

Software Tools for Analysis of Data from High-Resolution Animal-Borne Tags

Ye Joo Oh and David Sweeney (Supervised by Stacy DeRuiter), Calvin College, Grand Rapids, Michigan



Project Background

Bio-logging studies with high-resolution movement-sensors offer opportunities to observe animal behavior in unprecedented detail, but analysis of the resulting data is often complex, and there is a need for freely available, easy-to-use, flexible, well-documented software tools to facilitate analysis and interpretation.

We introduce a new open-source tool kit for processing data from tags with high-resolution movement sensors.

Examples of Tags:

- DTAG, CATS, Acousonde, DailyDiary, etc.



Photo of a CATS tag on a whale shark.
<http://www.cats.is/wp-content/uploads/2015/10/Whaleshark-with-CatsCam.jpg>



Photo of a DTAG being attached to a Cuvier's beaked whale (*Ziphius cavirostris*) in the Ligurian Sea, Italy.
https://www.soundtags.org/files/2012/05/tagging1_small.jpg

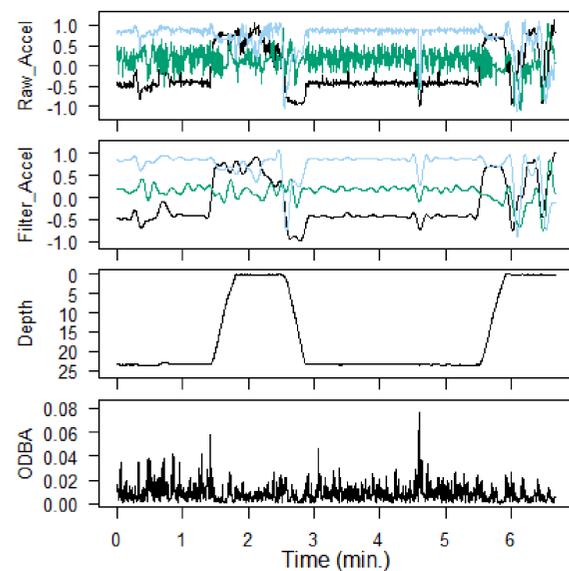
Software Tools Overview

Primary Research Tasks:

- Translating developed tools into all three software program languages
 - Matlab, Octave, R
- Developing new tools to include in the tagtools package
- Developing and enhancing help documentation for all tools

Types of Tools:

- Reading and writing data
- Calibration and writing data
- Data processing and visualization
- Statistical Analysis



Documentation

A wiki with detailed documentation of all tools, software downloads, tutorials, example datasets, workshop information, and more is at www.animaltags.org.

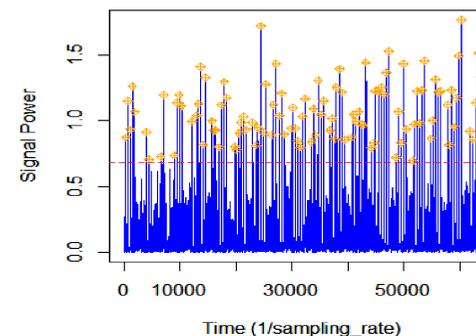
Event Detection

Purpose of detect_peaks:

- Allow for the automated detection of animal behavioral events from signal vector data

Current Research Applications:

- Detecting rorqual lunge-feeding events from norm-jerk signals
- Detecting dolphin foraging events from norm-jerk signals



Tag Metadata

- Tag metadata contains additional information about a tag including but not limited to:
 - Location/time of tag deployment
 - Tag type
- A simple interface for appending tag metadata to a dataset is provided in the tool kit
- The metadata_editor combines metadata automatically culled from the tag data files with user-input to a html metadata form, producing a completed tag metadata html file

Tag Metadata Form

Open from previously uploaded csv
Choose File | No file chosen | Open from CSV

All fields with * should be completed

Device Information | Tag and Animal Information | Timezone and Time Information | Locality Information | Project Information | Provider Information | Citation Information

Tag and animal information
Catalogue ID, Band ID or Flipper Tag ID (optional):
Describe how the tag was attached (e.g. glued, implanted, suction cups):
Common name of species: *
Scientific name: *
Save as: (file name):
Save

Workshops

University of St. Andrews

Our summer concluded with a three day introductory workshop at the University of St. Andrews. It was attended by 30 participants representing 7 countries and 18 home institutions.



Group photo of all who participated in our August 2017 workshop at the University of St. Andrews.

Future Workshops:

- A second workshop is planned for October 2017 at Aarhus University in Denmark.
- A third, one-day workshop, will take place at the Society for Marine Mammalogy Conference in Halifax, Nova Scotia, Canada in October 2017.

Software Repositories

Development versions of the tool kit are available from www.animaltags.org (past workshops section) and from github.com/stacyderuiter/TagTools. The R package can be installed from github and will be distributed via CRAN soon.

Acknowledgements



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