

twixreader: python reader for Siemens MRI raw data

Loosely based on mapVBVD (twix reader for matlab).

Warning: There are still a long list of missing features (e.g. protocol header information is currently not parsed), and the existing features are not tested very well.

Installation

Enter directory and type:

```
python setup.py install
```

You may require super-user privileges. If this is a problem, I suggest you to install anaconda in user-space.

Supported Files

Twix raw data files ('.dat') from Siemens' VB and VD/VE software lines are supported (including multi-raid files).

How to use?

Step 1: Parse file

Examples: * use filename (relative or full path to file)

```
from twixreader import Twix
twix = Twix(filename)
```

- use measurement ID (if unique and file in directory)

```
twix = Twix(10)
```

Twix() returns a list with one entry per measurement of a multi-raid file (a single entry if not multi-raid). Each entry in the 'twix' list consists of a python dictionary with entries for each raw data type that was found in the measurement (e.g. 'ima', 'noise', 'phasecor', ...):

```
print(twix)
```

```
Out[:]: [{'noise': <twixreader.twixreader.generic_twix_object at 0x7f56def3b518>},
{'noise': <twixreader.twixreader.generic_twix_object at 0x7f56def3b630>,
'refscan': <twixreader.twixreader.generic_twix_object at 0x7f56def3b358>,
'ima': <twixreader.twixreader.generic_twix_object at 0x7f56def3b3c8>}]
```

Step 2: Read data

Examples:

- All noise data from first scan

```
noise = twix[0]['noise'][:]
```
- All image data from second scan (multi-raid file):

```
imdata = twix[1]['ima'][:]
```
- All data for second phase-encoding line:

```
imdata = twix[1]['ima'][...,1,:]
```

Additional Features

- Control oversampling removal

```
twix[0]['ima'].args.removeOS = True
```
- Print dimension order of virtual array

```
print(twix[0]['noise'].dataDims)
```

```
Out: ['Ide', 'Idd', 'Idc', 'Idb', 'Ida', 'Seg', 'Set', 'Rep', 'Eco', 'Phs', 'Ave', 'Sli']
```
- Change order of virtual array (colfirst or collast)

```
print(twix[0]['noise'].shape)
```

```
Out: [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 1, 1, 128, 52, 256]
```

```
twix[0]['noise'].args.dataOrder = 'colfirst'
```

```
Out: [256, 52, 128, 1, 1, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
```
- Obtain all raw data in acquisition order:

```
twix[0]['ima'].raw()
```
- Obtain slice of raw data in acquisition order:

```
twix[0]['ima'].raw(slice(10, 50))
```
- Obtain information about line/partition acquisition order:

```
lin_order = twix[0]['ima'].lin
```

```
par_order = twix[0]['ima'].par
```

The rest of the measurement data header (mdh) information is stored as well in other member variables, such as 'ave', 'rep', 'sliceData', 'icePara', 'freePara',...

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