

Northeast Atlantic Classifiers

Description

This folder contains two Random Forest classifiers (one for clicks and one for whistles) for six commonly occurring northeast Atlantic delphinid species. These classifiers were trained with data collected from dipped hydrophones and towed hydrophone arrays deployed in combined visual and acoustic surveys. Only recordings of single species groups that had visual confirmation of species identity and were at least 4 nmi from any other species were included in the training dataset. The species included in the classifier are shown in the below table.

Species	Common name	Classifier code
<i>Delphinus delphis</i>	Short-beaked common dolphin	Dde
<i>Grampus griseus</i>	Risso's dolphin	Ggr
<i>Globicephala melas</i>	Long-finned pilot whale	Gme
<i>Lagenorhynchus albirostris</i>	White-beaked dolphin	Lal
<i>Orcinus orca</i>	Killer whale	Oor
<i>Tursiops truncatus</i>	Common bottlenose dolphin	Ttr

Model parameters

The whistle classifier contains 1,000 decision trees and the following 48 attributes. It was trained using 1,783 whistles from 79 spatiotemporally independent acoustic encounters.

- FREQMAX: highest frequency of the contour [Hz]
- FREQMIN: lowest frequency of the contour [Hz]
- DURATION: duration of the contour [s]
- FREQBEG: frequency of the first point of the contour [Hz]
- FREQEND: frequency of the last point of the contour [Hz]
- FREQRANGE: FREQMAX - FREQMIN [Hz]
- FREQMEAN: mean frequency of the contour [Hz]
- FREQSTDDEV: standard deviation of the frequency points in the contour
- FREQMEDIAN: median frequency of the contour [Hz]
- FREQCENTER: (FREQMIN+FREQMAX)/2 [Hz]
- FREQRELBW: (FREQMAX-FREQMIN)/FREQCENTER
- FREQMAXMINRATIO: FREQMAX/FREQMIN
- FREQBEGENDRATIO: FREQEND/FREQBEG
- FREQUARTER1: 25th percentile of the frequency points [Hz]
- FREQUARTER2: 50th percentile of the frequency points [Hz]
- FREQUARTER3: 75th percentile of the frequency points [Hz]
- FREQSPREAD: FREQUARTER3 - FREQUARTER1 [Hz]
- FREQCOFM: coefficient of frequency modulation
- FREQSTEPUP: number of contour steps up

- FREQSTEPDOWN: number of contour steps down
- FREQNUMSTEPS: FREQSTEPUP+ FREQSTEPDOWN
- FREQSLOPEMEAN: mean of the slopes in the contour [Hz/s]
- FREQABSSLOPEMEAN: mean of the abs(slope) values [Hz/s]
- FREQPOSSLOPEMEAN: mean of the positive slopes [Hz/s]
- FREQNEGSLOPEMEAN: mean of the negative slopes [Hz/s]
- FREQSLOPERATIO: FREQPOSSLOPEMEAN/ FREQNEGSLOPEMEAN
- FREQBEGSWEEP: the sweep of the beginning of the contour. Can be 0 (down sweep), 1 (flat) or 2 (up sweep)
- FREQBEGUP: whether the beginning sweep of the contour has a positive slope. Binary: 0 (no) or 1 (yes)
- FREQBEGDWN: whether the beginning sweep of the contour has a negative slope. Binary: 0 (no) or 1 (yes)
- FREQENDSWEEP: the sweep of the ending of the contour. Can be 0 (down sweep), 1 (flat) or 2 (up sweep)
- FREQENDUP: whether the ending sweep of the contour has a positive slope. Binary: 0 (no) or 1 (yes)
- FREQENDDWN: whether the ending sweep of the contour has a negative slope. Binary: 0 (no) or 1 (yes)
- NUMSWEEPSUPDWN: number of times an up sweep is followed by a down sweep
- NUMSWEEPSDWNUP : number of times a down sweep is followed by an up sweep
- NUMSWEEPSUPFLAT: number of times an up sweep is followed by a flat
- NUMSWEEPSDWNFLAT : number of times a down sweep is followed by a flat
- NUMSWEEPSFLATUP : number of times a flat is followed by an up sweep
- NUMSWEEPSFLATDWN : number of times a flat is followed by a down sweep
- FREQSWEEPUPPERCENT: percentage of the sweeps that are up sweeps
- FREQSWEEPDOWNPERCENT: percentage of the sweeps that are down sweeps
- FREQSWEEPFLATPERCENT: percentage of the sweeps that are flat
- NUMINFLECTIONS: number of inflection points
- INFLMAXDELTA : longest time between inflections [s]
- INFLMINDELTA: shortest time between inflections [s]
- INFLMAXMINDELTA: INFLMAXDELTA/ INFLMINDELTA
- INFLMEANDELTA: mean time between inflections [s]
- INFLSTDDEVDELTA: standard deviation of the time between inflections [s]
- INFLMEDIANDELTA: median time between inflections [s]
- INFLDUR: NUMINFLECTIONS/DURATION [counts/s]
- STEPDPUR: FREQNUMSTEPS/DURATION [counts/s]

The click classifier contains 1,000 decision trees and the following 14 attributes. It was trained using 1,963 clicks from 70 spatiotemporally independent acoustic encounters.

- DURATION: duration [s]

- FREQCENTER: mean frequency [Hz]
- FREQPEAK: peak frequency [Hz]
- BW3DB: -3dB bandwidth [Hz]
- BW3DBLOW: -3dB bandwidth lower limit [Hz]
- BW3DBHIGH: -3dB bandwidth upper limit [Hz]
- BW10DB: -10dB bandwidth [Hz]
- BW10DBLOW: -10dB bandwidth lower limit [Hz]
- BW10DBHIGH: -10dB bandwidth upper limit [Hz]
- NCROSSINGS: number of zero crossings
- SWEEP RATE: sweep rate of the zero crossings [kHz/ms]
- MEANTIMEZC: mean time between zero crossings [ms]
- MEDIANTIMEZC: median time between zero crossings [ms]
- VARIANCETIMEZC: variance of the time between zero crossings [ms²]

Support and guidance for using the ROCCA module can be found at

https://www.navy-marine-species-monitoring.us/files/5413/9422/0614/Rocca_User_Manual_Revised_FINAL.pdf.

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