
bootstrapping Documentation

Release 0.1.2

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Dec 24, 2017

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Contents:

Statistical Library for Bootstrapping

- Free software: MIT license
- Documentation: <https://bootstrapping.readthedocs.io>.

1.1 Resources

General Resources:

1. *What Teachers Should Know About the Bootstrap* <<http://amstat.tandfonline.com/doi/full/10.1080/00031305.2015.1089789#.Wj7t>>
2. *Introduction to the Bootstrap* <<https://www.amazon.com/Introduction-Bootstrap-Monographs-Statistics-Probability/dp/0412042312>> 2. *When the bootstrap doesn't work* <<http://notstatschat.tumblr.com/post/156650638586/when-the-bootstrap-doesnt-work>> 3. *Second Thoughts on the Bootstrap* <<http://finmath.stanford.edu/~ckirby/brad/papers/2003SecondThoughts.pdf>>
3. *Bootstrap Confidence Intervals* <https://projecteuclid.org/download/pdf_1/euclid.ss/1032280214>
3. *TODO: Statistics: Unlocking the Power of Data* <<https://www.wiley.com/en-us/Statistics%3A+Unlocking+the+Power+of+Data-p-9780470601877>> 4. *TODO: Bootstrap Methods and their Application* <<http://www.cambridge.org/asia/catalogue/catalogue.asp?isbn=9780521574716>> 5. *TODO* (A lot of goodies in here, probably to be checked out once the basics are done) *Bootstrap Methods with Applications to R* <http://www.ievbras.ru/ecostat/Kiril/R/Biblio/R_eng/Chernick2011.pdf>

Code Resources Python <<https://github.com/facebookincubator/bootstrapped/tree/master/bootstrapped>> Julia <<https://github.com/juliangehring/Bootstrap.jl>> Simple Python <<https://github.com/christopherjenness/bootstrap/tree/master/bootstrap>> This one is pretty deep, will be good to go through once other features have been implemented R <<https://github.com/christopherjenness/bootstrap/tree/master/bootstrap>>

1.2 Features

1.2.1 Sampling procedures

Make parallel. Make sparse??

Good stuff *here* <<https://github.com/facebookincubator/bootstrapped/tree/master/bootstrapped>> for checking out thread safe plus sparse arrays.

Though the initial implementation should be thread safe iterators that can be materialized into sparse representations of the original data. You should be able to yield batches as well.

To do the more complicated sampling methods we can see *Julia* <<https://github.com/juliangehring/Bootstrap.jl>>

1. With/without replacement
2. Antithetic resampling
2. Balanced random resampling
2. Exact resampling, iterating through all unique resamples
2. Resampling of residuals in generalized linear models (question on whether to do this here or with the regressions below)
 2. Jackknife... Maybe this should just be joined with the more complex methods
 3. Parametric sampling

1.2.2 Sampling Statistics

1. Standard Error
2. Bias estimates

1.2.3 Confidence Intervals

For these we can see *Julia* <<https://github.com/juliangehring/Bootstrap.jl>>

1. Student t intervals
2. Normal intervals
3. Percentile Intervals
4. BCA
5. ABC

1.2.4 Regression

1.2.5 Tests

Permutation Tests Bootstrap Hypothesis Testing Power calculations Good stuff *here* <<https://github.com/facebookincubator/bootstrapped/tree/master/bootstrapped>> This will be useful for checking out the visualizations they include with the power calc

1.2.6 Calibration

1.2.7 General Features

- Optimize number of bootstrap replications with coef of var and time
- Time estimates of replications (on multiple cores)
- Estimates of error in bootstrap estimates (Intro to the Boot, 19)
- Efficiency: (Intro to the Boot, 23)

1.2.8 Meta Features

Perhaps have a general multisample tool, though looks like we might just be able to build it into specific areas above.

2.1 Stable release

To install bootstrapping, run this command in your terminal:

```
$ pip install bootstrapping
```

This is the preferred method to install bootstrapping, as it will always install the most recent stable release.

