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# **imagecolor Documentation**

*Release 2.0.0rc1*

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## imagecolor - Extract colors from images

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imagecolor is a python module for averaging images using [pillow](#). When processing of multiple images it uses [concurrent.futures](#) for multiprocessing.

### 1.1 Important notes

#### 1.1.1 Warnings

<b>Warning:</b> imagecolor only supports python3.6 currently.
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#### 1.1.2 Notes

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**Note:** imagecolor is only tested on macOS and Linux currently.

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**Note:** imagecolor only works on 3 channel RGB images.

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### 1.2 Installation

#### 1.2.1 Basic Installation

Install imagecolor with **pip**:

```
$ pip install imagecolor
```

Depending on your platform you might need to install the required [dependencies](#) for pillow before pillow (and imagecolor) will install fully.

## 1.3 Usage examples

To use imagecolor import it with

```
import imagecolor
```

### 1.3.1 average an image

Average a single image file to a dict containing name, red, green, & blue

```
imagecolor.file_average(image)
```

If you are not interested in the file name you can use `core_average()` instead.

```
imagecolor.core_average(image)
```

### 1.3.2 average all images in a directory

Averages all images in a directory to a list of dicts containing name, red, green, & blue

```
imagecolor.directory_average(directory)
```

### 1.3.3 average a directory

Averages all images in a directory to a dict containing name, red, green, & blue

```
imagecolor.single_directory_average(directory)
```

### 1.3.4 average nested directories

Uses `single_directory_average` to average the directory and all subdirectories containing images to a list of dicts containing name, red, green, & blue

```
imagecolor.nested_directory_average(directory)
```

For more details read the full module [reference](#)

## 1.4 Development

### 1.4.1 Development Installation

image color uses [pipenv](#) to manage development dependencies.

Install development dependencies with **pipenv**:

```
$ pipenv install --dev
```

### 1.4.2 make commands

- `all`: calls `release` and `html`
- `release` checks the code with `test` and then calls `source-dist` and `wheel-dist`
- `source-dist` builds a source distribution
- `wheel-dist` builds a wheel distribution
- `lint` lints imagecolor with `pylint`, `pycodestyle`, `pydocstyle`
- `test` lints the code and then runs `pytest`
- `html` builds html docs with `Sphinx`
- `clean` cleans the build and dist directories





### 2.1 The MIT License

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## 3.1 imagecolor package

### 3.1.1 Module contents

imagecolor initialization.

`imagecolor.core_average` (*image*, *downsample=True*, *max\_size=100*, *alpha\_threshold=245*)  
Average a single image.

Averages a single image from a file or file-like object. By default downsamples images that are larger than 100px on the long side for speed. Ignores pixels that are more transparent than the `alpha_threshold`.

#### Parameters

- **image** (*str*) – A filename, `pathlib.Path` object or a file object.
- **downsample** (*bool*, *optional*) – if downsampling is enabled to speed up iteration.
- **max\_size** (*int*, *optional*) – max length of longest side if `downsample == True`.
- **alpha\_threshold** (*int*, *optional*) – level at which transparent pixels are excluded.

**Returns** A dictionary with the following keys: red, green, blue.

**Return type** dict

#### Raises

- `IOError` – If the file cannot be found, or the image cannot be opened and identified.
- `ImageAveragingError` – If the image could not be averaged.

`imagecolor.file_average` (*image*, *name=None*, *downsample=True*, *max\_size=100*, *alpha\_threshold=245*)  
Average a single image and keep track of its file name.

Averages a single image from a file or file-like object. `name` is extracted from the filepath unless set. By default downsamples images that are larger than 100px on the long side for speed. Ignores pixels that are more transparent than the `alpha_threshold`.

**Parameters**

- **image** (*str*) – A filename, `pathlib.Path` object or a file object.
- **name** (*str*, *optional*) – auto generated from path unless set.
- **downsample** (*bool*, *optional*) – if downsampling is enabled to speed up iteration.
- **max\_size** (*int*, *optional*) – max length of longest side if `downsample == True`.
- **alpha\_threshold** (*int*, *optional*) – level at which transparent pixels are excluded.

