

# Package: magick (via r-universe)

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**Type** Package

**Title** Advanced Graphics and Image-Processing in R

**Version** 2.8.5

**Description** Bindings to 'ImageMagick': the most comprehensive open-source image processing library available. Supports many common formats (png, jpeg, tiff, pdf, etc) and manipulations (rotate, scale, crop, trim, flip, blur, etc). All operations are vectorized via the Magick++ STL meaning they operate either on a single frame or a series of frames for working with layers, collages, or animation. In RStudio images are automatically previewed when printed to the console, resulting in an interactive editing environment. The latest version of the package includes a native graphics device for creating in-memory graphics or drawing onto images using pixel coordinates.

**License** MIT + file LICENSE

**URL** <https://docs.ropensci.org/magick/>  
<https://ropensci.r-universe.dev/magick>

**BugReports** <https://github.com/ropensci/magick/issues>

**SystemRequirements** ImageMagick++: ImageMagick-c++-devel (rpm) or libmagick++-dev (deb)

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analysis

*Image Analysis*

---

## Description

Functions for image calculations and analysis. This part of the package needs more work.

## Usage

```
image_compare(image, reference_image, metric = "", fuzz = 0)
```

```
image_compare_dist(image, reference_image, metric = "", fuzz = 0)
```

```
image_fft(image)
```

## Arguments

|                 |   |
|-----------------|---|
| image           | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>       |
| reference_image | another image to compare to   |
| metric          | string with a <b>metric</b> from <a href="#">metric_types()</a> such as "AE" or "phash"             |
| fuzz            | relative color distance (value between 0 and 100) to be considered similar in the filling algorithm |

## Details

For details see [Image++](#) documentation. Short descriptions:

- [image\\_compare](#) calculates a metric by comparing image with a reference image.
- [image\\_fft](#) returns Discrete Fourier Transform (DFT) of the image as a magnitude / phase image pair. I wish I knew what this means.

Here [image\\_compare\(\)](#) is vectorized over the first argument and returns the diff image with the calculated distortion value as an attribute.

## See Also

Other image: [\\_index\\_](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

## Examples

```
out1 <- image_blur(logo, 3)
out2 <- image_oilpaint(logo, 3)
input <- c(logo, out1, out2, logo)
if(magick_config()$version >= "6.8.7"){
  diff_img <- image_compare(input, logo, metric = "AE")
  attributes(diff_img)
}
```

---

animation

*Image Frames and Animation*

---

## Description

Operations to manipulate or combine multiple frames of an image. Details below.

## Usage

```
image_animate(  
  image,  
  fps = 10,  
  delay = NULL,  
  loop = 0,  
  dispose = c("background", "previous", "none"),  
  optimize = FALSE  
)
```

```
image_coalesce(image)
```

```
image_morph(image, frames = 8)
```

```
image_mosaic(image, operator = NULL)
```

```
image_flatten(image, operator = NULL)
```

```
image_average(image)
```

```
image_append(image, stack = FALSE)
```

```
image_apply(image, FUN, ...)
```

```
image_montage(  
  image,  
  geometry = NULL,  
  tile = NULL,  
  gravity = "Center",  
  bg = "white",
```

```

    shadow = FALSE
)

```

### Arguments

|          |  |
|----------|--|
| image    | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>                                  |
| fps      | frames per second. Ignored if delay is not NULL.   |
| delay    | delay after each frame, in 1/100 seconds. Must be length 1, or number of frames. If specified, then fps is ignored.            |
| loop     | how many times to repeat the animation. Default is infinite.   |
| dispose  | a frame <a href="#">disposal method</a> from <a href="#">dispose_types()</a>   |
| optimize | optimize the gif animation by storing only the differences between frames. Input images must be exactly the same size.         |
| frames   | number of frames to use in output animation  |
| operator | string with a <a href="#">composite operator</a> from <a href="#">compose_types()</a>  |
| stack    | place images top-to-bottom (TRUE) or left-to-right (FALSE)   |
| FUN      | a function to be called on each frame in the image   |
| ...      | additional parameters for FUN  |
| geometry | a <a href="#">geometry</a> string that defines the size the individual thumbnail images, and the spacing between them.         |
| tile     | a <a href="#">geometry</a> string for example "4x5 with limits on how the tiled images are to be laid out on the final result. |
| gravity  | a gravity direction, if the image is smaller than the frame, where in the frame is the image to be placed.                     |
| bg       | a background color string  |
| shadow   | enable shadows between images  |

### Details

For details see [Magick++ STL](#) documentation. Short descriptions:

- [image\\_animate](#) coalesces frames by playing the sequence and converting to gif format.
- [image\\_morph](#) expands number of frames by interpolating intermediate frames to blend into each other when played as an animation.
- [image\\_mosaic](#) inlays images to form a single coherent picture.
- [image\\_montage](#) creates a composite image by combining frames.
- [image\\_flatten](#) merges frames as layers into a single frame using a given operator.
- [image\\_average](#) averages frames into single frame.
- [image\\_append](#) stack images left-to-right (default) or top-to-bottom.
- [image\\_apply](#) applies a function to each frame

The [image\\_apply](#) function calls an image function to each frame and joins results back into a single image. Because most operations are already vectorized this is often not needed. Note that FUN() should return an image. To apply other kinds of functions to image frames simply use [lapply](#), [vapply](#), etc.

**See Also**

Other image: [\\_index\\_](#), [analysis](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

**Examples**

```
# Combine images
logo <- image_read("https://jeroen.github.io/images/Rlogo.png")
oldlogo <- image_read("https://jeroen.github.io/images/Rlogo-old.png")

# Create morphing animation
both <- image_scale(c(oldlogo, logo), "400")
image_average(image_crop(both))
image_animate(image_morph(both, 10))

# Create thumbnails from GIF
banana <- image_read("https://jeroen.github.io/images/banana.gif")
length(banana)
image_average(banana)
image_flatten(banana)
image_append(banana)
image_append(banana, stack = TRUE)

# Append images together
wizard <- image_read("wizard:")
image_append(image_scale(c(image_append(banana[c(1,3)], stack = TRUE), wizard)))

image_composite(banana, image_scale(logo, "300"))

# Break down and combine frames
front <- image_scale(banana, "300")
background <- image_background(image_scale(logo, "400"), 'white')
frames <- image_apply(front, function(x){image_composite(background, x, offset = "+70+30")})
image_animate(frames, fps = 10)
# Simple 4x3 montage
input <- rep(logo, 12)
image_montage(input, geometry = 'x100+10+10', tile = '4x3', bg = 'pink', shadow = TRUE)

# With varying frame size
input <- c(wizard, wizard, logo, logo)
image_montage(input, tile = '2x2', bg = 'pink', gravity = 'southwest')
```

as\_EBImage

*Convert to EBImage***Description**

Convert a Magick image to **EBImage** class. Note that EBImage only supports multi-frame images in greyscale.

