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PRIMARY USER INTERFACE: IMAGESTATS

```python
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 available fields are the following.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>image</td>
<td>image data array</td>
</tr>
<tr>
<td>npix</td>
<td>the number of pixels used to do the statistics</td>
</tr>
<tr>
<td>mean</td>
<td>the mean of the pixel distribution</td>
</tr>
<tr>
<td>midpt</td>
<td>estimate of the median of the pixel distribution</td>
</tr>
<tr>
<td>mode</td>
<td>the mode of the pixel distribution</td>
</tr>
<tr>
<td>stddev</td>
<td>the standard deviation of the pixel distribution</td>
</tr>
<tr>
<td>min</td>
<td>the minimum pixel value</td>
</tr>
<tr>
<td>max</td>
<td>the maximum pixel value</td>
</tr>
</tbody>
</table>

**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.

\[
\text{mean} = \frac{\text{sum} (x_1, \ldots, x_N)}{N} \\
y = x - \text{mean} \\
\text{variance} = \frac{\text{sum} (y_1^2, \ldots, y_N^2)}{(N-1)} \\
\text{stddev} = \sqrt{\text{variance}}
\]

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 \textit{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:

```python
>>> 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()
```

The statistical quantities specified by the parameter \textit{fields} are computed and printed for the input \textit{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.

```
class stsci.imagestats.histogram1d.histogram1d(arrayInput, nbins, binWidth, zeroValue)
```

Populate a 1 dimensional histogram from array object

```
getCenters()
```
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