Right Whale Detection Challenge

Other Approaches

Deep learning (a convolutional neural network) of the image of spectrogram and treat it as an image handwriting recognition.

Python - scikit-learn, SciPy, NumPy for data analysis
Classifiers - gradient boosting and random forest and SVMs

Winning Algorithms

multiple template matching approach
Viterbi algorithm

Future

Use Bank scale (psychoacoustic) instead of Mel scale (perceptual scale of pitches - octaves)

- flatten the matrix and random forest gave 0.97
- By using an ensemble of random forests built on small local substrates got 0.93 / 0.94
- With template matching (test 400 templates based on individual performance on a small validation set) selected one subtype (mean amplitude > mean) per right whale call I reached 0.975
- At the end I used the ordering information and finished with 0.975

Labeled positive even though spectrogram looks negative due to:
- low signal - noise ratio
- from non-biological source

Labeled negative even though spectrogram looks positive:
- portion of humpback whale's call
- from different species

SluiceBox - 0.98384 (70 entries)
 strife - 0.95759 (27 entries)
Right Whale Detection Challenge
Received the docs and source codes from both winners. Now building the new automated right whale detection-classification system (run for 44 months)
Both winning teams used tight-boxing a spectrogram

Set of features for each tight box
Temporal ordering of labeling

=> consecutive positives

Winning Algorithms

multiple template matching approach

Viterbi algorithm
Other Approaches

Deep learning (a convolutional neural network) of the image of spectrogram and treat it as an image handwriting recognition.

Python - libraries Sci-Kit-learn, Sci-py, Num-py for data analysis
Classifiers - gradient boosting and random forest and SVMs
Labeled **positive** even though spectrogram looks **negative** due to:

- low signal-noise ratio
- from non-biological source

labeled **negative** even though spectrogram looks **positive**

- portion of humpback whales up-call
- from diff species
Use Bark scale (psychoacoustic) instead of Mel scale (perceptual scale of pitches - octaves)

- Flatten the matrix and random forest gave 0.917
- By using an ensemble of random forests built on small local submatrixes got 0.93-0.94
- With template matching (best 400 templates based on individual performance on a small validation set) selected one subpic (mean_amplitude -> max) per right whale call I reached 0.970
- At the end I used the ordering information and finished with 0.973
Apply top two winning methods, along with other methods developed in the Bioacoustic Research and also deep learning and computer-vision-based techniques

Future