**Usage**

```
as_EBImage(image)
```

**Arguments**

image            magick image object returned by [image\\_read\(\)](#) or [image\\_graph\(\)](#)

---

attributes            *Image Attributes*

---

**Description**

Attributes are properties of the image that might be present on some images and might affect image manipulation methods.

**Usage**

```
image_comment(image, comment = NULL)
```

```
image_info(image)
```

**Arguments**

image            magick image object returned by [image\\_read\(\)](#) or [image\\_graph\(\)](#)

comment            string to set an image comment

**Details**

Each attribute can be get and set with the same function. The [image\\_info\(\)](#) function returns a data frame with some commonly used attributes.

**See Also**

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

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autoviewer

*RStudio Graphics AutoViewer*

---

### Description

This enables a [addTaskCallback](#) that automatically updates the viewer after the state of a magick graphics device has changed. This is enabled by default in RStudio.

### Usage

```
autoviewer_enable()
```

```
autoviewer_disable()
```

### Examples

```
# Only has effect in RStudio (or other GUI with a viewer):  
autoviewer_enable()
```

```
img <- magick::image_graph()  
plot(1)  
abline(0, 1, col = "blue", lwd = 2, lty = "solid")  
abline(0.1, 1, col = "red", lwd = 3, lty = "dotted")
```

```
autoviewer_disable()  
abline(0.2, 1, col = "green", lwd = 4, lty = "twodash")  
abline(0.3, 1, col = "black", lwd = 5, lty = "dotdash")
```

```
autoviewer_enable()  
abline(0.4, 1, col = "purple", lwd = 6, lty = "dashed")  
abline(0.5, 1, col = "yellow", lwd = 7, lty = "longdash")
```

---

coder\_info

*Magick Configuration*

---

### Description

ImageMagick can be configured to support various additional tool and formats via external libraries. These functions show which features ImageMagick supports on your system.

### Usage

```
coder_info(format)
```

```
magick_config()
```

```
magick_set_seed(seed)
```

**Arguments**

format            image format such as png, tiff or pdf.  
seed             integer with seed value to use

**Details**

Note that `coder_info` raises an error for unsupported formats.

**References**

<https://www.imagemagick.org/Magick++/CoderInfo.html>

**Examples**

```
coder_info("png")
coder_info("jpg")
coder_info("pdf")
coder_info("tiff")
coder_info("gif")
# Reproduce random image
magick_set_seed(123)
image_blank(200,200, pseudo_image = "plasma:fractal")
```

---

color

*Image Color*

---

**Description**

Functions to adjust contrast, brightness, colors of the image. Details below.

**Usage**

```
image_modulate(image, brightness = 100, saturation = 100, hue = 100)

image_quantize(
  image,
  max = 256,
  colorspace = "rgb",
  dither = TRUE,
  treedepth = NULL
)

image_map(image, map, dither = FALSE)

image_ordered_dither(image, threshold_map)

image_channel(image, channel = "lightness")
```

```

image_separate(image, channel = "default")
image_combine(image, colorspace = "sRGB", channel = "default")
image_transparent(image, color, fuzz = 0)
image_background(image, color, flatten = TRUE)
image_colorize(image, opacity, color)
image_contrast(image, sharpen = 1)
image_normalize(image)
image_enhance(image)
image_equalize(image)
image_median(image, radius = 1)

```

### Arguments

|               |  |
|---------------|--|
| image         | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>  |
| brightness    | modulation of brightness as percentage of the current value (100 for no change)  |
| saturation    | modulation of saturation as percentage of the current value (100 for no change)  |
| hue           | modulation of hue is an absolute rotation of -180 degrees to +180 degrees from the current position corresponding to an argument range of 0 to 200 (100 for no change)   |
| max           | preferred number of colors in the image. The actual number of colors in the image may be less than your request, but never more.   |
| colorspace    | string with a <a href="#">colorspace</a> from <a href="#">colorspace_types</a> for example "gray", "rgb" or "cmyk"   |
| dither        | a boolean (defaults to TRUE) specifying whether to apply Floyd/Steinberg error diffusion to the image: averages intensities of several neighboring pixels  |
| treedepth     | depth of the quantization color classification tree. Values of 0 or 1 allow selection of the optimal tree depth for the color reduction algorithm. Values between 2 and 8 may be used to manually adjust the tree depth. |
| map           | reference image to map colors from   |
| threshold_map | A string giving the dithering pattern to use. See <a href="#">the ImageMagick documentation</a> for possible values  |
| channel       | a string with a <a href="#">channel</a> from <a href="#">channel_types</a> for example "alpha" or "hue" or "cyan"  |
| color         | a valid <a href="#">color string</a> such as "navyblue" or "#000080". Use "none" for transparency.   |

|         |   |
|---------|---|
| fuzz    | relative color distance (value between 0 and 100) to be considered similar in the filling algorithm |
| flatten | should image be flattened before writing? This also replaces transparency with background color.    |
| opacity | percentage of opacity used for coloring   |
| sharpen | enhance intensity differences in image  |
| radius  | replace each pixel with the median color in a circular neighborhood                                 |

## Details

For details see [Magick++ STL](#) documentation. Short descriptions:

- [image\\_modulate](#) adjusts brightness, saturation and hue of image relative to current.
- [image\\_quantize](#) reduces number of unique colors in the image.
- [image\\_ordered\\_dither](#) reduces number of unique colors using a dithering threshold map.
- [image\\_map](#) replaces colors of image with the closest color from a reference image.
- [image\\_channel](#) extracts a single channel from an image and returns as grayscale.
- [image\\_transparent](#) sets pixels approximately matching given color to transparent.
- [image\\_background](#) sets background color. When image is flattened, transparent pixels get background color.
- [image\\_colorize](#) overlays a solid color frame using specified opacity.
- [image\\_contrast](#) enhances intensity differences in image
- [image\\_normalize](#) increases contrast by normalizing the pixel values to span the full range of colors
- [image\\_enhance](#) tries to minimize noise
- [image\\_equalize](#) equalizes using histogram equalization
- [image\\_median](#) replaces each pixel with the median color in a circular neighborhood

Note that colors are also determined by image properties [imagetype](#) and [colorspace](#) which can be modified via [image\\_convert\(\)](#).

## See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

## Examples

```
# manually adjust colors
logo <- image_read("logo:")
image_modulate(logo, brightness = 200)
image_modulate(logo, saturation = 150)
image_modulate(logo, hue = 200)
```

```

# Reduce image to 10 different colors using various spaces
image_quantize(logo, max = 10, colorspace = 'gray')
image_quantize(logo, max = 10, colorspace = 'rgb')
image_quantize(logo, max = 10, colorspace = 'cmyk')

image_ordered_dither(logo, 'o8x8')
# Change background color
translogo <- image_transparent(logo, 'white')
image_background(translogo, "pink", flatten = TRUE)

# Compare to flood-fill method:
image_fill(logo, "pink", fuzz = 20)

# Other color tweaks
image_colorize(logo, 50, "red")
image_contrast(logo)
image_normalize(logo)
image_enhance(logo)
image_equalize(logo)
image_median(logo)

# Alternate way to convert into black-white
image_convert(logo, type = 'grayscale')

```

---

 composite

*Image Composite*


---

## Description

Similar to the ImageMagick composite utility: compose an image on top of another one using a [CompositeOperator](#).