If you don't have `pip` installed, this [Python installation guide](#) can guide you through the process.

2.2 From sources

The sources for bootstrapping can be downloaded from the [Github repo](#).

You can either clone the public repository:

```
$ git clone git://github.com/knathanieltucker/bootstrapping
```

Or download the [tarball](#):

```
$ curl -OL https://github.com/knathanieltucker/bootstrapping/tarball/master
```

Once you have a copy of the source, you can install it with:

```
$ python setup.py install
```


CHAPTER 3

Usage

To use bootstrapping in a project:

```
import bootstrapping
```


Contributions are welcome, and they are greatly appreciated! Every little bit helps, and credit will always be given. You can contribute in many ways:

4.1 Types of Contributions

4.1.1 Report Bugs

Report bugs at <https://github.com/knathanieltucker/bootstrapping/issues>.

If you are reporting a bug, please include:

- Your operating system name and version.
- Any details about your local setup that might be helpful in troubleshooting.
- Detailed steps to reproduce the bug.

4.1.2 Fix Bugs

Look through the GitHub issues for bugs. Anything tagged with “bug” and “help wanted” is open to whoever wants to implement it.

4.1.3 Implement Features

Look through the GitHub issues for features. Anything tagged with “enhancement” and “help wanted” is open to whoever wants to implement it.

4.1.4 Write Documentation

bootstrapping could always use more documentation, whether as part of the official bootstrapping docs, in docstrings, or even on the web in blog posts, articles, and such.

4.1.5 Submit Feedback

The best way to send feedback is to file an issue at <https://github.com/knathanieltucker/bootstrapping/issues>.

If you are proposing a feature:

- Explain in detail how it would work.
- Keep the scope as narrow as possible, to make it easier to implement.
- Remember that this is a volunteer-driven project, and that contributions are welcome :)

4.2 Get Started!

Ready to contribute? Here's how to set up *bootstrapping* for local development.

1. Fork the *bootstrapping* repo on GitHub.
2. Clone your fork locally:

```
$ git clone git@github.com:your_name_here/bootstrapping.git
```

3. Install your local copy into a virtualenv. Assuming you have virtualenvwrapper installed, this is how you set up your fork for local development:

```
$ mkvirtualenv bootstrapping
$ cd bootstrapping/
$ python setup.py develop
```

4. Create a branch for local development:

```
$ git checkout -b name-of-your-bugfix-or-feature
```

Now you can make your changes locally.

5. When you're done making changes, check that your changes pass flake8 and the tests, including testing other Python versions with tox:

```
$ flake8 bootstrapping tests
$ python setup.py test or py.test
$ tox
```

To get flake8 and tox, just pip install them into your virtualenv.

6. Commit your changes and push your branch to GitHub:

```
$ git add .
$ git commit -m "Your detailed description of your changes."
$ git push origin name-of-your-bugfix-or-feature
```

7. Submit a pull request through the GitHub website.

4.3 Pull Request Guidelines

Before you submit a pull request, check that it meets these guidelines:

1. The pull request should include tests.
2. If the pull request adds functionality, the docs should be updated. Put your new functionality into a function with a docstring, and add the feature to the list in README.rst.
3. The pull request should work for Python 2.6, 2.7, 3.3, 3.4 and 3.5, and for PyPy. Check https://travis-ci.org/knathanieltucker/bootstrapping/pull_requests and make sure that the tests pass for all supported Python versions.

4.4 Tips

To run a subset of tests:

```
$ python -m unittest tests.test_bootstrapping
```


5.1 Development Lead

- 11. Nathaniel Tucker <k.nathaniel.tucker@gmail.com>

5.2 Contributors

None yet. Why not be the first?

6.1 0.1.0 (2017-12-19)

- First release on PyPI.

CHAPTER 7

Indices and tables

- `genindex`
- `modindex`
- `search`