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Geometric Statistics

The Geometric Statistics module adds a couple of image statistic variables centered around image geometry. These variables can then be used in RoboRealm [conditional statement](#), [VBScript module](#) or exported to external programs using [RoboRealm Plugins](#).

Interface

| Name | Value |
|-------------------|------------|
| AREA | 10386 |
| PERIMETER | 611 |
| EQUIV_DIAMETER | 114.9951 |
| AP_RATIO | 16.9984 |
| COMPACTNESS | 35.9447 |
| COMPACTNESS_2 | 0.7173 |
| CIRCULARITY | 0.3497 |
| CIRCULARITY_2 | 0.7529 |
| CIRCULARITY_3 | 0.4375 |
| MAX_RADIUS | 96 |
| MIN_RADIUS | 42 |
| FERET | 160.3278 |
| FERET_AREA | 20361.6290 |
| FERET_ORIENTATION | 13.3429 |
| FERET_FIRST_X | 56 |
| FERET_FIRST_Y | 128 |
| FERET_SECOND_X | 212 |
| FERET_SECOND_Y | 165 |
| BREATH | 127.0001 |
| ROUNDNENESS | 0.5145 |

1. Scope - Click on the appropriate radio button to select if you want the statistics to be generated from the entire image or from an individual blob. If you select individual blobs non-black pixels in the current image will be used to form blobs. To see the statistics for an individual blob click on the blob within the main RoboRealm GUI window. That will switch the variable(x) denotation to that particular blob.

Variables

AREA - the number of non-black (0,0,0) pixels in the current image

ANGLE - the orientation angle of the blob. This is calculated by determining the angle from the center of gravity of the blob to the furthest point from that center along the blob's perimeter.

ANGLE_ALT - alternative orientation angle of the blob. This is calculated by determining the vector formed by the center of gravity to the perimeter's center of gravity. If your blob has holes in it this may be a more stable way to determine blob orientation than ANGLE.

ANGLE_ALT_2 - alternative orientation angle of the blob. This is calculated by determining the average vector formed from a current perimeter point to the center

of gravity.

COG_X, COG_Y - the center of gravity of the blob

PERIMETER - the number of pixels that surround non black blobs

AP_RATIO - AREA / PERIMETER, determines how round an image is; also known as "Perimeter Equivalent Diameter".

EQUIV_DIAMETER - the diameter of a circle with the same area as the region. Calculated as $\sqrt{4 * \text{Area} / \pi}$

COMPACTNESS - $(\text{PERIMETER} * \text{PERIMETER}) / \text{AREA}$: ratio of the square of the perimeter to the area; also known as "shape".

COMPACTNESS_2 - $\sqrt{4 * \text{AREA} / \pi} / \text{FERET}$: alternate compactness measure

CIRCULARITY - $4 * \pi * \text{AREA} / (\text{PERIMETER} * \text{PERIMETER})$, measure of circularity.

CIRCULARITY_2 - alternate measure of circularity.

CIRCULARITY_3 - MIN_RADIUS/MAX_RADIUS : another alternate measure of circularity.

MAX_RADIUS - radius of enclosing circle around center of gravity

MIN_RADIUS - radius of enclosed circle around center of gravity

FERET - Feret's diameter also known as the caliper length or largest axis length: the greatest distance between any two non-zero pixels

FERET_AREA - FERET * BREATH; also know as Feret's bounding box

FERET_ORIENTATION - orientation of the Feret's diameter in degrees

FERET_FIRST_X

FERET_FIRST_Y

FERET_SECOND_X

FERET_SECOND_Y - points that makeup the Feret diameter

BREATH - the largest axis perpendicular to the Feret diameter

ROUNDNESS - $4 * \text{AREA} / (\pi * (\text{FERET} * \text{FERET}))$, measure of roundness

MIN_X - minimum bounding box x coordinate

MIN_Y - minimum bounding box y coordinate

MAX_X - maximum bounding box x coordinate

MAX_Y - maximum bounding box y coordinate

EXTENT - proportion of the pixels in the bounding box that are also in the region. Calculated as (blob area / bounding box area).

TOP_LEFT_X

TOP_LEFT_Y

TOP_RIGHT_X

TOP_RIGHT_Y

RIGHT_TOP_X

RIGHT_TOP_Y

RIGHT_BOTTOM_X

RIGHT_BOTTOM_Y

BOTTOM_LEFT_X

BOTTOM_LEFT_Y

BOTTOM_RIGHT_X

BOTTOM_RIGHT_Y

LEFT_TOP_X

LEFT_TOP_Y

LEFT_BOTTOM_X

LEFT_BOTTOM_Y - the extrema points of the image

FERET_ASPECT_RATIO - FERET/BREATH

BOX_ASPECT_RATIO - (MAX_X-MIN_X)/(MAX_Y-MIN_Y)

WIDTH - the width of the object in pixels

HEIGHT - the height of the object in pixels

Note that you can highlight the appropriate statistics and press CTRL-C to copy the information to your clipboard. This information can then be pasted into Excel or other statistics programs.

See Also

[Center of Gravity](#)

[Moments of Inertia](#)

[Color Statistics](#)

| Geometric_Statistics Related Forum Posts | | Last post | Posts | Views |
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|  | <p>Tracking a \"U\" shape of lights</p> <p>I have a rectangular robot with LED strips around three edges. I'm successfully using RoboRealm to isolate the light from the r...</p> | 2 months | 5 | 334 |
|  | <p>Blob Segmentation and Filtering : Human Targets</p> <p>Hi, I have been using the movement module to track a single target. It is now my goal to track more than 1 target, starting firs...</p> | 3 months | 11 | 730 |
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| | <p>COLOUR_STATISTICS averages</p> <p>I am trying to do fine colour comparisons of items presented to a camera. I am using the COLOUR_STATISTICS after t...</p> | 2 years | 2 | 594 |
|  | <p>Locate brightest pixel</p> <p>I'm trying to use roborealms to locate the brightest pixel. Does this feature already exist? Thanks!...</p> | 2 years | 2 | 764 |
|  | <p> Compass reading</p> <p>Howdy= Im a beginner and could use a little help. I would like to read the compass heading from a compass. The camera and compas...</p> | 2 years | 4 | 833 |

| | | | | | | |
|---|---|---|---|---------|------|------|
|  |  | <u>Geometric Statistics Problem</u> | 2 years | 3 | 898 | |
| Hi Steven and Prof Mason, Thanks for ur help in my last post about marker p... | | | | | | |
|  |  |  | <u>Image Module Problem</u> | 2 years | 9 | 1521 |
| Hello Steven, [image1] [image2] I'm trying to align/regi... | | | | | | |
|  |  | <u>SRV- 1B</u> | 2 years | 2 | 733 | |
| Hi. I am using the SRV - 1B for my project and I need to detection of visual markers. The deal with the visual markers is each o... | | | | | | |
|  |  | <u>triangle direction</u> | 2 years | 5 | 1180 | |
| hi! how can i find a triangle direction using RR? ... | | | | | | |
| <u>overflow</u> | | | | | | |
| I am calculating an angle from result obtained from earlier calculation. The result return an error with OVERFLOW. | | | 2 years | 2 | 751 | |