ltf_catalog Documentation

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Giacomo Vianello (giacomov@stanford.edu)

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CHAPTER 1

ltf_catalog

Catalog parser for the LAT Transient Factory

1.1 Installation

Clone this repository with git:

```
git clone https://github.com/giacomov/ltf_catalog.git
```

Then go inside the repository and execute the setup:

```
cd ltf_catalog
python setup.py install
```

1.2 Usage

You will need a data file. At the moment, the LAT Transient Factory catalog is private and you need to be part of the Fermi Large Area Telescope collaboration to be able to access it.

Let's say that your data file is called "LTF_March24_2016.csv". Then you can load the catalog like this:

```
import ltf_catalog as ltf

c = ltf.get_catalog("LTF_March24_2016.csv")
```

Now you can get the catalog of detections as:

```
detections = c.get_catalog_of_detections()
```

By default the detections are selected requiring a final TS >= 25 and at least 3 events with a probability larger than 90% of belonging to the trigger. You can change these criteria. For example, the following will consider detections all triggers with a final TS >= 30 and at lest 10 events with a probability larger than 90% of belonging to the trigger:

```
custom_detections = c.get_catalog_of_detections("Final_TS >= 30","GRB_events >= 10")
```

Once you have your catalog of detections, you can loop over them by doing:

```
for trigger in detections.iteritems():

    [do your processing here]
```

So for example, this will print all the available information:

```
for trigger in detections.iteritems():

    for det in detections.iteritems():
        print("%s %s %s %s %s %s %s %s" %(det.name, det.trigger_time, det.date, det.gcn_type,
                                          det.get_longest_time_scale_with_detection(), det.time_scale_with_la
                                          det.maximum_TS, det.get_position_with_smallest_error()))
```

To see all methods and properties of the catalog and the triggers, see the API documentation at http://ltf-catalog.readthedocs.org/

CHAPTER 2

API

class ltf_catalog.**Catalog**(*data*)

data
Returns a numpy.ndarray containing the currently loaded data

get_catalog_of_detections(**criteria*)
Return a new catalog containing only the detections, according to the default criteria or the custom one specified during the call.

Examples:

Get the detections with the standard criteria (Final_TS >= 25 and GRB_Events >= 3):

> detections = c.get_catalog_of_detections()

Get the detections requiring a TS larger than 30 and more than 10 events:

> detections = c.get_catalog_of_detections("Final_TS >= 30","GRB_events >= 10")

get_trigger(*triggername*)
Returns the results relative to the provided trigger

iteritems()
Iterate through the loaded data, one trigger at the time.

triggers
Return the list of all the triggers

class ltf_catalog.**TriggerResults**(*name*, *windows*)

date
Returns the date in UTC format

Returns a string containing the date in UTC format

gcn_type
Returns the GCN_type, which can be used to figure out if this GRB belongs to the seed from the GBM, INTEGRAL, SWIFT and so on

Returns a string

get_longest_time_scale_with_detection(*TS=25*)
Returns the longest time scale among the time windows having a TS larger than TS

Parameters **TS** – threshold for claiming a detection (default : 25)

Returns the longest time windows

get_position_with_smallest_error(*TS=25*)
Returns the position with the smallest error among all the time scales where the candidate has a TS larger than the provided threshold

Parameters **TS** – threshold for TS (default: 25)

Returns a tuple (R.A., Dec, error), where the error is the 90% containment (statistical only)

maximum_TS
Returns the largest TS

Returns the maximum of TS

name
Return the trigger name

Returns trigger name

time_scale_with_largest_TS
Returns the time scale which resulted in the largest TS

Returns the time window with the maximum TS

trigger_time
Returns the trigger time

Returns the trigger time

windows
Returns the time windows for this trigger where the search has been successfully executed

Returns a list of time windows

ltf_catalog.**get_catalog**(*catalog_file*)
Load the catalog from the provided file

Parameters **catalog_file** – a comma-separated catalog file

Returns an instance of the Catalog class

CHAPTER 3

Indices and tables

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