Core Image

Photo Editing in Color and Depth

Pragma Conference – October 9, 2019

by Tobias Due Munk

KABELL & MUNK

kabellmunk.dk

Kalle Kabell
@kkabell

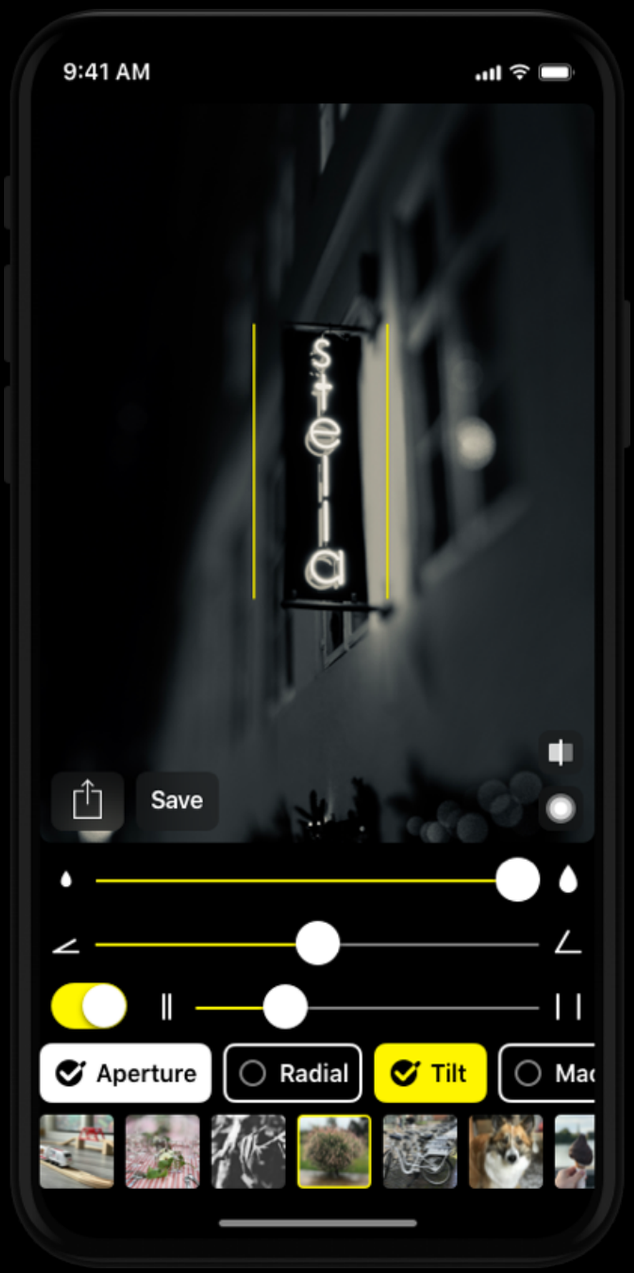
Tobias Due Munk
@tobiasdm

KABELL & MUNK

kabellmunk.dk

~~Kalle Kabell~~
~~@kkabell~~

Tobias Due Munk
@tobiasdm



Piculet

Slør

Agenda

- Introduction - 30 minutes
- Basics – 1 hour
- Custom – 1 hour
- Extensions and Free Play – 2 hours
- Show Casing – 1 hour

Intro

Core Image

- Image Processing and Analysis
- iOS, macOS, and tvOS
- GPU
- Recipe based
- 207 built-in filters

Extensible

- Core Graphics
- Accelerate vImage
- Metal – Metal Shading Language
- CPU-based processing, e.g. Swift