## Usage

```

image_composite(
  image,
  composite_image,
  operator = "atop",
  offset = "+0+0",
  gravity = "northwest",
  compose_args = ""
)

image_border(image, color = "lightgray", geometry = "10x10", operator = "copy")

image_frame(image, color = "lightgray", geometry = "25x25+6+6")

image_shadow_mask(image, geometry = "50x10+30+30")

```

```

image_shadow(
  image,
  color = "black",
  bg = "none",
  geometry = "50x10+30+30",
  operator = "copy",
  offset = "+20+20"
)

image_shade(image, azimuth = 30, elevation = 30, color = FALSE)

```

### Arguments

|                 |  |
|-----------------|--|
| image           | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>  |
| composite_image | composition image  |
| operator        | string with a <b>composite operator</b> from <a href="#">compose_types()</a>   |
| offset          | string with either a <a href="#">gravity_type</a> or a <a href="#">geometry_point</a> to set position of top image.  |
| gravity         | string with <b>gravity</b> value from <a href="#">gravity_types</a> .  |
| compose_args    | additional arguments needed for some composite operations  |
| color           | Set to true to shade the red, green, and blue components of the image.   |
| geometry        | a <b>geometry string</b> to set height and width of the border, e.g. "10x8". In addition <a href="#">image_frame</a> allows for adding shadow by setting an offset e.g. "20x10+7+2". |
| bg              | background color   |
| azimuth         | position of light source   |
| elevation       | position of light source   |

### Details

The `image_composite` function is vectorized over both image arguments: if the first image has  $n$  frames and the second  $m$  frames, the output image will contain  $n * m$  frames.

The [image\\_border](#) function creates a slightly larger solid color frame and then composes the original frame on top. The [image\\_frame](#) function is similar but has an additional feature to create a shadow effect on the border (which is really ugly).

### See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

## Examples

```
# Compose images using one of many operators
imlogo <- image_scale(image_read("logo:"), "x275")
rlogo <- image_read("https://jeroen.github.io/images/Rlogo-old.png")

# Standard is atop
image_composite(imlogo, rlogo)

# Same as 'blend 50' in the command line
image_composite(imlogo, rlogo, operator = "blend", compose_args="50")

# Offset can be geometry or gravity
image_composite(logo, rose, offset = "+100+100")
image_composite(logo, rose, gravity = "East")

# Add a border frame around the image
image_border(imlogo, "red", "10x10")
image_frame(imlogo)
image_shadow(imlogo)
image_shade(imlogo)
```

---

defines

*Set encoder defines*

---

## Description

So called 'defines' are properties that are passed along to external filters and libraries. Usually defines are used in [image\\_read](#) or [image\\_write](#) to control the image encoder/decoder, but you can also set these manually on the image object.

## Usage

```
image_set_defines(image, defines)
```

## Arguments

|         |  |
|---------|--|
| image   | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>  |
| defines | a named character vector with extra options to control reading. These are the <code>-define key{=value}</code> settings in the <a href="#">command line tool</a> . Use an empty string for value-less defines, and NA to unset a define. |

## Details

The defines values must be a character string, where the names contain the defines keys. Each name must be of the format "enc:key" where the first part is the encoder or filter to which the key is passed. For example "png:..." defines can control the encoding and decoding of png images.

The [image\\_set\\_defines](#) function does not make a copy of the image, so the defined values remain in the image object until they are overwritten or unset.

**See Also**

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

**Examples**

```
# Write an image
x <- image_read("https://jeroen.github.io/images/frink.png")
image_write(x, "frink.png")

# Pass some properties to PNG encoder
defines <- c("png:compression-filter" = "1", "png:compression-level" = "0")
image_set_defines(x, defines)
image_write(x, "frink-uncompressed.png")

# Unset properties
defines[1:2] = NA
image_set_defines(x, defines)
image_write(x, "frink-final.png")

# Compare size and cleanup
file.info(c("frink.png", "frink-uncompressed.png", "frink-final.png"))
unlink(c("frink.png", "frink-uncompressed.png", "frink-final.png"))
```

---

device

*Magick Graphics Device*


---

**Description**

Graphics device that produces a Magick image. Can either be used like a regular device for making plots, or alternatively via `image_draw` to open a device which draws onto an existing image using pixel coordinates. The latter is vectorized, i.e. drawing operations are applied to each frame in the image.

**Usage**

```
image_graph(
  width = 800,
  height = 600,
  bg = "white",
  pointsize = 12,
  res = 72,
  clip = TRUE,
  antialias = TRUE
)

image_draw(image, pointsize = 12, res = 72, antialias = TRUE, ...)
```

```
image_capture()
```

### Arguments

|           |  |
|-----------|--|
| width     | in pixels  |
| height    | in pixels  |
| bg        | background color   |
| pointsize | size of fonts  |
| res       | resolution in pixels   |
| clip      | enable clipping in the device. Because clipping can slow things down a lot, you can disable it if you don't need it.                     |
| antialias | TRUE/FALSE: enables anti-aliasing for text and strokes   |
| image     | an existing image on which to start drawing  |
| ...       | additional device parameters passed to <a href="#">plot.window</a> such as <code>xlim</code> , <code>ylim</code> , or <code>mar</code> . |

### Details

The device is a relatively recent feature of the package. It should support all operations but there might still be small inaccuracies. Also it is a bit slower than some of the other devices, in particular for rendering text and clipping. Hopefully this can be optimized in the next version.

By default `image_draw` sets all margins to 0 and uses graphics coordinates to match image size in pixels (width x height) where  $(0, 0)$  is the top left corner. Note that this means the y axis increases from top to bottom which is the opposite of typical graphics coordinates. You can override all this by passing custom `xlim`, `ylim` or `mar` values to `image_draw`.

The `image_capture` function returns the current device as an image. This only works if the current device is a magick device or supports [dev.capture](#).

