

# Package ‘magick’

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**Type** Package

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

**Version** 2.9.1

**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. Also includes a graphics device for creating 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	<i>Image Analysis</i>
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### 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 <a href="#">image_read()</a> or <a href="#">image_graph()</a>
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://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_virtual_pixel(image, virtual_pixel_method)
```

```
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 <b>colorspace</b> 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 <b>channel</b> from <a href="#">channel_types</a> for example "alpha" or "hue" or "cyan"
color	a valid <b>color string</b> 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.
virtual_pixel_method	a string with a <b>virtual pixel method</b> from <a href="#">virtual_pixel_methods</a> .
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
- [image\\_virtual\\_pixel](#) sets the [virtual pixel](#) filling method to use when a raw distortion transformation (e.g. [image\\_distort](#)) introduces new pixels in the image. Some high-level transformations (e.g. [image\\_rotate](#) and [image\\_shear](#)) will override the virtual pixel value with a default one.

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)

# Black virtual pixel on a 45° rotation
logo |> image_virtual_pixel("Black") |>
  image_distort("AffineProjection", sqrt(0.5) * c(1,1,-1,1,0,0), bestfit = TRUE)

# Tile virtual pixel on a 45° rotation
logo |> image_virtual_pixel("Tile") |>
  image_distort("AffineProjection", sqrt(0.5) * c(1,1,-1,1,0,0), bestfit = TRUE)

# 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 <a href="#">composite operator</a> 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 <a href="#">gravity</a> 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 <a href="#">geometry string</a> 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 <- ggplot(mtcars, aes(mpg, wt)) + geom_point()
myplot + annotation_raster(raster, 25, 35, 3, 5)

# Or overplot image using grid
library(grid)
ggplot(cars, aes(speed, dist)) + geom_point() + geom_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", HOcr = 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> .
HOcr	if TRUE return results as HOcr 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()
virtual_pixel_methods()
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 <a href="#">geometry_point</a> 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 <code>lat</code> , <code>black</code> or <code>white</code> (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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