CIImage

CIFilter

Sepia

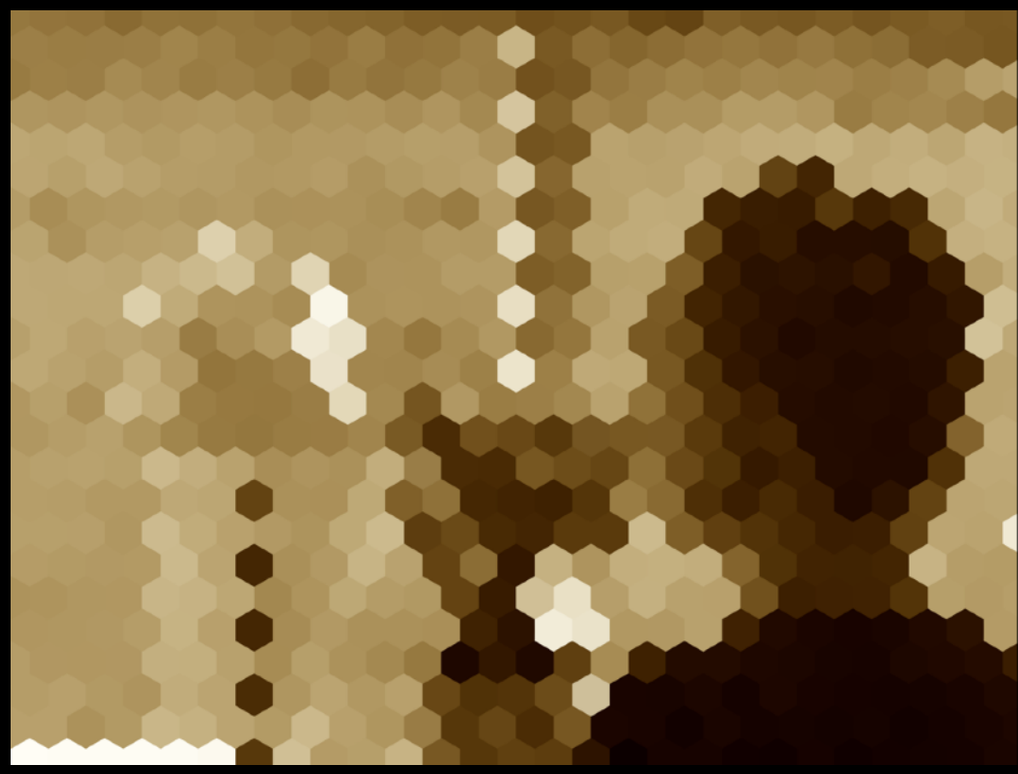
CIImage

CIImage

CIFilter

Hex

CIImage



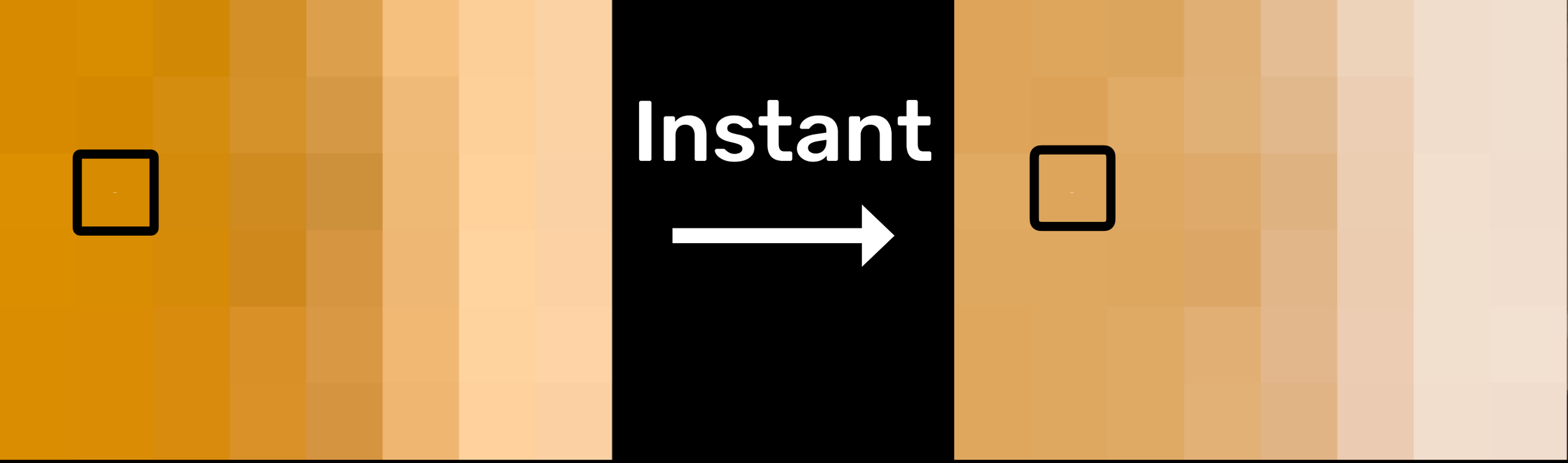
CIImage

CIFilter