### See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

### Examples

```
# Regular image
frink <- image_read("https://jeroen.github.io/images/frink.png")

# Produce image using graphics device
fig <- image_graph(res = 96)
ggplot2::qplot(mpg, wt, data = mtcars, colour = cyl)
dev.off()

# Combine
out <- image_composite(fig, frink, offset = "+70+30")
print(out)
```

```

# Or paint over an existing image
img <- image_draw(frunk)
rect(20, 20, 200, 100, border = "red", lty = "dashed", lwd = 5)
abline(h = 300, col = 'blue', lwd = '10', lty = "dotted")
text(10, 250, "Hoiven-Glaven", family = "monospace", cex = 4, srt = 90)
palette(rainbow(11, end = 0.9))
symbols(rep(200, 11), seq(0, 400, 40), circles = runif(11, 5, 35),
  bg = 1:11, inches = FALSE, add = TRUE)
dev.off()
print(img)

# Vectorized example with custom coordinates
earth <- image_read("https://jeroen.github.io/images/earth.gif")
img <- image_draw(earth, xlim = c(0,1), ylim = c(0,1))
rect(.1, .1, .9, .9, border = "red", lty = "dashed", lwd = 5)
text(.5, .9, "Our planet", cex = 3, col = "white")
dev.off()
print(img)

```

---

edges

---

*Edge / Line Detection*


---

## Description

Best results are obtained by finding edges with `image_canny()` and then performing Hough-line detection on the edge image.

## Usage

```

image_edge(image, radius = 1)

image_canny(image, geometry = "0x1+10%+30%")

image_hough_draw(
  image,
  geometry = NULL,
  color = "red",
  bg = "transparent",
  size = 3,
  overlay = FALSE
)

image_hough_txt(image, geometry = NULL, format = c("mvg", "svg"))

```

**Arguments**

|          |   |
|----------|---|
| image    | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a> |
| radius   | edge size in pixels   |
| geometry | geometry string, see details.   |
| color    | a valid <b>color string</b> such as "navyblue" or "#000080". Use "none" for transparency.     |
| bg       | background color  |
| size     | size in points to draw the line   |
| overlay  | composite the drawing atop the input image. Only for bg = 'transparent'.                      |
| format   | output format of the text, either svg or mvg  |

**Details**

For Hough-line detection, the geometry format is {W}x{H}+{threshold} defining the size and threshold of the filter used to find 'peaks' in the intermediate search image. For canny edge detection the format is {radius}x{sigma}+{lower%}+{upper%}. More details and examples are available at the [imagemagick website](#).

**See Also**

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

**Examples**

```
if(magick_config()$version > "6.8.9"){
  shape <- demo_image("shape_rectangle.gif")
  rectangle <- image_canny(shape)
  rectangle |> image_hough_draw('5x5+20')
  rectangle |> image_hough_txt(format = 'svg') |> cat()
}
```

---

 editing

*Image Editing*


---

**Description**

Read, write and join or combine images. All image functions are vectorized, meaning they operate either on a single frame or a series of frames (e.g. a collage, video, or animation). Besides paths and URLs, [image\\_read\(\)](#) supports commonly used bitmap and raster object types.

**Usage**

```
image_read(  
  path,  
  density = NULL,  
  depth = NULL,  
  strip = FALSE,  
  coalesce = TRUE,  
  defines = NULL  
)  
  
image_read_svg(path, width = NULL, height = NULL)  
  
image_read_pdf(path, pages = NULL, density = 300, password = "")  
  
image_read_video(path, fps = 1, format = "png")  
  
image_write(  
  image,  
  path = NULL,  
  format = NULL,  
  quality = NULL,  
  depth = NULL,  
  density = NULL,  
  comment = NULL,  
  flatten = FALSE,  
  defines = NULL,  
  compression = NULL  
)  
  
image_convert(  
  image,  
  format = NULL,  
  type = NULL,  
  colorspace = NULL,  
  depth = NULL,  
  antialias = NULL,  
  matte = NULL,  
  interlace = NULL,  
  profile = NULL  
)  
  
image_data(image, channels = NULL, frame = 1)  
  
image_raster(image, frame = 1, tidy = TRUE)  
  
image_display(image, animate = TRUE)  
  
image_browse(image, browser = getOption("browser"))
```

```

image_strip(image)

image_blank(width, height, color = "none", pseudo_image = "", defines = NULL)

image_destroy(image)

image_join(...)

image_attributes(image)

image_get_artifact(image, artifact = "")

demo_image(path)

```

### Arguments

|             |  |
|-------------|--|
| path        | a file, url, or raster object or bitmap array  |
| density     | resolution to render pdf or svg  |
| depth       | color depth (either 8 or 16)   |
| strip       | drop image comments and metadata   |
| coalesce    | automatically <a href="#">image_coalesce()</a> gif images  |
| defines     | a named character vector with extra options to control reading. These are the <code>-define key{=value}</code> settings in the <a href="#">command line tool</a> . Use an empty string for value-less defines, and NA to unset a define. |
| width       | in pixels  |
| height      | in pixels  |
| pages       | integer vector with page numbers. Defaults to all pages.   |
| password    | user <a href="#">password</a> to open protected pdf files  |
| fps         | how many images to capture per second of video. Set to NULL to get all frames from the input video.  |
| format      | output format such as "png", "jpeg", "gif", "rgb" or "rgba".   |
| image       | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>  |
| quality     | number between 0 and 100 for jpeg quality. Defaults to 75.   |
| comment     | text string added to the image metadata for supported formats  |
| flatten     | should image be flattened before writing? This also replaces transparency with background color.   |
| compression | a string with compression type from <a href="#">compress_types</a>   |
| type        | string with <a href="#">imagetype</a> value from <a href="#">image_types</a> for example grayscale to convert into black/white   |
| colorspace  | string with a <a href="#">colorspace</a> from <a href="#">colorspace_types</a> for example "gray", "rgb" or "cmyk"   |
| antialias   | enable anti-aliasing for text and strokes  |

|              |  |
|--------------|--|
| matte        | set to TRUE or FALSE to enable or disable transparency   |
| interlace    | string with <a href="#">interlace</a>  |
| profile      | path to file with ICC color profile  |
| channels     | string with image channel(s) for example "rgb", "rgba", "cmyk", "gray", or "ycbcr". Default is either "gray", "rgb" or "rgba" depending on the image |
| frame        | integer setting which frame to extract from the image  |
| tidy         | converts raster data to long form for use with <a href="#">geom_raster</a> . If FALSE output is the same as <code>as.raster()</code> .               |
| animate      | support animations in the X11 display  |
| browser      | argument passed to <a href="#">browseURL</a>   |
| color        | a valid <a href="#">color string</a> such as "navyblue" or "#000080". Use "none" for transparency.   |
| pseudo_image | string with <a href="#">pseudo image</a> specification for example "radial-gradient:purple-yellow"   |
| ...          | several images or lists of images to be combined   |
| artifact     | string with name of the artifact to extract, see the <a href="#">image_deskew</a> for an example.  |

## Details

All standard base vector methods such as `[`, `[[`, `c()`, `as.list()`, `as.raster()`, `rev()`, `length()`, and `print()` can be used to work with magick image objects. Use the standard `img[i]` syntax to extract a subset of the frames from an image. The `img[[i]]` method is an alias for `image_data()` which extracts a single frame as a raw bitmap matrix with pixel values.

For reading `svg` or `pdf` it is recommended to use `image_read_svg()` and `image_read_pdf()` if the [rsvg](#) and [pdftools](#) R packages are available. These functions provide more rendering options (including rendering of literal `svg`) and better quality than built-in `svg/pdf` rendering delegates from `imagemagick` itself.

