Adafruit_ImageLoad_Library Documentation

Release 1.0

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Contents

This library decodes an image file into new bitmap and palette objects of the provided type. It's designed to load code needed during decoding as needed. This is meant to minimize the memory overhead of the decoding code.

Only certain types of bitmaps work with this library, and they often have to be exported in specific ways. To find out what types are supported and how to make them, see this learn guide page.

CHAPTER 1

Usage Example

```
import board
import displayio
import adafruit_imageload

image, palette = adafruit_imageload.load(
    "images/4bit.bmp", bitmap=displayio.Bitmap, palette=displayio.Palette
)
tile_grid = displayio.TileGrid(image, pixel_shader=palette)

group = displayio.Group()
group.append(tile_grid)
board.DISPLAY.show(group)

while True:
    pass
```

CHAPTER 2

Contributing

Contributions are welcome! Please read our Code of Conduct before contributing to help this project stay welcoming.

CHAPTER 3

Documentation

For information on building library documentation, please check out this guide.

CHAPTER 4

Table of Contents

4.1 Simple test

Ensure your image loads with this simple test.

Listing 1: examples/imageload_simpletest.py

```
# SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
# SPDX-License-Identifier: MIT

import board
import displayio
import adafruit_imageload

image, palette = adafruit_imageload.load("images/4bit.bmp")

tile_grid = displayio.TileGrid(image, pixel_shader=palette)

group = displayio.Group()
group.append(tile_grid)
board.DISPLAY.show(group)

while True:
    pass
```

4.2 adafruit_imageload

Load pixel values (indices or colors) into a bitmap and colors into a palette.

- Author(s): Scott Shawcroft

adafruit_imageload.**load**(*filename*, *, *bitmap=None*, *palette=None*)
Load pixel values (indices or colors) into a bitmap and colors into a palette.

bitmap is the desired type. It must take width, height and color_depth in the constructor. It must also have a _load_row method to load a row's worth of pixel data.

palette is the desired pallete type. The constructor should take the number of colors and support assignment to indices via [].

4.3 adafruit_imageload.bmp

Load pixel values (indices or colors) into a bitmap and colors into a palette from a BMP file.

- Author(s): Scott Shawcroft

adafruit_imageload.bmp.**load**(*file*, *, *bitmap=None*, *palette=None*)
Loads a bmp image from the open `file`.

Returns tuple of bitmap object and palette object.

Parameters

- **bitmap** (*object*) – Type to store bitmap data. Must have API similar to `displayio.Bitmap`. Will be skipped if None
- **palette** (*object*) – Type to store the palette. Must have API similar to `displayio.Palette`. Will be skipped if None

4.4 adafruit_imageload.bmp.indexed

Load pixel values (indices or colors) into a bitmap and colors into a palette from an indexed BMP.

- Author(s): Scott Shawcroft

adafruit_imageload.bmp.indexed.**decode_rle**(*bitmap*, *file*, *compression*, *y_range*, *width*)
Helper to decode RLE images

adafruit_imageload.bmp.indexed.**load**(*file*, *width*, *height*, *data_start*, *colors*, *color_depth*, *compression*, *, *bitmap=None*, *palette=None*)
Loads indexed bitmap data into bitmap and palette objects.

Parameters

- **file** (*file*) – The open bmp file
- **width** (*int*) – Image width in pixels
- **height** (*int*) – Image height in pixels
- **data_start** (*int*) – Byte location where the data starts (after headers)
- **colors** (*int*) – Number of distinct colors in the image
- **color_depth** (*int*) – Number of bits used to store a value
- **compression** (*int*) – 0 - none, 1 - 8bit RLE, 2 - 4bit RLE

4.5 Developing

Strategy: * read headers to determine file type * keep a pointer to the start of data * read data into the Palette for all colors present * rewind the file pointer back to start of data * read data into the Bitmap * return a bitmap and palette instance

4.5.1 Shared Bindings

This library uses interfaces from CircuitPython's `displayio` module (Bitmap and Palette) to load images from disk into memory.