Instant

CIImage

Instant


Instant

Instant

Pixel

Red 0.86

Green 0.55

Blue 0.0

Alpha 1.0

Pixel

Red 0.87

Green 0.65

Blue 0.36

Alpha 1.0

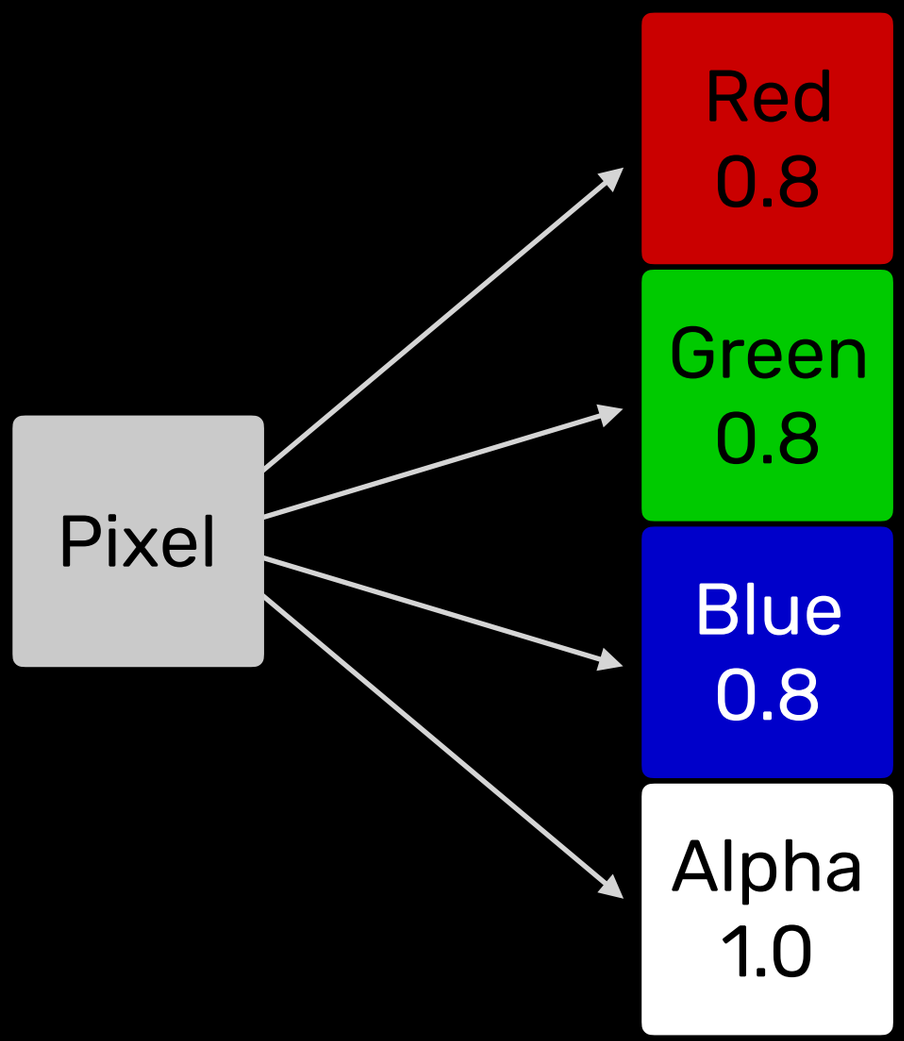