X11 is required for `image_display()` which only works on some platforms. A more portable method is `image_browse()` which opens the image in a browser. RStudio has an embedded viewer that does this automatically which is quite nice.

Image objects are automatically released by the garbage collector when they are no longer reachable. Because the GC only runs once in a while, you can also call `image_destroy()` explicitly to release the memory immediately. This is usually only needed if you create a lot of images in a short period of time, and you might run out of memory.

## See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

## Examples

```
# Download image from the web
frink <- image_read("https://jeroen.github.io/images/frink.png")
worldcup_frink <- image_fill(frink, "orange", "+100+200", 20)
```

```

image_write(worldcup_frink, "output.png")

# extract raw bitmap array
bitmap <- frink[[1]]

# replace pixels with #FF69B4 ('hot pink') and convert back to image
bitmap[,50:100, 50:100] <- as.raw(c(0xff, 0x69, 0xb4, 0xff))
image_read(bitmap)

# Plot to graphics device via legacy raster format
raster <- as.raster(frink)
par(ask=FALSE)
plot(raster)

# Read bitmap arrays from other image packages
download.file("https://jeroen.github.io/images/example.webp", "example.webp", mode = 'wb')
if(require(webp)) image_read(webp::read_webp("example.webp"))
unlink(c("example.webp", "output.png"))
if(require(rsvg)){
tiger <- image_read_svg("http://jeroen.github.io/images/tiger.svg")
svgtxt <- '<?xml version="1.0" encoding="UTF-8"?>
<svg width="400" height="400" viewBox="0 0 400 400" fill="none">
  <circle fill="steelblue" cx="200" cy="200" r="100" />
  <circle fill="yellow" cx="200" cy="200" r="90" />
</svg>'
circles <- image_read_svg(svgtxt)
}
if(require(pdftools))
image_read_pdf(file.path(R.home('doc'), 'NEWS.pdf'), pages = 1, density = 100)
# create a solid canvas
image_blank(600, 400, "green")
image_blank(600, 400, pseudo_image = "radial-gradient:purple-yellow")
image_blank(200, 200, pseudo_image = "gradient:#3498db-#db3a34",
  defines = c('gradient:direction' = 'east'))

```

---

effects

*Image Effects*

---

## Description

High level effects applied to an entire image. These are mostly just for fun.

## Usage

```
image_despeckle(image, times = 1L)
```

```
image_reducenoise(image, radius = 1L)
```

```
image_noise(image, noisetype = "gaussian")
```

```
image_blur(image, radius = 1, sigma = 0.5)
image_motion_blur(image, radius = 1, sigma = 0.5, angle = 0)
image_charcoal(image, radius = 1, sigma = 0.5)
image_oilpaint(image, radius = 1)
image_emboss(image, radius = 1, sigma = 0.5)
image_implode(image, factor = 0.5)
image_negate(image)
```

### Arguments

|           |   |
|-----------|---|
| image     | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a> |
| times     | number of times to repeat the despeckle operation   |
| radius    | radius, in pixels, for various transformations  |
| noisetype | string with a <b>noisetype</b> value from <a href="#">noise_types</a> .                       |
| sigma     | the standard deviation of the Laplacian, in pixels.   |
| angle     | angle, in degrees, for various transformations  |
| factor    | image implode factor (special effect)   |

### See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

### Examples

```
logo <- image_read("logo:")
image_despeckle(logo)
image_reducenoise(logo)
image_noise(logo)
image_blur(logo, 10, 10)
image_motion_blur(logo, 10, 10, 45)
image_charcoal(logo)
image_oilpaint(logo, radius = 3)
image_emboss(logo)
image_implode(logo)
image_negate(logo)
```

fx

*Image FX***Description**

Apply a custom an **fx expression** to the image.

**Usage**

```
image_fx(image, expression = "p", channel = NULL)
```

```
image_fx_sequence(image, expression = "p")
```

**Arguments**

|            |   |
|------------|---|
| image      | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a> |
| expression | string with an <b>fx expression</b>   |
| channel    | a value of <a href="#">channel_types()</a> specifying which channel(s) to set                 |

**Details**

There are two different interfaces. The [image\\_fx](#) function simply applies the same fx to each frame in the input image. The [image\\_fx\\_sequence](#) function on the other hand treats the entire input vector as a sequence, allowing you to apply an expression with multiple input images. See examples.

**See Also**

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

**Examples**

```
# Show image_fx() expression
img <- image_convert(logo, colorspace = "Gray")
gradient_x <- image_convolve(img, kernel = "Prewitt")
gradient_y <- image_convolve(img, kernel = "Prewitt:90")
gradient <- c(image_fx(gradient_x, expression = "p^2"),
             image_fx(gradient_y, expression = "p^2"))
gradient <- image_flatten(gradient, operator = "Plus")
#gradient <- image_fx(gradient, expression = "sqrt(p)")
gradient

image_fx(img, expression = "pow(p, 0.5)")
image_fx(img, expression = "rand()")

# Use multiple source images
```

```
input <- c(logo, image_flop(logo))
image_fx_sequence(input, "(u+v)/2")
```

---

 geometry

*Geometry Helpers*


---

### Description

ImageMagick uses a handy geometry syntax to specify coordinates and shapes for use in image transformations. You can either specify these manually as strings or use the helper functions below.

### Usage

```
geometry_point(x, y)
```

```
geometry_area(width = NULL, height = NULL, x_off = 0, y_off = 0)
```

```
geometry_size_pixels(width = NULL, height = NULL, preserve_aspect = TRUE)
```

```
geometry_size_percent(width = 100, height = NULL)
```

### Arguments

x left offset in pixels

y top offset in pixels

width in pixels

height in pixels

x\_off offset in pixels on x axis

y\_off offset in pixels on y axis

preserve\_aspect

if FALSE, resize to width and height exactly, losing original aspect ratio. Only one of percent and preserve\_aspect may be TRUE.

### Details

See [ImageMagick Manual](#) for details about the syntax specification. Examples of geometry strings:

- "500x300" – *Resize image keeping aspect ratio, such that width does not exceed 500 and the height does not exceed 300.*
- "500x300!" – *Resize image to 500 by 300, ignoring aspect ratio*
- "500x" – *Resize width to 500 keep aspect ratio*
- "x300" – *Resize height to 300 keep aspect ratio*
- "50%x20%" – *Resize width to 50 percent and height to 20 percent of original*
- "500x300+10+20" – *Crop image to 500 by 300 at position 10,20*

**See Also**

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

**Examples**

```
# Specify a point
logo <- image_read("logo:")
image_annotate(logo, "Some text", location = geometry_point(100, 200), size = 24)

# Specify image area
image_crop(logo, geometry_area(300, 300), repage = FALSE)
image_crop(logo, geometry_area(300, 300, 100, 100), repage = FALSE)

# Specify image size
image_resize(logo, geometry_size_pixels(300))
image_resize(logo, geometry_size_pixels(height = 300))
image_resize(logo, geometry_size_pixels(300, 300, preserve_aspect = FALSE))

# resize relative to current size
image_resize(logo, geometry_size_percent(50))
image_resize(logo, geometry_size_percent(50, 20))
```

---

 image\_ggplot

*Image to ggplot*


---

**Description**

Create a ggplot with axes set to pixel coordinates and plot the raster image on it using `ggplot2::annotation_raster`. See examples for how to plot an image onto an existing ggplot.

