

```
int cv::connectedComponentsWithStats ( InputArray   image,
                                     OutputArray labels,
                                     OutputArray stats,
                                     OutputArray centroids,
                                     int            connectivity,
                                     int            ltype,
                                     int            ccltype
                                     )
```

computes the connected components labeled image of boolean image and also produces a statistics output for each label

image with 4 or 8 way connectivity - returns N, the total number of labels [0, N-1] where 0 represents the background label. ltype specifies the output label image type, an important consideration based on the total number of labels or alternatively the total number of pixels in the source image. ccltype specifies the connected components labeling algorithm to use, currently Grana's (BBDT) and Wu's (SAUF) algorithms are supported, see the [cv::ConnectedComponentsAlgorithmsTypes](#) for details. Note that SAUF algorithm forces a row major ordering of labels while BBDT does not. This function uses parallel version of both Grana and Wu's algorithms (statistics included) if at least one allowed parallel framework is enabled and if the rows of the image are at least twice the number returned by `getNumberOfCPUs`.

#### Parameters

<b>image</b>	the 8-bit single-channel image to be labeled
<b>labels</b>	destination labeled image
<b>stats</b>	statistics output for each label, including the background label, see below for available statistics. Statistics are accessed via <code>stats(label, COLUMN)</code> where COLUMN is one of <a href="#">cv::ConnectedComponentsTypes</a> . The data type is CV_32S.
<b>centroids</b>	centroid output for each label, including the background label. Centroids are accessed via <code>centroids(label, 0)</code> for x and <code>centroids(label, 1)</code> for y. The data type CV_64F.
<b>connectivity</b>	8 or 4 for 8-way or 4-way connectivity respectively
<b>ltype</b>	output image label type. Currently CV_32S and CV_16U are supported.
<b>ccltype</b>	connected components algorithm type (see the <a href="#">cv::ConnectedComponentsAlgorithmsTypes</a> ).

## § connectedComponentsWithStats() [2/2]

```
int cv::connectedComponentsWithStats ( InputArray   image,  
                                     OutputArray labels,  
                                     OutputArray stats,  
                                     OutputArray centroids,  
                                     connectivity =  
                                     int           8,  
                                     int           ltype = cv_32S  
                                     )
```

This is an overloaded member function, provided for convenience. It differs from the above function only in what argument(s) it accepts.

### Parameters

- image** the 8-bit single-channel image to be labeled
- labels** destination labeled image
- stats** statistics output for each label, including the background label, see below for available statistics. Statistics are accessed via stats(label, COLUMN) where COLUMN is one of **cv::ConnectedComponentsTypes**. The data type is CV\_32S.
- centroids** centroid output for each label, including the background label. Centroids are accessed via centroids(label, 0) for x and centroids(label, 1) for y. The data type CV\_64F.
- connectivity** 8 or 4 for 8-way or 4-way connectivity respectively
- ltype** output image label type. Currently CV\_32S and CV\_16U are supported.

## § contourArea()