Color

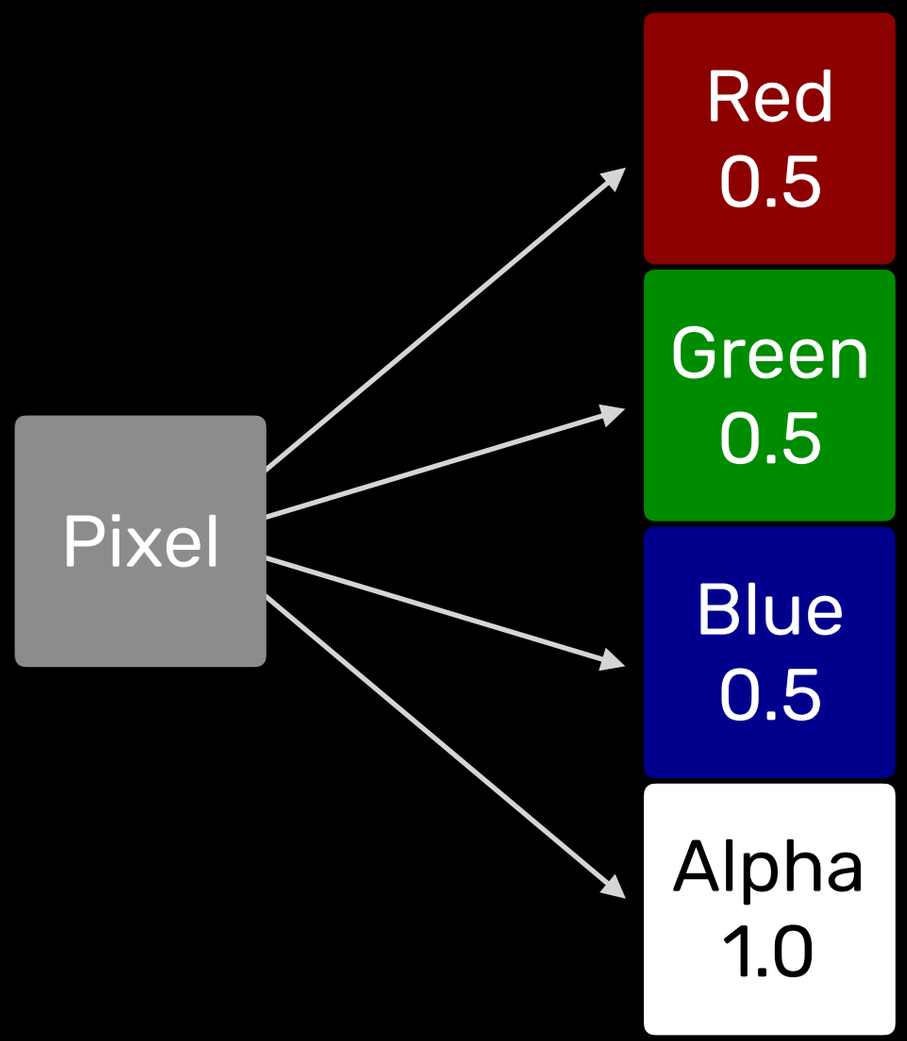
CIImage

Depth Map

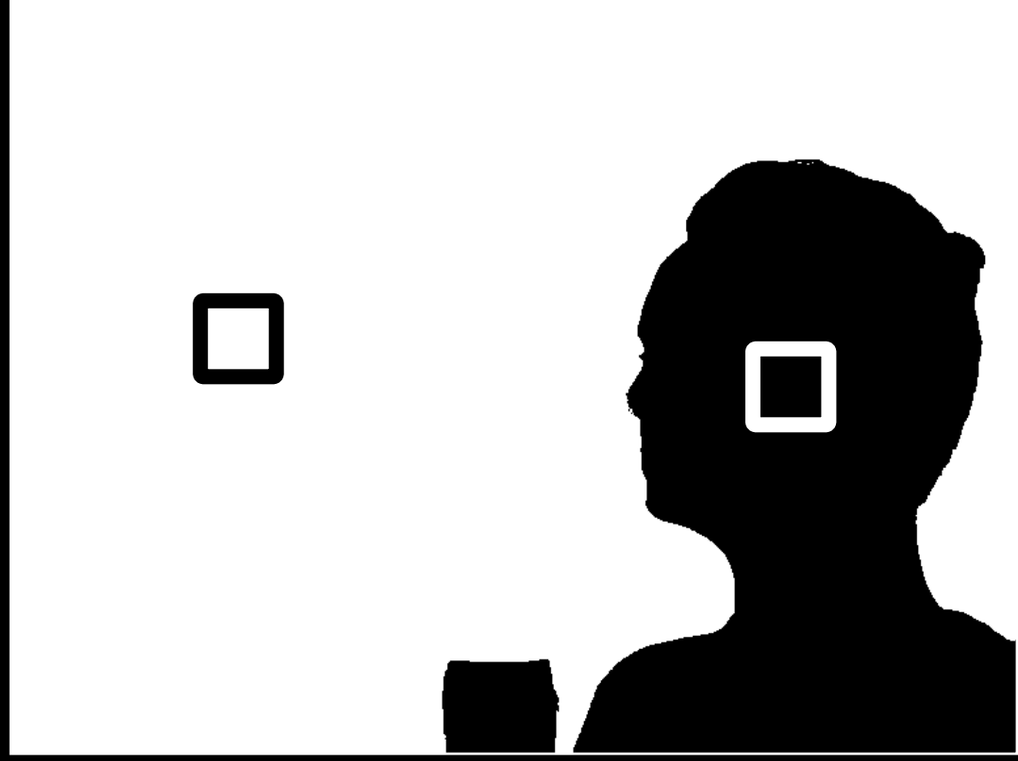
CIImage

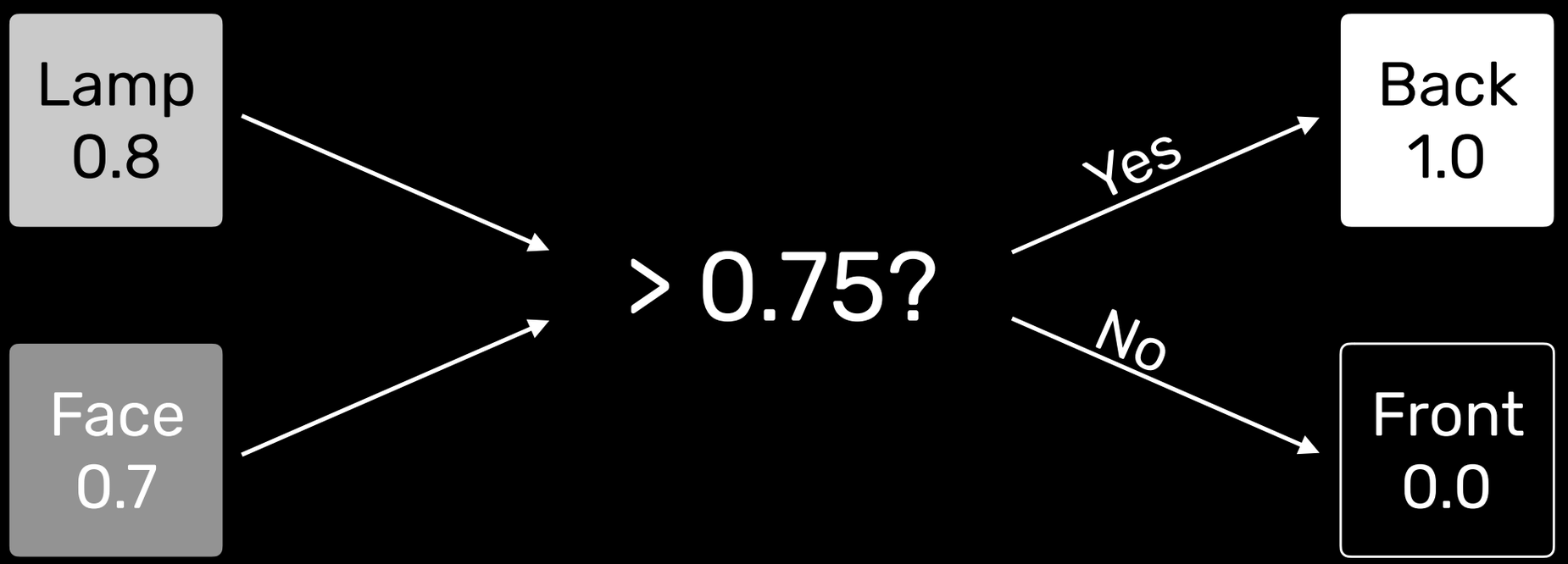
