timestreamlib Documentation

Release 0.0a

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1.1.1 Windows

Dependencies

- `Python 2.x`: You will need python 2.x. We have not tested with python 3.x. You can download for windows Here.

- `Qt for Python`: This is needed if you are going to run the timestreamlib GUI. Download it from here.

- `GIT`: Download it here.

- `pip-win`: To aid with pip install. Download it here.

- `numpy`: Here.

- `matplotlib`: Here.

- `scipy`: Here.

- `pip`: Here.

- `python-opencv`: Here.

- `netcdf4`: Here.

- `scikit-image`: Here.

- `python-dateutil`: Here.

- `pyyaml`: Here.

- `six`: Here.

- `pyparsing`: Here.

Installing timestreamlib

We use pip to install from our git repository. We suggest you install the master branch as it is more stable. You can also select the branch to install from by re-placing *master* with *next*. To run *pip install* execute *pip-win* and enter *pip install -e git://github.com/borevitzlab/timestreamlib@master#egg=timestreamlib* in the command prompt

1.1.2 Linux

Linux installation instructions

Timestream Format Specifications

The timestream format is a way of structuring image files that allows for simple, time-indexed, access to images in an image series. Traditionally (i.e. in version 1 timestreams) this has been a simple folder hierarchy. Moving forward (i.e. version 2 timestreams), timestreams will be stored in BagIt objects. This will allow more scalable storage of long time series.

2.1 The Timestream Format (Version 1)

A timestream refers to the root directory containing the folder hierarchy detailed below. A timestream may optionally contain a single file – `timestream.json` – containing the "manifest", a data structure defining certain timestream metadata.

2.1.1 Timestream Version 1 Folder Hierarchy

In the following diagram, folder levels are on different lines, parseable keywords are enclosed in `< >`, and `strptime`/`strftime` date format specifiers are used to represent date components. All other characters are literal.

```
<name>/
.     /%Y/
.        /%Y_%m/
.               /%Y_%m_%d/
.                        /%Y_%m_%d/
.                                 /%Y_%m_%d_%H/
.                                            /<name>_%Y_%m_%d_%H_%M_%S_<n>.<ext>
```

Named timestream parameters:

- `<name>`: Timestream name. May contain any ASCII character except ' ' (space) and '_' and any character which requires escaping on NTFS or EXT4 filesystems (mostly these: `/\$()[]{}^"'` `) and all non-printing characters.

- `<n>`: A sub-second counter. Valid values are `00-99`. Use `printf` specifier `%02d` or similar to format this field.

- `<ext>`: File extension of files in timestream. This must be uniform across all images in timestream. It must be three alphanumeric characters. It may be capitalised, and parsers should be case insensitive. Examples of valid formats include `JPG`, `png`, and `CR2`.

2.2 Timestream Manifests

The timestream manifest file is a file containing a, valid, parsable JSON object. The fields of this object are layed out below. All fields are required. Additionally, all fields must contain a valid value unless otherwise specified.

Key	JSON Type	Description
`name`	`string`	The name of the timestream. May contain any ASCII character except ' ' and '_' and any character which requires escaping on NTFS or EXT4 filesystems (mostly these: `/\$()[]{}^"'` `) and all non-printing characters.
`version`	`string`	The timestreams' version. Valid values are "1" and "2".
`start_datetime`	`string`	The first timepoint in the time series. This is encoded as a string using the following ISO 8601 format string: `%Y-%m-%dT%H:%M:%S%z`
`end_datetime`	`string`	The final timepoint in the time series. Encoded as a string per `start_datetime` above.
`image_type`	`string`	The image type of timestreams. This corresponds to the `<ext>` field discussed in *Timestream Version 1 Folder Hierarchy* .
`missing_images`	`array`	An array of timepoints at which no image exists, encoded as a string per `start_datetime` above. This array may be empty.
`bookmarks`	`array`	An array of objects containing descriptions of the bookmarks within the timestream. The format of these objects is described in *Bookmark Objects*.
`numeric_data`	`array`	An array of objects that describe optional numeric data files. The format of these objects is described in *Numeric Data Objects*.

2.2.1 Bookmark Objects

The format of a timestream bookmark object within the timestream manifest object is detailed below. All fields are required. Additionally, all fields must contain a valid value unless otherwise specified.

2.2.2 Numeric Data Objects

The format of a timestream numeric data object within the timestream manifest object is detailed below. All fields are required. Additionally, all fields must contain a valid value unless otherwise specified.

- TODO

Timestream Flask API

In the future, there will be a web API to access timestreams. This section will provide the specification for this, once written.

Indices and tables

- *genindex*
- *modindex*
- *search*