Article

Building a basic image conversion workflow

Learn the fundamentals of the convert-any-to-any function by converting a CMYK image to an RGB image.

Overview

The functions in the vImage library that perform image-processing operations are specific to properties such as bit-depth, the number of channels, and channel ordering. For example, the `vImageAlphaBlend_ARGB8888(_:_:_:_:)` function works with 8-bit-per-channel, ARGB image data. The convert-any-to-any functionality allows you to convert images with formats you know at runtime to a format you define at compile time.

You can use the vImage convert-any-to-any functionality to convert image data between different bit depths, different channel counts, and different color spaces. In this example, the code converts a 16-bit-per-channel CMYK source image to an 8-bit-per-channel RGB destination image. In some cases, working in a non-RGB color space simplifies image-processing tasks. For an example of using convert-any-to-any to work in L*a*b* color space, see Adjusting the hue of an image.

Create the source and destination image formats

A `vImageConverter` instance – that contains the information to perform image conversion – requires two `vImage_CGImageFormat` structures that describe the source and destination formats. The code below defines the CMYK source format and the RGB destination format:

```
let cmykSourceImageFormat = vImage_CGImageFormat(
    bitsPerComponent: 16,
    bitsPerPixel: 16 * 4,
    colorSpace: CGColorSpaceCreateDeviceCMYK(),
```

```
    bitmapInfo: CGBitmapInfo(rawValue: CGImageAlphaInfo.none.rawValue))!

let rgbDestinationImageFormat = vImage_CGImageFormat(
    bitsPerComponent: 8,
    bitsPerPixel: 8 * 3,
    colorSpace: CGColorSpaceCreateDeviceRGB(),
    bitmapInfo: CGBitmapInfo(rawValue: CGImageAlphaInfo.none.rawValue))!
```

Create the converter

The Swift `make(sourceFormat:destinationFormat:flags:)` method calls the underlying `vImageConverter_CreateWithCGImageFormat(_:_:_:_:_:)` function and returns a new any-to-any converter instance.

```
let cmykToRgbConverter = try vImageConverter.make(
    sourceFormat: cmykSourceImageFormat,
    destinationFormat: rgbDestinationImageFormat)
```

Perform the conversion using pixel buffers

The code below converts the CMYK image data that `cmykSourceBuffer` contains and writes the RGB result to `rgbDestinationBuffer`. In this example, `cmykSourceBuffer` is a `vImage.PixelBuffer` structure with a `vImage.Interleaved16Ux4` format.

The Swift `convert(from:to:)` method calls the underlying `vImageConvert_AnyToAny(_:_:_:_:)` function.

```
let rgbDestinationBuffer = vImage.PixelBuffer<vImage.Interleaved8x3>(
    size: cmykSourceBuffer.size)

try cmykToRgbConverter.convert(from: cmykSourceBuffer,
                               to: rgbDestinationBuffer)
```

On return, `rgbDestinationBuffer` contains the RGB representation of the CMYK source image.

Perform the conversion using vImage buffers

If you're creating apps for older operating systems that don't support the `vImage.PixelBuffer` API, the following code performs the same conversion using `vImage_Buffer` structures.

The Swift `convert(source:destination:flags:)` method calls the underlying `vImageConvert_AnyToAny(_:_:_:_:_:)` function

```
var rgbDestinationBuffer = try vImage_Buffer(
    size: cmykSourceBuffer.size,
    bitsPerPixel: rgbDestinationImageFormat.bitsPerPixel)

try cmykToRgbConverter.convert(source: cmykSourceBuffer,
                               destination: &rgbDestinationBuffer)
```

On return, `rgbDestinationBuffer` contains the RGB representation of the CMYK source image.

See Also

Conversion Between Image Formats

{} Converting color images to grayscale

Convert an RGB image to grayscale using matrix multiplication.

Applying color transforms to images with a multidimensional lookup table

Precompute translation values to optimize color space conversion and other pointwise operations.

{} Converting luminance and chrominance planes to an ARGB image

Create a displayable ARGB image using the luminance and chrominance information from your device's camera.

Conversion

Convert an image to a different format.