Norm


Red
0.8
Green
0.8
Blue
0.8
Alpha
1.0
Pixel

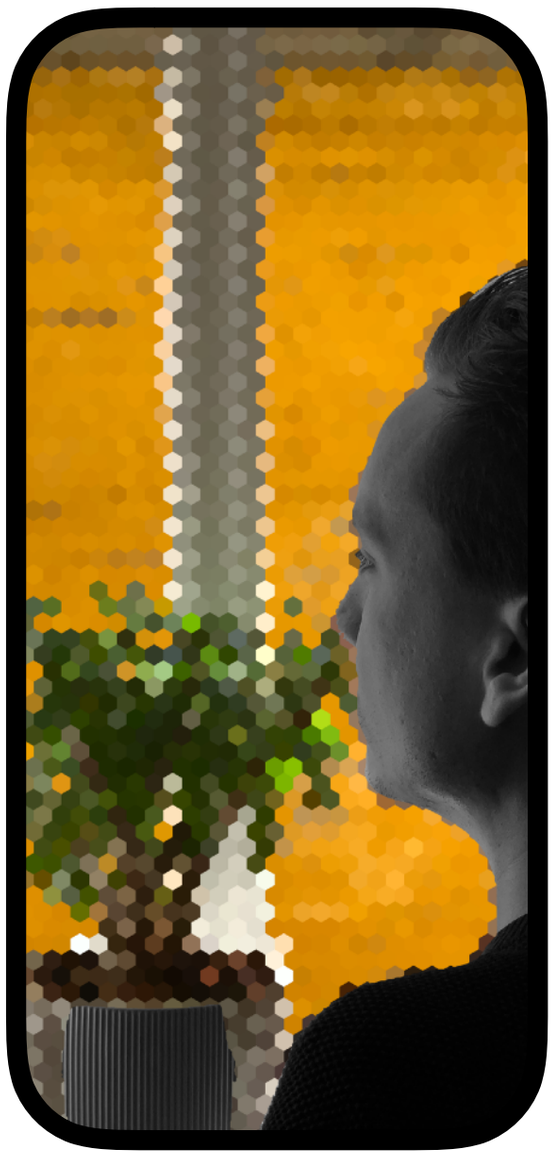

Red
0.5
Green
0.5
Blue
0.5
Alpha
1.0
Pixel

Split





Outcome



Pair Up

Pair Up

