

imregionalmin

Regional minima

Syntax

```
BW = imregionalmin(I)
BW = imregionalmin(I,conn)
```

Description

BW = imregionalmin(I) returns the binary image BW that identifies the regional minima in grayscale image I. Regional minima are connected components of pixels with a constant intensity value, surrounded by pixels with a higher value.

example

BW = imregionalmin(I,conn) specifies the desired connectivity, conn.

Examples

collapse all

Find Regional Minima in Simple Sample Image

Create a simple sample array with several regional minima.

Try This Example

Copy Command

```
A = 10*ones(10,10);
A(2:4,2:4) = 3;
A(6:8,6:8) = 8
```

Get

A = 10x10

10	10	10	10	10	10	10	10	10	10
10	3	3	3	10	10	10	10	10	10
10	3	3	3	10	10	10	10	10	10
10	3	3	3	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	8	8	8	10	10
10	10	10	10	10	8	8	8	10	10
10	10	10	10	10	8	8	8	10	10
10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10

Calculate the regional minima. The function returns a binary image, the same size as the input image, in which pixels with the value 1 represent the regional minima. imregionalmin sets all other pixels in to 0.

```
regmin = imregionalmin(A)
```

Get

regmin = 10x10 logical array

```
0 0 0 0 0 0 0 0 0 0
0 1 1 1 0 0 0 0 0 0
0 1 1 1 0 0 0 0 0 0
0 1 1 1 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 1 1 1 0 0
0 0 0 0 0 1 1 1 0 0
0 0 0 0 0 1 1 1 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
```

Input Arguments

collapse all

▼ I – Grayscale image
numeric array


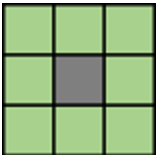
Grayscale image, specified as a numeric array of any dimension.

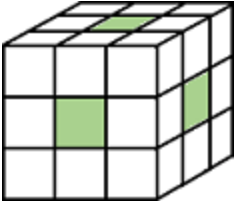
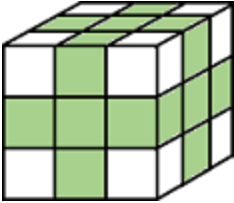
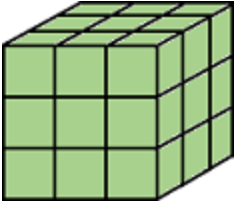
Example: I = imread('cameraman.tif');

Data Types: single | double | int8 | int16 | int32 | int64 | uint8 | uint16 | uint32 | uint64 | logical

▼ conn – Pixel connectivity
4 | 8 | 6 | 18 | 26 | 3-by-3-by- ... -by-3 matrix of 0s and 1s

Pixel connectivity, specified as one of the values in this table. The default connectivity is 8 for 2-D images, and 26 for 3-D images.

Value	Meaning	
Two-Dimensional Connectivities		
4	Pixels are connected if their edges touch. The neighborhood of a pixel are the adjacent pixels in the horizontal or vertical direction.	<div></div> <div>Current pixel is shown in gray.</div>
8	Pixels are connected if their edges or corners touch. The neighborhood of a pixel are the adjacent pixels in the horizontal, vertical, or diagonal direction.	<div></div> <div>Current pixel is shown in gray.</div>

Value	Meaning
Three-Dimensional Connectivities	
6	<div><div><div>Pixels are connected if their faces touch. The neighborhood of a pixel are the adjacent pixels in:</div><ul style="list-style-type: none">• One of these directions: in, out, left, right, up, and down</div><div><p>Current pixel is shown in gray.</p></div></div>
18	<div><div><div>Pixels are connected if their faces or edges touch. The neighborhood of a pixel are the adjacent pixels in:</div><ul style="list-style-type: none">• One of these directions: in, out, left, right, up, and down• A combination of two directions, such as right-down or in-up</div><div><p>Current pixel is center of cube.</p></div></div>
26	<div><div><div>Pixels are connected if their faces, edges, or corners touch. The neighborhood of a pixel are the adjacent pixels in:</div><ul style="list-style-type: none">• One of these directions: in, out, left, right, up, and down• A combination of two directions, such as right-down or in-up• A combination of three directions, such as in-right-up or in-left-down</div><div><p>Current pixel is center of cube.</p></div></div>

For higher dimensions, `imregionalmin` uses the default value `conn=ndims(I), 'maximal'`.

Connectivity can also be defined in a more general way for any dimension by specifying a 3-by-3-by- ... -by-3 matrix of 0s and 1s. The 1-valued elements define neighborhood locations relative to the center element of `conn`. Note that `conn` must be symmetric about its center element. See [Specifying Custom Connectivities](#) for more information.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `int64` | `uint8` | `uint16` | `uint32` | `uint64`

Output Arguments

[collapse all](#)

▼ **BW — Locations of regional minima**
logical array

Locations of regional minima, returned as a logical array of the same size as `I`. Pixels with the value 1 indicate regional maxima; all other pixels are set to 0.

Data Types: `logical`

Extended Capabilities

> C/C++ Code Generation

Generate C and C++ code using MATLAB® Coder™.

> Thread-Based Environment

Run code in the background using MATLAB® backgroundPool or accelerate code with Parallel Computing Toolbox™ ThreadPool.

> GPU Arrays

Accelerate code by running on a graphics processing unit (GPU) using Parallel Computing Toolbox™.

Version History

Introduced before R2006a

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- > **R2022b:** Support for thread-based environments

See Also

[conndef](#) | [imextendedmin](#) | [imhmin](#) | [imimposemin](#) | [imreconstruct](#) | [imregionalmax](#)