ONC-MERIDIAN Joint Passive Acoustics Workshop Series Summary

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Overview

Two 2-day workshops hosted at Ocean Networks Canada

1. Developing Standards for Annotating & Storing Marine Passive Acoustic Data & Metadata

- Agenda by ONC

2. Detection and classification in marine bioacoustics with Deep Learning – from academic exercises to practical tools

- Agenda by MERIDIAN

~30% attendance turnover between workshops, with more metadata specialists in workshop 1 and more deep learning specialists in workshop 2

Developing Standards for Annotating & Storing Marine Passive Acoustic Data & Metadata

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Goals:

- Facilitate knowledge- and methods- sharing

- Inform participants of pros and cons of existing metadata schemas

- Identify crucial information to include in metadata to maximize dataset reusability

- Identify what methods and information should be standard vs. remain flexible

- Form voluntary working groups to continue work on standardization

- Produce recommendations which will guide development of ONC's new passive acoustic data annotation environment

Developing Standards for Annotating & Storing Marine Passive Acoustic Data & Metadata

Attendees:

- 26 attendees

- Representatives from ONC, MERIDIAN, JASCO, DFO-West, DFO-East, NOAA, APL, OSmOSE, SDSU, and OrcaSound

- Expertise in marine mammal research, passive acoustics, classical machine learning, deep learning, and metadata

Structure:

- Morning: presentations

- Afternoon: breakout discussion sessions

OCEAN NETWORKS CANADA

Developing Standards for Annotating & Storing Marine Passive Acoustic Data & Metadata

Outcomes:

- Extensive preliminary recommendations for minimum requirements and best practices for annotating passive acoustic data, both manually and when using detectors

    - Recommendations will maximize cross-disciplinary and cross-project usefulness of annotated data sets

- Development of a plan to standardize poorly defined call types and preliminary recommendations for how to annotate these call types in the interim

- Extensive recommendations for useful metadata to include with passive acoustic data sets, which could be assembled into a best practices guide

- Participants invited to join ANSI working group on passive acoustic data standards through Marie Roch

- 2 new working groups:

    - Call type vocabulary standardization

    - Marine passive acoustic detector/classifier development, use, and reporting standardization

Detection and classification in marine bioacoustics with Deep Learning – from academic exercises to practical tools

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Goals:

- Provide attendees with basic understanding of Deep Learning

- Review existing examples of Deep Learning applications to marine bioacoustic classification problems

- Assess potential of Deep Learning compared to other detection and classification methods

- Introduce attendees to MERIDIAN's open source, Deep Learning package "Ketos"

- Discuss challenges that must be overcome for Deep Learning to become widely adopted

Detection and classification in marine bioacoustics with Deep Learning – from academic exercises to practical tools

Attendees:

- 27 attendees

- Representatives from ONC, MERIDIAN, JASCO, DFO-West, DFO-East, NOAA, APL, SDSU, OrcaSound, SFU, Axiom Data Science, Cornell, Google, and OrcaLab

- Expertise in marine mammal research, passive acoustics, classical machine learning, and deep learning

Structure:

- Morning: presentations

- Afternoon: presentations and panel discussions

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Detection and classification in marine bioacoustics with Deep Learning – from academic exercises to practical tools

Outcomes:

- Bi-directional knowledge transfer

  - Marine mammal scientists learned about Deep Learning and existing tools to make Deep Learning more accessible to them

  - Deep Learning experts learned about common issues rarely considered when computer scientists apply learning techniques to labelled passive acoustic data (the violation of the assumption of sample independence has far-reaching consequences)

- Useful connections

  - Opportunity for ONC to work with Google AI For Social Good on classifying ONC acoustic data
  - New collaborations between many participants

Questions?