The Ketos Deep Learning Python Package

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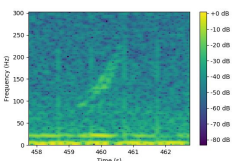
neural network architectures

audio processing

AI-based acoustic detectors/classifiers
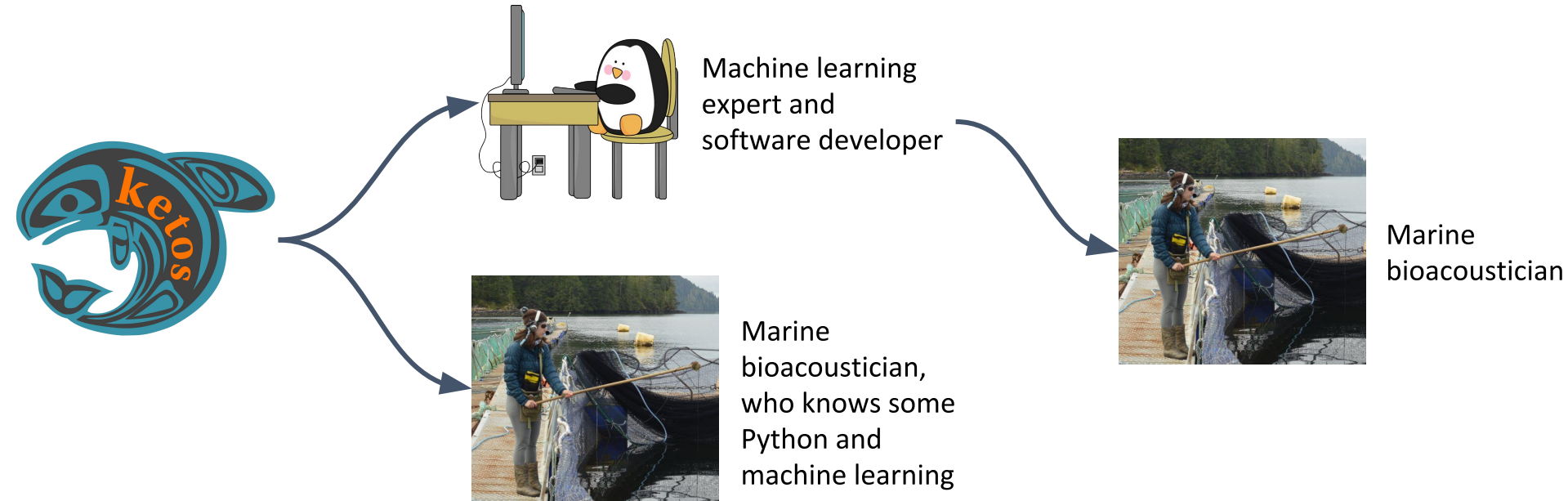
Annotations

Training Database
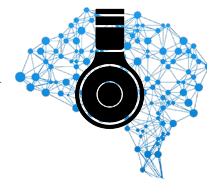
Training methods

- In Ancient Greek, *ketos* denotes a large fish, whale, shark, or sea monster.

- *ketos* is also the origin of the scientific term for whales, cetacean.

Ketos - who is it for ?

Machine learning expert and software developer

Marine bioacoustician, who knows some Python and machine learning

Marine bioacoustician

Neural network adaptation to new data

Pre-trained network
The Deep Neural Network detects sounds and proposes classifications.

Validation
A human analyst validates the network's detections and classifications.

Improved training data
The new validated examples are added to the network's pool of training data.

Enhanced performance
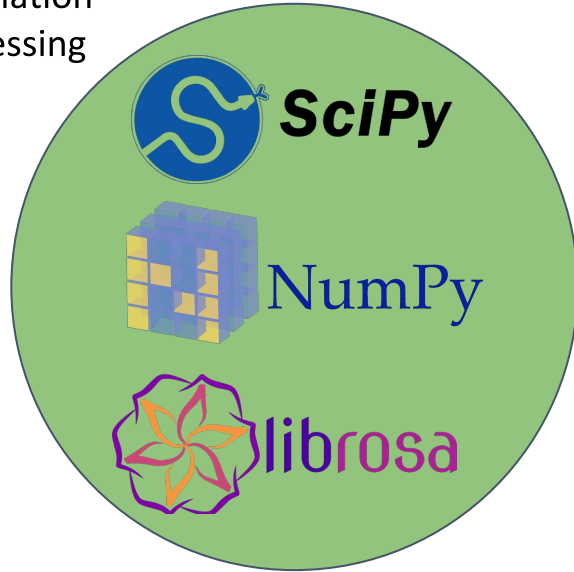The human analyst can now retrain the neural network to improve its performance.