**Usage**

```
image_ggplot(image, interpolate = FALSE)
```

**Arguments**

`image` magick image object returned by `image_read()` or `image_graph()`  
`interpolate` passed to `ggplot2::annotation_raster`

**Examples**

```
# Plot with base R
plot(logo)

# Plot image with ggplot2
library(ggplot2)
```

```
myplot <- image_ggplot(logo)
myplot + ggtitle("Test plot")

# Show that coordinates are reversed:
myplot + theme_classic()

# Or add to plot as annotation
image <- image_fill(logo, 'none')
raster <- as.raster(image)
myplot <- qplot(mpg, wt, data = mtcars)
myplot + annotation_raster(raster, 25, 35, 3, 5)

# Or overplot image using grid
library(grid)
qplot(speed, dist, data = cars, geom = c("point", "smooth"))
grid.raster(image)
```

---

morphology

*Morphology*

---

## Description

Apply a morphology method. This is a very flexible function which can be used to apply any morphology method with custom parameters. See [imagemagick website](#) for examples.

## Usage

```
image_morphology(
  image,
  method = "convolve",
  kernel = "Gaussian",
  iterations = 1,
  opts = list()
)
```

```
image_convolve(
  image,
  kernel = "Gaussian",
  iterations = 1,
  scaling = NULL,
  bias = NULL
)
```

## Arguments

|        |   |
|--------|---|
| image  | magick image object returned by <code>image_read()</code> or <code>image_graph()</code> |
| method | a string with a valid method from <code>morphology_types()</code>                       |

|            |  |
|------------|--|
| kernel     | either a square matrix or a string. The string can either be a parameterized <a href="#">kerneltype</a> such as: "DoG:0,0,2" or "Diamond" or it can contain a custom matrix (see examples) |
| iterations | number of iterations   |
| opts       | a named list or character vector with custom attributes  |
| scaling    | string with kernel scaling. The special flag "!" automatically scales to full dynamic range, for example: "50%!"   |
| bias       | output bias string, for example "50%"  |

### See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

### Examples

```
#example from IM website:
if(magick_config()$version > "6.8.8"){
pixel <- image_blank(1, 1, 'white') |> image_border('black', '5x5')

# See the effect of Dilate method
pixel |> image_scale('800%')
pixel |> image_morphology('Dilate', "Diamond") |> image_scale('800%')

# These produce the same output:
pixel |> image_morphology('Dilate', "Diamond", iter = 3) |> image_scale('800%')
pixel |> image_morphology('Dilate', "Diamond:3") |> image_scale('800%')

# Plus example
pixel |> image_morphology('Dilate', "Plus", iterations = 2) |> image_scale('800%')

# Rose examples
rose |> image_morphology('ErodeI', 'Octagon', iter = 3)
rose |> image_morphology('DilateI', 'Octagon', iter = 3)
rose |> image_morphology('OpenI', 'Octagon', iter = 3)
rose |> image_morphology('CloseI', 'Octagon', iter = 3)

# Edge detection
man <- demo_image('man.gif')
man |> image_morphology('EdgeIn', 'Octagon')
man |> image_morphology('EdgeOut', 'Octagon')
man |> image_morphology('Edge', 'Octagon')

# Octagonal Convex Hull
man |>
  image_morphology('Close', 'Diamond') |>
  image_morphology('Thicken', 'ConvexHull', iterations = 1)

# Thinning down to a Skeleton
man |> image_morphology('Thinning', 'Skeleton', iterations = 1)
```

```

# Specify custom kernel matrix usingn a string:
img <- demo_image("test_mag.gif")
i <- image_convolve(img, kernel = '4x5:
    0 -1 0 0
   -1 +1 -1 0
   -1 +1 -1 0
   -1 +1 +1 -1
    0 -1 -1 0 ', bias = "50%")
}

```

ocr

*Image Text OCR***Description**

Extract text from an image using the [tesseract](#) package.

**Usage**

```
image_ocr(image, language = "eng", HOOCR = FALSE, ...)
```

```
image_ocr_data(image, language = "eng", ...)
```

**Arguments**

|          |  |
|----------|--|
| image    | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>                                    |
| language | passed to <a href="#">tesseract</a> . To install additional languages see instructions in <a href="#">tesseract_download()</a> . |
| HOOCR    | if TRUE return results as HOOCR xml instead of plain text  |
| ...      | additional parameters passed to <a href="#">tesseract</a>  |

**Details**

To use this function you need to [tesseract](#) first:

```
install.packages("tesseract")
```

Best results are obtained if you set the correct language in [tesseract](#). To install additional languages see instructions in [tesseract\\_download\(\)](#).

**See Also**

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

**Examples**

```
if(require("tesseract")){  
img <- image_read("http://jeroen.github.io/images/testocr.png")  
image_ocr(img)  
image_ocr_data(img)  
}
```

---

options

*Magick Options*

---

**Description**

List option types and values supported in your version of ImageMagick. For descriptions see [ImageMagick Enumerations](#).

**Usage**

```
magick_options()  
magick_fonts()  
option_types()  
filter_types()  
metric_types()  
dispose_types()  
compose_types()  
colorspace_types()  
channel_types()  
image_types()  
kernel_types()  
noise_types()  
gravity_types()  
orientation_types()  
morphology_types()
```

```
style_types()
decoration_types()
compress_types()
distort_types()
dump_option_info(option = "font")
```

### Arguments

option            one of the [option\\_types](#)

### Details

The [dump\\_option\\_info](#) function is equivalent to calling `convert -list [option]` on the command line. It does not return anything, it only makes ImageMagick print stuff to the console, use only for debugging.

### References

ImageMagick Manual: [Enumerations](#)

### See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

---

painting

*Image Painting*

---

### Description

The [image\\_fill\(\)](#) function performs flood-fill by painting starting point and all neighboring pixels of approximately the same color. `Annotate` prints some text on the image.