The Bitmap and Palette objects are related, and together can be used to display the image on a screen for the user.

The Palette is a list of colors present in the image. Its constructor takes a single argument: (int) max_colors, representing how many colors will be populated in the palette.

4.5.1.1 Palette code example

```
palette = Palette(4)  # 4 represents that we will define four colors in palette
palette[0] = b'\x00\x00\x00\x00'  # white
palette[1] = b'\xFF\x00\x00\x00'  # red
palette[2] = b'\x00\xFF\x00\x00'  # green
palette[3] = b'\x00\x00\xFF\x00'  # blue
```

4.5.1.2 Bitmap code example

```
bitmap = Bitmap(3, 2, 4)  # 3 pixels wide, two pixels tall, 4 colors
bitmap[0,0] = 0  # palette color 0
bitmap[0,1] = 1  # palette color 1
...
```

4.5.1.3 Example of Palette and Image

The example is 4bit.bmp from the examples/images folder:

The Palette object appears like this after loading:

```
Palette:
[0] b'\x00\x00\x00\x00'
[1] b'\x7f\x00\x00\x00'
[2] b'\xff\x00\x00\x00'
[3] b'w\x00\xb1\x00'
[4] b'\xff\x00\x9d\x00'
[5] b'\x00\x00\xff\x00'
[6] b'\xff\x00\xfe\x00'
[7] b'\xbf\x80\x00\x00'
[8] b'zzz\x00'
[9] b'\xff\x9e\xa5\x00'
[10] b'\x00\x98\xff\x00'
[11] b'\x00\xff\x00\x00'
```

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```
[12] b'h\xff\x00\x00'
[13] b'\xfb\xff\x9e\x00'
[14] b'\x00\xfb\xff\x00'
[15] b'\xfb\xfb\xfb\x00'
```

This palette has 16 colors. The value in square brackets [] is the color's index in the palette. The byte values are the RGB or RGB + padding of each color.

The Bitmap is an grid of which palette color to use in each position of the image.

The corresponding Bitmap to the example above appears like this after loading:

```
5   5   5   5   5   5   5   5   5   5   5   5   5   5   5
5   5   5   5   5   5   5   5   5   5   5   5   5   5   5
5   5   5   5   5   5   5   5   5   5   5   5   5   5   5
11  11  11   5   5   5  15  15  15   5   5   5   2   2   2
11  11  11   5   5   5  15  15  15   5   5   5   2   2   2
6   6   6   5   5   5   1   1   1   5   5   5  10  10  10
6   6   6   5   5   5   1   1   1   5   5   5  10  10  10
6   6   6   5   5   5   1   1   1   5   5   5  10  10  10
14  14  14   5   5   5   9   9   9   5   5   5   8   8   8
14  14  14   5   5   5   9   9   9   5   5   5   8   8   8
14  14  14   5   5   5   9   9   9   5   5   5   8   8   8
3   3   3   5   5   5   0   0   0   5   5   5  13  13  13
3   3   3   5   5   5   0   0   0   5   5   5  13  13  13
4   4   4   5   5   5  12  12  12   5   5   5   7   7   7
4   4   4   5   5   5  12  12  12   5   5   5   7   7   7
4   4   4   5   5   5  12  12  12   5   5   5   7   7   7
5   5   5   5   5   5   5   5   5   5   5   5   5   5   5
```

This grid represents the example image (`15 pixels wide` and `17 pixels tall`). The coordinates are arranged in a zero indexed grid, starting in the top left at `[0,0]`, and continuing down and to the right to a final coordinate of `[14,16]`.

The value at each position is an integer, representing an entry in the palette object.

For example, the Bitmap coordinate `[0,0]` has the value (integer) `5`.

This corresponds to the the Palette object's, `[5]` which is `b'\x00\x00\xff\x00'`. This is a byte string that represents a color.

CHAPTER 5

Indices and tables

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