**Returns** A dictionary with the following keys: `name`, `red`, `green`, `blue`.

**Return type** `dict`

**Raises**

- `AttributeError` – If `name` is not passed in and cannot be set from filepath.
- `IOError` – If the file cannot be found, or the image cannot be opened and identified.
- `ImageAveragingError` – If the image could not be averaged.

`imagecolor.directory_average` (*path*, *image\_formats*=(`'jpeg'`, `'png'`))

Average all images in a directory.

Accepts the path to a directory and averages each individual image. Uses `concurrent.futures` to process images in parallel. If images fail to average successfully, the exceptions are caught and logged allowing other images to finish. By default only averages `jpeg` and `png` images.

**Parameters**

- **path** (*str*) – Path to directory.
- **image\_formats** (*tuple of str*, *optional*) – tuple of image formats used by `imgHDR` to determine what types of images to average. Defaults: (`'jpeg'`, `'png'`)

**Returns** For each image averaged, returns a list of dictionaries each with the following keys: `name`, `red`, `green`, `blue`.

**Return type** `list`

**Raises** `ImageAveragingError` – If no images were averaged successfully.

`imagecolor.single_directory_average` (*path*, *image\_formats*=(`'jpeg'`, `'png'`))

Average all images in a directory into a single average.

Accepts the path to a directory and averages each all images together into a single directory average. Uses `concurrent.futures` to process images in parallel. If images fail to average successfully, the exceptions are caught and logged allowing other images to finish. By default only averages `jpeg` and `png` images.

**Parameters**

- **path** (*str*) – Path to directory.
- **image\_formats** (*tuple of str*, *optional*) – tuple of image formats used by `imgHDR` to determine what types of images to average. Defaults: (`'jpeg'`, `'png'`)

**Returns** A dictionary with the following keys: `name`, `red`, `green`, `blue`.

**Return type** `dict`

**Raises** *DirectoryAveragingError* – If the directory could not be averaged.

`imagecolor.nested_directory_average` (*path*, *image\_formats*=('jpeg', 'png'))

Averages all subdirectories into a directory average for each directory.

Accepts the path to a directory and walks all the enclosed directories calling `single_directory_average` for each one that contains images. Uses `concurrent.futures` to process images in parallel. If images fail to average successfully, the exceptions are caught and logged allowing other images to finish. By default only averages jpeg and png images.

**Parameters**

- **path** (*str*) – path to directory
- **image\_formats** (*tuple of str, optional*) – tuple of image formats used by `img_hdr` to determine what types of images to average. Defaults: ('jpeg', 'png')

**Returns** For each directory averaged, returns a list of dictionaries each with the following keys: name, red, green, blue.

**Return type** list

**exception** `imagecolor.ImageColorException`

Bases: `Exception`

Base Exception for all imagecolor exceptions.

**exception** `imagecolor.ImageAveragingError`

Bases: `imagecolor.exceptions.ImageColorException`

Raised when an image was unable to be averaged.

**exception** `imagecolor.DirectoryAveragingError`

Bases: `imagecolor.exceptions.ImageColorException`

Raised when a directory was unable to be averaged.

**exception** `imagecolor.NoResultsError`

Bases: `imagecolor.exceptions.ImageColorException`

Raised when a list of results is empty or invalid.

`imagecolor.results_line` (*results*)

Create a line of pixels from a list of results.

Accepts a list of results and creates an image that is 1 pixel tall and the length of the number of results. The image contains a pixel of the color of each result in the list of results.

**Parameters** **results** (*list*) – a list of imagecolor results

**Returns** linear image containing the results

**Return type** `PIL.Image.object`

`imagecolor.results_rectangle` (*results*, *aspectratio*=(3, 2))

Create a rectangle of pixels from a list of results.

Accepts a list of results and creates an image that is rectangular. The aspect ratio can be set by passing a list formatted as [16,9] to `aspectratio`. The default is 3x2. The image contains a pixel of the color of each result in the list of results.