p. 144-145:
"Towards Versatile and Adaptive Detection Algorithms in Underwater Acoustics"
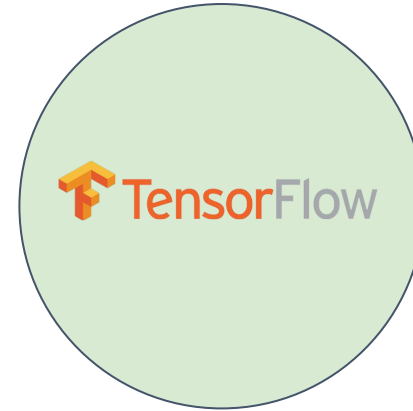
Main building blocks

1. Audio data
manipulation
& processing

3. Machine Learning
esp. Neural Networks

2. Data handling
& storage

GPLv3
Free Software

Free as in Freedom

copyleft license

- Written in Python

- GNU GPLv3 license - freely available to use and modify

- Hosted on GitLab:
  https://gitlab.meridian.cs.dal.ca/public_projects/ketos

- Fully documented code, including examples:
  https://docs.meridian.cs.dal.ca/ketos/

- Tutorials, version history, and more ...

- Available on the Python Package Index (PyPi) - the official third-party software repository for Python
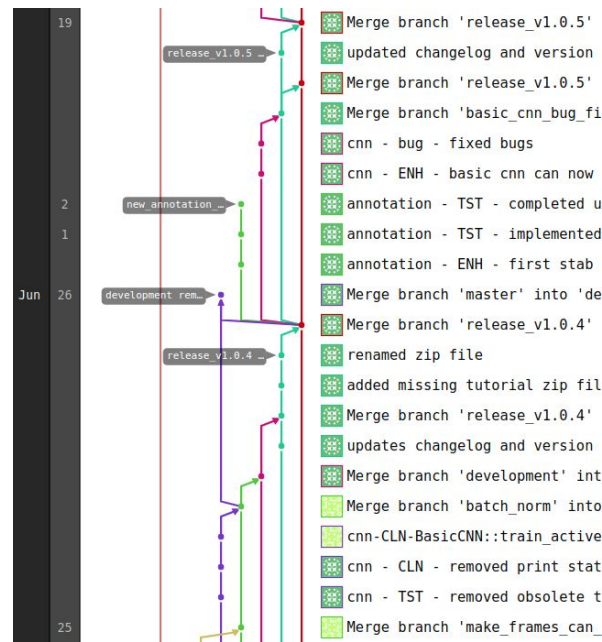
Documentation - https://docs.meridian.cs.dal.ca/ketos/

Key features

- Version control and backup

- Branches, merge requests, etc.

- Unit tests & Continuous Integration (CI)

- Issue list

- Wiki pages

- and more ...

https://gitlab.meridian.cs.dal.ca/public_projects/ketos
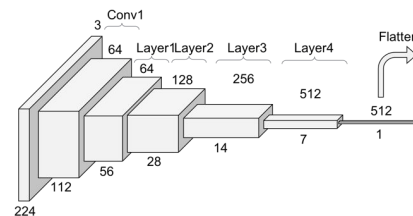
Hands-on tutorial

- Friday morning 8.30 - 10.00

- Optional

- Detect North Atlantic right whale (NARW) upcalls using tools from MERIDIAN's Deep Learning Python package, Ketos.

- Acoustic recordings from the Gulf of St. Lawrence, made available by Yvan Simard's research group at University of Québec at Rimouski.

- Familiarity with basic programming concepts such as functions, loops, if statements, etc. would be an advantage.

- If you wish to participate, please go to:

  https://gitlab.meridian.cs.dal.ca/workshops/victoria_nov2019

  and try to install the necessary software.
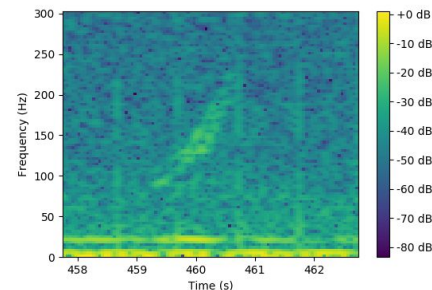
NARW upcall recorded by DFO scientists in the Emerald Basin off the coast of Nova Scotia

ResNet deep neural network