Machine Learning in Marine Bioacoustics

- Cost reduction to Passive Acoustic Monitoring (PAM) systems is changing the way marine research is done

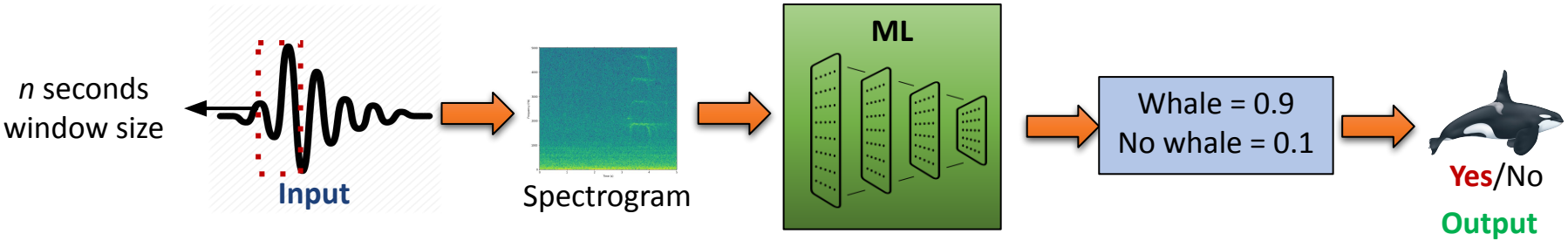
- Massive amounts of data are being generated
  - Easily exceeds our capacity for manual analysis

Machine Learning (ML) can help us solve this problem

Why ML for Passive Acoustic Monitoring?

- **Real-time or near real-time detection** of marine mammals are needed to **protect endangered species**.
- **Robust automated ML-based monitoring systems** are needed to **improve the performance of detection software**.
- **Trained ML models are easily scalable.** Performance also **increases with more training data**, making it viable for Big Data from numerous PAM systems.

Use of Machine Learning in Ocean Science



- A multi-disciplinary team is essential in building a curated dataset to train ML models

False Positives are currently the biggest challenge: Negative examples predicted incorrectly as positive

- Goal is to develop a Machine learning system that is able to support marine researches, NGOs and conservationists

See more of our Projects!

www.meridian.cs.dal.ca

References

- Ketos - Underwater acoustic detection and classification with deep neural networks. https://docs.meridian.cs.dal.ca/ketos/
- Kirsebom, O. S., *et al* (2020). " Performance of a deep neural network at detecting north atlantic right whale upcalls," J. Acoust. Soc. Am. **147**(4), 2636–2646. https://doi.org/10.1121/10.0001132
- Gervaise, C., *et al*. (2019a). *Optimal Passive Acoustic Systems for Real-Time Detection and Localization of North Atlantic Right Whales in Their Feeding Ground off Gaspé in the Gulf of St. Lawrence* (Department of Fisheries and Oceans, Ottawa, Canada).

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