**Parameters**

- **results** (*list*) – a list of imagecolor results.

- **aspectratio** (*tuple of int*) – the aspect ratio of the image being created. Format (3, 2)

**Returns** rectangular image containing the results.

**Return type** PIL.Image.object

`imagecolor.results_save_csv(results, path)`

Create a csv file from a list of results.

Accepts the path to a new csv file and a list containing results. Writes the current results to a csv file which can be re-loaded again by using `csv_to_results`. The csv created is formatted as follows: ‘File or Folder’, ‘Red’, ‘Green’, ‘Blue’

**Parameters**

- **results** (*list*) – a list of imagecolor results.
- **path** (*str*) – the path to the file to be created.

`imagecolor.results_load_csv(path)`

Create a list of results from a csv file.

Accepts the path to a csv file formatted as follows: ‘File or Folder’, ‘Red’, ‘Green’, ‘Blue’ parses the file line by line skipping the header. Returns a list containing an list for each line in the csv. Does not do any input checks other than converting the r, g, b columns to ints.

**Parameters** **path** (*str*) – the path to the file to be loaded.

**Returns** a list of imagecolor results.

**Return type** list

### 3.1.2 Submodules

### 3.1.3 imagecolor.average module

imagecolor functions for averaging images.

`imagecolor.average.core_average(image, downsample=True, max_size=100, alpha_threshold=245)`

Average a single image.

Averages a single image from a file or file-like object. By default downsamples images that are larger than 100px on the long side for speed. Ignores pixels that are more transparent than the `alpha_threshold`.

**Parameters**

- **image** (*str*) – A filename, `pathlib.Path` object or a file object.
- **downsample** (*bool, optional*) – if downsampling is enabled to speed up iteration.
- **max\_size** (*int, optional*) – max length of longest side if `downsample == True`.
- **alpha\_threshold** (*int, optional*) – level at which transparent pixels are excluded.

**Returns** A dictionary with the following keys: red, green, blue.

**Return type** dict

**Raises**

- `IOError` – If the file cannot be found, or the image cannot be opened and identified.

- `ImageAveragingError` – If the image could not be averaged.

`imagecolor.average.directory_average` (*path*, *image\_formats*=('jpeg', 'png'))

Average all images in a directory.

Accepts the path to a directory and averages each individual image. Uses `concurrent.futures` to process images in parallel. If images fail to average successfully, the exceptions are caught and logged allowing other images to finish. By default only averages jpeg and png images.

#### Parameters

- **path** (*str*) – Path to directory.
- **image\_formats** (*tuple of str, optional*) – tuple of image formats used by `imghdr` to determine what types of images to average. Defaults: ('jpeg', 'png')

**Returns** For each image averaged, returns a list of dictionaries each with the following keys: name, red, green, blue.

**Return type** list

**Raises** `ImageAveragingError` – If no images were averaged successfully.

`imagecolor.average.file_average` (*image*, *name*=None, *downsample*=True, *max\_size*=100, *alpha\_threshold*=245)

Average a single image and keep track of its file name.

Averages a single image from a file or file-like object. `name` is extracted from the filepath unless set. By default downsamples images that are larger than 100px on the long side for speed. Ignores pixels that are more transparent than the `alpha_threshold`.

#### Parameters

- **image** (*str*) – A filename, `pathlib.Path` object or a file object.
- **name** (*str, optional*) – auto generated from path unless set.
- **downsample** (*bool, optional*) – if downsampling is enabled to speed up iteration.
- **max\_size** (*int, optional*) – max length of longest side if `downsample == True`.
- **alpha\_threshold** (*int, optional*) – level at which transparent pixels are excluded.

**Returns** A dictionary with the following keys: name, red, green, blue.

**Return type** dict

#### Raises

- `AttributeError` – If `name` is not passed in and cannot be set from filepath.
- `IOError` – If the file cannot be found, or the image cannot be opened and identified.
- `ImageAveragingError` – If the image could not be averaged.

`imagecolor.average.nested_directory_average` (*path*, *image\_formats*=('jpeg', 'png'))

Averages all subdirectories into a directory average for each directory.

