



stsci.imagestats Documentation

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`stsci.imagestats` is a package designed to compute various statistics on image data using sigma-clipping iterations. It is designed to replicate core behaviour of the IRAF's `imstatistics` task (<http://stdas.stsci.edu/cgi-bin/gethelp.cgi?imstatistics>).

1.1 Primary User Interface: ImageStats

Compute desired statistics values for input array objects.

Author Warren Hack, Christopher Hanley (for help, contact [HST Help Desk](https://hsthhelp.stsci.edu) (<https://hsthhelp.stsci.edu>))

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```
class stsci.imagestats.ImageStats (image, fields='npix, min, max, mean, stddev',  
                                     lower=None, upper=None, nclip=0, lsig=3.0,  
                                     usig=3.0, binwidth=0.1)
```

Class to compute desired statistics from array objects.

Parameters

image [str] input image data array.

fields [str] comma-separated list of values to be computed. The following are the available fields:

image	image data array
npix	the number of pixels used to do the statistics
mean	the mean of the pixel distribution
midpt	estimate of the median of the pixel distribution
mode	the mode of the pixel distribution
stddev	the standard deviation of the pixel distribution
min	the minimum pixel value
max	the maximum pixel value

WARNING Only those fields specified upon instantiation will be computed and available as an output value.

lower [float] Lowest valid value in the input array to be used for computing the statistical values

upper [float] Largest valid value in the input array to be used in computing the statistical values

nclip [int] Number of clipping iterations to apply in computing the results

lsig [float] Lower sigma clipping limit (in sigma)

usig [float] Upper sigma clipping limit (in sigma)

binwidth [float] Width of bins (in sigma) to use in generating histograms for computing median-related values

Notes

The mean, standard deviation, min and max are computed in a single pass through the image using the expressions listed below. Only the quantities selected by the fields parameter are actually computed.

```
mean = sum (x1, ..., xN) / N
y = x - mean
variance = sum (y1 ** 2, ..., yN ** 2) / (N-1)
stddev = sqrt (variance)
```

The midpoint and mode are computed in two passes through the image. In the first pass the standard deviation of the pixels is calculated and used with the *binwidth* parameter to compute the resolution of the data histogram. The midpoint is estimated by integrating the histogram and computing by interpolation the data value at which exactly half the pixels are below that data value and half are above it. The mode is computed by locating the maximum of the data histogram and fitting the peak by parabolic interpolation.

Warning This data will be promoted down to float32 if provided as 64-bit datatype.

Examples

This class can be instantiated using the following syntax:

```
>>> import stsci.imagestats as imagestats
>>> i = imagestats.ImageStats(image,
    fields="npix,min,max,mean,stddev",
    nclip=3,
    lsig=3.0,
    usig=3.0,
    binwidth=0.1
)
>>> i.printStats()
>>> i.mean
```


The statistical quantities specified by the parameter *fields* are computed and printed for the input *image* array. The results are available as attributes of the class object as well.

getCenters ()

Compute the array of bin center positions.

printStats ()

Print the requested statistics values for those fields specified on input.

1.2 histogram1d

A module that provides functionality to construct a 1-dimensional histogram from an array object.

Author Christopher Hanley (for help, contact [HST Help Desk](https://hsthhelp.stsci.edu) (<https://hsthhelp.stsci.edu>))

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class `stsci.imagestats.histogram1d.histogram1d` (*arrayInput*, *nbins*, *binWidth*,
zeroValue)
Populate a 1-dimensional histogram from 1D `numpy.ndarray` array.

Parameters

arrayInput [`numpy.ndarray`] 2D array object

nbins [`int`] Number of bins in the histogram.

binWidth [`float`] Width of 1 bin in desired units

zeroValue [`float`] Zero value for the histogram range

getCenters ()

Returns histogram's centers.

1.3 LICENSE

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