data to enable the public to track fishing activity in near real-time. Credit: Matt Reeder

Over-harvesting and illegal fishing have left some fish stocks around the world on the brink of collapse. Experts and the public alike know this, but they don't often see it.

Kristina Boerder, a PhD student in Biology at Dal, is helping us see. She is involved with [Global Fishing Watch](#) (GFW), a website that uses satellite data from automatic identification systems (AIS) to enable the public to track fishing activity anywhere in the world in near real-time for free.

A joint project between tech giant Google and advocacy organizations Oceana and Skytruth, the website allows users to see how individual fishing vessels move across the globe. By making AIS data publicly accessible, people or organizations or even countries that cannot afford this kind of data have a chance to ask and answer questions about fisheries, a traditionally non-transparent industry.

Soon, the technology will become even more transparent thanks to an algorithm developed by Boerder and colleagues in Dal's Faculty of Computer Science. The algorithm uses the giant set of AIS data to identify the types of fishing activity. It is able to do so because different types of fishing methods exhibit distinct behaviours—that is, distinct patterns of movement and speed.

The idea for the algorithm first came to Kristina when she was beginning to investigate the global distribution of fishing effort and how it relates to conservation issues and measure like [marine protected areas](#) (MPAs).

"We had the question, we had the data" she says, "but we didn't have the tool to answer the question."

So she developed the algorithm with help from Canada Research Chair Stan Matwin (below) and his Institute of Big Data Analytics. Together with Dr. Matwin's post-doctoral fellow Erico de Souza, Boerder looked at the characteristic behaviours of vessels and tailor-made algorithms to automatically classify the behaviour of the vessels.

For example, a trawler moves in straight lines and sandwiches slow trawling speeds in between faster steaming speeds, whereas a purse seiner moves in circles at high speeds to set a net around its fish and then drifts slowly while hauling the net in. It is rather like tracking animal movement and behaviour.

"We were aware that they are different species, because they behave differently, they are not the same types of animals," says Boerder.

The collaboration soon expanded beyond Dalhousie. Boerder teamed up with Skytruth, a non-profit group that uses satellite imagery and remote sensing data to monitor threats to Earth's natural resources. Together, they pooled their efforts to further develop the algorithm and Global Fishing Watch.

Boerder is very happy with the collaboration. "We didn't want to have this develop in an academic bubble. We want to see this applied," she says.

Ultimately, sharing and collaboration is what the project is all about. By sharing the AIS data with the public, not only can seafood suppliers and consumers track the vessels they buy fish from, but they can also see the sheer scale of fishing occurring around the globe, recognize previously unnoticed patterns of fishing behaviour, and maybe ask some questions about it themselves. By allowing the public to see, the website offers them the power to participate in science and the power to make changes.

Boerder hopes that the Canadian government can make some changes, too. Presently, AIS transponders are not mandatory for fishing vessels operating in Canada. By passing legislation to ensure that all vessels have operating and untampered transponders, Canada can help improve the quality of data offered on GFW, so that the quality of answers to questions posed can also be enhanced.

Provided by Dalhousie University

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