### Usage

```
image_fill(image, color, point = "+1+1", fuzz = 0, refcolor = NULL)

image_annotate(
  image,
  text,
  gravity = "northwest",
  location = "+0+0",
```

```

degrees = 0,
size = 10,
font = "",
style = "normal",
weight = 400,
kerning = 0,
decoration = NULL,
color = NULL,
strokecolor = NULL,
strokewidth = NULL,
boxcolor = NULL
)

```

### Arguments

|             |  |
|-------------|--|
| image       | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>  |
| color       | a valid <b>color string</b> such as "navyblue" or "#000080". Use "none" for transparency.  |
| point       | a geometry_point string indicating the starting point of the flood-fill  |
| fuzz        | relative color distance (value between 0 and 100) to be considered similar in the filling algorithm  |
| refcolor    | if set, fuzz color distance will be measured against this color, not the color of the starting point. Any color (within fuzz color distance of the given refcolor), connected to starting point will be replaced with the color. If the pixel at the starting point does not itself match the given refcolor (according to fuzz) then no action will be taken. |
| text        | character vector of length equal to 'image' or length 1  |
| gravity     | string with <b>gravity</b> value from <a href="#">gravity_types</a> .  |
| location    | geometry string with location relative to gravity  |
| degrees     | rotates text around center point   |
| size        | font-size in pixels  |
| font        | string with font family such as "sans", "mono", "serif", "Times", "Helvetica", "Trebuchet", "Georgia", "Palatino" or "Comic Sans". See <a href="#">magick_fonts()</a> for what is available.   |
| style       | value of <a href="#">style_types</a> for example "italic"  |
| weight      | thickness of the font, 400 is normal and 700 is bold, see <a href="#">magick_fonts()</a> .   |
| kerning     | increases or decreases whitespace between letters  |
| decoration  | value of <a href="#">decoration_types</a> for example "underline"  |
| strokecolor | a <b>color string</b> adds a stroke (border around the text)   |
| strokewidth | set the strokewidth of the border around the text  |
| boxcolor    | a <b>color string</b> for background color that annotation text is rendered on.  |

**Details**

Note that more sophisticated drawing mechanisms are available via the graphics device using [image\\_draw](#).

Setting a font, weight, style only works if your imagemagick is compiled with fontconfig support.

**See Also**

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [segmentation](#), [transform\(\)](#), [video](#)

**Examples**

```
logo <- image_read("logo:")
logo <- image_background(logo, 'white')
image_fill(logo, "pink", point = "+450+400")
image_fill(logo, "pink", point = "+450+400", fuzz = 25)
# Add some text to an image
image_annotate(logo, "This is a test")
image_annotate(logo, "CONFIDENTIAL", size = 50, color = "red", boxcolor = "pink",
degrees = 30, location = "+100+100")

# Setting fonts requires fontconfig support (and that you have the font)
image_annotate(logo, "The quick brown fox", font = "monospace", size = 50)
```

---

segmentation

---

*Image Segmentation*


---

**Description**

Basic image segmentation like connected components labelling, blob extraction and fuzzy c-means

**Usage**

```
image_connect(image, connectivity = 4)

image_split(image, keep_color = TRUE)

image_fuzzycmeans(image, min_pixels = 1, smoothing = 1.5)
```

**Arguments**

|              |  |
|--------------|--|
| image        | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>  |
| connectivity | number neighbor colors which are considered part of a unique object  |
| keep_color   | if TRUE the output images retain the color of the input pixel. If FALSE all matching pixels are set black to retain only the image mask. |

|                         |   |
|-------------------------|---|
| <code>min_pixels</code> | the minimum number of pixels contained in a hexahedra before it can be considered valid (expressed as a percentage)                       |
| <code>smoothing</code>  | the smoothing threshold which eliminates noise in the second derivative of the histogram (higher values gives smoother second derivative) |

### Details

- [image\\_connect](#) Connect adjacent pixels with the same pixel intensities to do blob extraction
- [image\\_split](#) Splits the image according to pixel intensities
- [image\\_fuzzycmeans](#) Fuzzy c-means segmentation of the histogram of color components

[image\\_connect](#) performs blob extraction by scanning the image, pixel-by-pixel from top-left to bottom-right where regions of adjacent pixels which share the same set of intensity values get combined.

### See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [transform\(\)](#), [video](#)

### Examples

```
# Split an image by color
img <- image_quantize(logo, 4)
layers <- image_split(img)
layers

# This returns the original image
image_flatten(layers)

# From the IM website
objects <- image_convert(demo_image("objects.gif"), colorspace = "Gray")
objects

# Split image in blobs of connected pixel levels
if(magick_config()$version > "6.9.0"){
objects |>
  image_connect(connectivity = 4) |>
  image_split()

# Fuzzy c-means
image_fuzzycmeans(logo)

logo |>
  image_convert(colorspace = "HCL") |>
  image_fuzzycmeans(smoothing = 5)
}
```

---

|              |                           |
|--------------|---------------------------|
| thresholding | <i>Image thresholding</i> |
|--------------|---------------------------|

---

### Description

Thresholding an image can be used for simple and straightforward image segmentation. The function `image_threshold()` allows to do black and white thresholding whereas `image_lat()` performs local adaptive thresholding.

### Usage

```
image_threshold(
  image,
  type = c("black", "white"),
  threshold = "50%",
  channel = NULL
)

image_level(
  image,
  black_point = 0,
  white_point = 100,
  mid_point = 1,
  channel = NULL
)

image_lat(image, geometry = "10x10+5%")
```

### Arguments

|                          |   |
|--------------------------|---|
| <code>image</code>       | magick image object returned by <code>image_read()</code> or <code>image_graph()</code> |
| <code>type</code>        | type of thresholding, either one of lat, black or white (see details below)             |
| <code>threshold</code>   | pixel intensity threshold percentage for black or white thresholding                    |
| <code>channel</code>     | a value of <code>channel_types()</code> specifying which channel(s) to set              |
| <code>black_point</code> | value between 0 and 100, the darkest color in the image                                 |
| <code>white_point</code> | value between 0 and 100, the lightest color in the image                                |
| <code>mid_point</code>   | value between 0 and 10 used for gamma correction  |
| <code>geometry</code>    | pixel window plus offset for LAT algorithm  |

### Details

- `image_threshold(type = "black")`: Forces all pixels below the threshold into black while leaving all pixels at or above the threshold unchanged
- `image_threshold(type = "white")`: Forces all pixels above the threshold into white while leaving all pixels at or below the threshold unchanged

- `image_lat()`: Local Adaptive Thresholding. Looks in a box (width x height) around the pixel neighborhood if the pixel value is bigger than the average minus an offset.

### Examples

```
test <- image_convert(logo, colorspace = "Gray")
image_threshold(test, type = "black", threshold = "50%")
image_threshold(test, type = "white", threshold = "50%")

# Turn image into BW
test |>
  image_threshold(type = "white", threshold = "50%") |>
  image_threshold(type = "black", threshold = "50%")

# adaptive thresholding
image_lat(test, geometry = '10x10+5%')
```

---

transform

*Image Transform*

---

### Description

Basic transformations like rotate, resize, crop and flip. The [geometry](#) syntax is used to specify sizes and areas.