Accepts the path to a directory and walks all the enclosed directories calling `single_directory_average` for each one that contains images. Uses `concurrent.futures` to process images in parallel. If images fail to average successfully, the exceptions are caught and logged allowing other images to finish. By default only averages jpeg and png images.

#### Parameters

- **path** (*str*) – path to directory

- **image\_formats** (*touple of str, optional*) – tuple of image formats used by imghdr to determine what types of images to average. Defaults: ('jpeg', 'png')

**Returns** For each directory averaged, returns a list of dictionaries each with the following keys: name, red, green, blue.

**Return type** list

`imagecolor.average.single_directory_average` (*path, image\_formats=('jpeg', 'png')*)  
Average all images in a directory into a single average.

Accepts the path to a directory and averages each all images together into a single directory average. Uses `concurrent.futures` to process images in paralell. If images fail to average successfully, the exceptions are caught and logged allowing other images to finish. By default only averages jpeg and png images.

**Parameters**

- **path** (*str*) – Path to directory.
- **image\_formats** (*touple of str, optional*) – tuple of image formats used by imghdr to determine what types of images to average. Defaults: ('jpeg', 'png')

**Returns** A dictionary with the following keys: name, red, green, blue.

**Return type** dict

**Raises** `DirectoryAveragingError` – If the directory could not be averaged.

### 3.1.4 imagecolor.exceptions module

imagecolor module containing all publically raised exceptions.

**exception** `imagecolor.exceptions.DirectoryAveragingError`  
Bases: `imagecolor.exceptions.ImageColorException`

Raised when an directory was unable to be averaged.

**exception** `imagecolor.exceptions.ImageAveragingError`  
Bases: `imagecolor.exceptions.ImageColorException`

Raised when an image was unable to be averaged.

**exception** `imagecolor.exceptions.ImageColorException`  
Bases: `Exception`

Base Exception for all imagecolor exceptions.

**exception** `imagecolor.exceptions.NoResultsError`  
Bases: `imagecolor.exceptions.ImageColorException`

Raised when a list of results is empty or invalid.

### 3.1.5 imagecolor.loadsave module

imagecolor functions for loading and saving results.

`imagecolor.loadsave.results_line` (*results*)  
Create a line of pixels from a list of results.

Accepts a list of results and creates an image that is 1 pixel tall and the length of the number of results. The image contains a pixel of the color of each result in the list of results.

**Parameters** **results** (*list*) – a list of imagecolor results



**Returns** linear image containing the results

**Return type** PIL.Image.object

`imagecolor.loadsave.results_load_csv(path)`

Create a list of results from a csv file.

Accepts the path to a csv file formatted as follows: 'File or Folder', 'Red', 'Green', 'Blue' parses the file line by line skipping the header. Returns a list containing an list for each line in the csv. Does not do any input checks other than converting the r, g, b columns to ints.

**Parameters** `path` (*str*) – the path to the file to be loaded.

**Returns** a list of imagecolor results.

**Return type** list

`imagecolor.loadsave.results_rectangle(results, aspectratio=(3, 2))`

Create a rectangle of pixels from a list of results.

Accepts a list of results and creates an image that is rectangular. The aspect ratio can be set by passing a list formatted as [16,9] to `aspectratio`. The default is 3x2. The image contains a pixel of the color of each result in the list of results.

**Parameters**

- **results** (*list*) – a list of imagecolor results.
- **aspectratio** (*tuple of int*) – the aspect ratio of the image being created. Format (3, 2)

**Returns** rectangular image containing the results.

**Return type** PIL.Image.object

`imagecolor.loadsave.results_save_csv(results, path)`

Create a csv file from a list of results.

Accepts the path to a new csv file and a list containing results. Writes the current results to a csv file which can be re-loaded again by using `csv_to_results`. The csv created is formatted as follows: 'File or Folder', 'Red', 'Green', 'Blue'

**Parameters**

- **results** (*list*) – a list of imagecolor results.
- **path** (*str*) – the path to the file to be created.



## CHAPTER 4

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### Indices and tables

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