HydroAnalysis

Release 0.0.0

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CONTENTS

HydroAnalysis is a Python package to calculate indices and metrics useful in the everyday job of an hydrologist.

The package is the result of the re-organization of code that I have used during my research and that I have decided to publish because of its supposed usefulness.

CHAPTER

ONE

GENERIC INTERFACE

Please refer to the docstrings of the single functions for documentation.

Generally all the functions have the same interface

```
def calculate_index_name(flux1, quality, flux2, fluxN, other_time_series):
    # code
```

where: - `flux1`, `flux2`, `fluxN` are fluxes needed to calculate the index/metric - `quality` is a vector that is used to signal time steps where the quality of the data is not good and, therefore, are not used to calculate the index/metric. - :code`other_time_series`: are other time series needed to calculate the index/metric. Example could be the season.

CHAPTER

TWO

FILES IN THE PACKAGE

- meteo_indices.py: contains the functions to calculate the indices related to meteorological data
- metrics.py: contains the functions to calculate the metrics related to the hydrological data
- streamflow_signatures.py: contains the functions to calculate the signatures related to the hydrological data
- utils.py: contains the functions used by the other files

CHAPTER

THREE

EXAMPLES

Examples of the usage of the package are not available yet. However, the code should be self-explanatory..just read carefully the docstrings.

CHAPTER

FOUR

TESTING

There is no systematic testing implemented here. However, the code has been manually tested against other available code (e.g., R code from Addor et al. (2017)) when possible.

CHAPTER

FIVE

YOUR CONTRIBUTION

Please feel free to contribute to the package. If you have any suggestion or you want to contribute to the documentation, please contact the author and have a look at the documentation page explaining how to do it.

CHAPTER

SIX

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6.1 Software organization and contribution

The HydroAnalysis framework comprises the following components:

- **Source code**: Latest version of all the code necessary to use the framework. The source code would normally be accessed only by advanced users, e.g. to understand the internal organization of the framework, to install manually the latest version, to extend the framework with new functionality, etc.
- **Packaged release**: Latest stable version of the framework available for users.
- **Documentation**: Detailed explanation of the framework.

The source code, documentation, and examples are part of the official repository of HydroAnalysis hosted on GitHub. A user who wishes to read the source code and/or modify any aspect of HydroAnalysis (source code, documentation, and examples) can do it using GitHub.

New releases of the software are available from the official Python Package Index (PyPI), where HydroAnalysis has a dedicated page.

The documentation builds automatically from the source folder on GitHub and is published online in Read the Docs.

6.1.1 Contributions

Contributions to the framework can be made in the following ways:

- Submit issues on bugs, desired features, etc;
- Solve open issues;
- Extend the documentation with new demos and examples;
- Extend and/or modify the framework;
- Use and cite the framework in your publications.

Code contribution by external users will be mainly additive (i.e., adding new components, as illustrated in build_element and customize_components) and should include also appropriate testing (tests).

Contributors will maintain authorship of the contributed code and are invited to include, in all files, their contact information to facilitate future collaboration. The authors and maintainers of HydroAnalysis will undertake a basic inspection of the contributed code to identify any quality issues.

The typical workflow that should be followed when contributing to a GitHub project is described here.

In summary, the following steps should be followed:

1. Fork the HydroAnalysis repository to the user GitHub account;

2. Clone the fork on the user computer;
3. Modify the code, commit the changes, and push them to the GitHub fork of HydroAnalysis;
4. Make a pull request on GitHub to the HydroAnalysis repository.

Branching scheme of the GitHub repository

Updates to HydroAnalysis are made directly in the branch `master`, which is the most up-to-date branch. The branch `release` is used only for the staging of new software releases and, therefore, code should not be pushed directly to it.

When a code update is merged from `master` to `release`, a new version of the package is automatically released on PyPI. Remember to update the version number in the `setup.py` file to avoid conflicts.

Developers are free to create new branches, but pull requests must be directed to `master` and not to `release`.

Documentation and examples are generated from the `master` branch.

6.2 License

```
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                       Version 3, 29 June 2007

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