### Usage

```
image_trim(image, fuzz = 0)

image_chop(image, geometry)

image_rotate(image, degrees)

image_resize(image, geometry = NULL, filter = NULL)

image_scale(image, geometry = NULL)

image_sample(image, geometry = NULL)

image_crop(image, geometry = NULL, gravity = NULL, repage = TRUE)

image_extent(image, geometry, gravity = "center", color = "none")

image_flip(image)

image_flop(image)

image_deskew(image, threshold = 40)
```

```

image_deskew_angle(image, threshold = 40)

image_page(image, pagesize = NULL, density = NULL)

image_repage(image)

image_orient(image, orientation = NULL)

image_shear(image, geometry = "10x10", color = "none")

image_distort(image, distortion = "perspective", coordinates, bestfit = FALSE)

```

### Arguments

|             |   |
|-------------|---|
| image       | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a>   |
| fuzz        | relative color distance (value between 0 and 100) to be considered similar in the filling algorithm   |
| geometry    | a <a href="#">geometry</a> string specifying area (for cropping) or size (for resizing).  |
| degrees     | value between 0 and 360 for how many degrees to rotate  |
| filter      | string with <a href="#">filter</a> type from: <a href="#">filter_types</a>  |
| gravity     | string with <a href="#">gravity</a> value from <a href="#">gravity_types</a> .  |
| repage      | resize the canvas to the cropped area   |
| color       | a valid <a href="#">color string</a> such as "navyblue" or "#000080". Use "none" for transparency.  |
| threshold   | straightens an image. A threshold of 40 works for most images.  |
| pagesize    | geometry string with preferred size and location of an image canvas   |
| density     | geometry string with vertical and horizontal resolution in pixels of the image. Specifies an image density when decoding a Postscript or PDF.                                       |
| orientation | string to set image orientation one of the <a href="#">orientation_types</a> . If NULL it applies auto-orientation which tries to infer the correct orientation from the Exif data. |
| distortion  | string to set image orientation one of the <a href="#">distort_types</a> .  |
| coordinates | numeric vector (typically of length 12) with distortion coordinates   |
| bestfit     | if set to TRUE the size of the output image can be different from input   |

### Details

For details see [Magick++ STL](#) documentation. Short descriptions:

- [image\\_trim](#) removes edges that are the background color from the image.
- [image\\_chop](#) removes vertical or horizontal subregion of image.
- [image\\_crop](#) cuts out a subregion of original image
- [image\\_rotate](#) rotates and increases size of canvas to fit rotated image.
- [image\\_deskew](#) auto rotate to correct skewed images

- `image_resize` resizes using custom `filterType`
- `image_scale` and `image_sample` resize using simple ratio and pixel sampling algorithm.
- `image_flip` and `image_flop` invert image vertically and horizontally

The most powerful resize function is `image_resize` which allows for setting a custom resize filter. Output of `image_scale` is similar to `image_resize(img, filter = "point")`.

For resize operations it holds that if no geometry is specified, all frames are rescaled to match the top frame.

### See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [video](#)

### Examples

```
logo <- image_read("logo:")
logo <- image_scale(logo, "400")
image_trim(logo)
image_chop(logo, "100x20")
image_rotate(logo, 45)
# Small image
rose <- image_convert(image_read("rose:"), "png")

# Resize to 400 width or height:
image_resize(rose, "400x")
image_resize(rose, "x400")

# Resize keeping ratio
image_resize(rose, "400x400")

# Resize, force size losing ratio
image_resize(rose, "400x400!")

# Different filters
image_resize(rose, "400x", filter = "Triangle")
image_resize(rose, "400x", filter = "Point")
# simple pixel resize
image_scale(rose, "400x")
image_sample(rose, "400x")
image_crop(logo, "400x400+200+200")
image_extent(rose, '200x200', color = 'pink')
image_flip(logo)
image_flop(logo)
skewed <- image_rotate(logo, 5)
deskewed <- image_deskew(skewed)
attr(deskewed, 'angle')
if(magick_config()$version > "6.8.6")
  image_orient(logo)
image_shear(logo, "10x10")
```

```
building <- demo_image('building.jpg')
image_distort(building, 'perspective', c(7,40,4,30,4,124,4,123,85,122,100,123,85,2,100,30))
```

---

video

*Write Video*

---

## Description

High quality video / gif exporter based on external packages [gifski](#) and [av](#).

## Usage

```
image_write_video(image, path = NULL, framerate = 10, ...)
```

```
image_write_gif(image, path = NULL, delay = 1/10, ...)
```

## Arguments

|           |   |
|-----------|---|
| image     | magick image object returned by <a href="#">image_read()</a> or <a href="#">image_graph()</a> |
| path      | filename of the output gif or video. This is also the return value.                           |
| framerate | frames per second, passed to <a href="#">av_encode_video</a>                                  |
| ...       | additional parameters passed to <a href="#">av_encode_video</a> and <a href="#">gifski</a> .  |
| delay     | duration of each frame in seconds (inverse of framerate)                                      |

## Details

This requires an image with multiple frames. The GIF exporter accomplishes the same thing as [image\\_animate](#) but much faster and with better quality.

## See Also

Other image: [\\_index\\_](#), [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#)

---

wizard

*Example Images*

---

### Description

Example images included with ImageMagick:

### Usage

logo

### Format

An object of class magick-image of length 1.

### Details

- logo: ImageMagick Logo, 640x480
- wizard: ImageMagick Wizard, 480x640
- rose : Picture of a rose, 70x46
- granite : Granite texture pattern, 128x128

---

[\\_index\\_](#)

*Magick Image Processing*

---

### Description

The magick package for graphics and image processing in R. Important resources:

- [R introduction vignette](#): getting started
- [Magick++ API](#) and [Magick++ STL](#) detailed descriptions of methods and parameters

### Details

Documentation is split into the following pages:

- [analysis](#) - metrics and calculations: compare, fft
- [animation](#) - manipulate or combine multiple frames: animate, morph, mosaic, montage, average, append, apply
- [attributes](#) - image properties: comment, info
- [color](#) - contrast, brightness, colors: modulate, quantize, map, transparent, background, colorize, contrast, normalize, enhance, equalize, median
- [composite](#) - advanced joining: composite, border, frame

- [device](#) - creating graphics and drawing on images
- [editing](#) - basic image IO: read, write, convert, join, display, brose
- [effects](#) - fun effects: despeckle, reducennoise, noise, blur, charcoal, edge, oilpaint, emboss, implode, negate
- [geometry](#) - specify points, areas and sizes using geometry syntax
- [ocr](#) - extract text from image using [tesseract](#) package
- [options](#) - list option types and values supported in your version of ImageMagick
- [painting](#) - flood fill and annotating text
- [transform](#) - shape operations: trim, chop, rotate, resize, scale, sample crop, flip, flop, deskew, page

**See Also**

Other image: [analysis](#), [animation](#), [attributes\(\)](#), [color](#), [composite](#), [defines](#), [device](#), [edges](#), [editing](#), [effects\(\)](#), [fx](#), [geometry](#), [morphology](#), [ocr](#), [options\(\)](#), [painting](#), [segmentation](#), [transform\(\)](#), [video](#)

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