git.kabellmunk.dk/coreimage-color-and-depth/photo-editor

Basics

Task #1

Task #1

CIFilter.io

CICategoryColorEffect

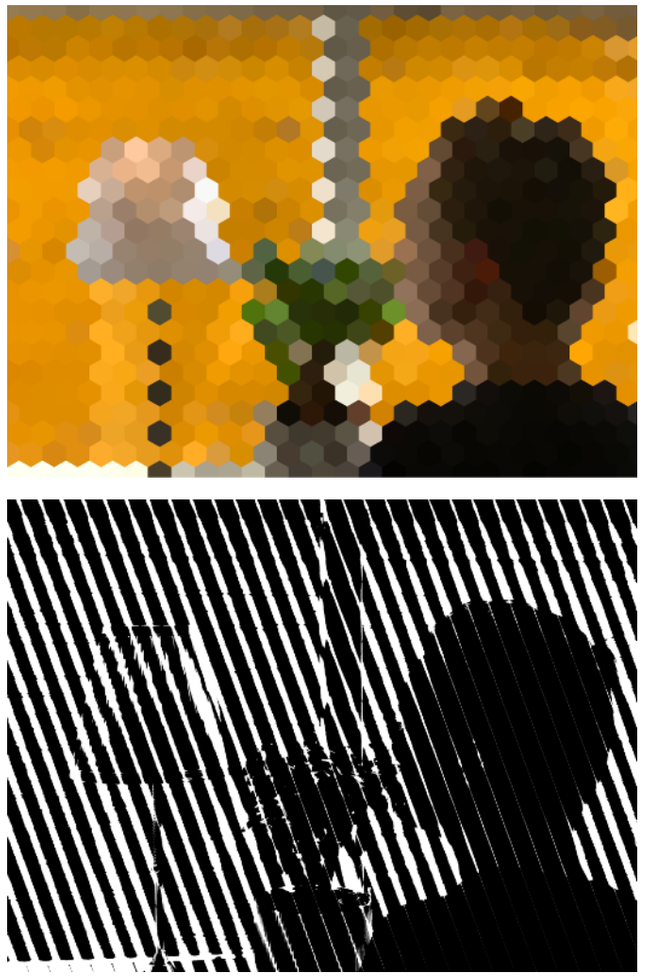
Task #1

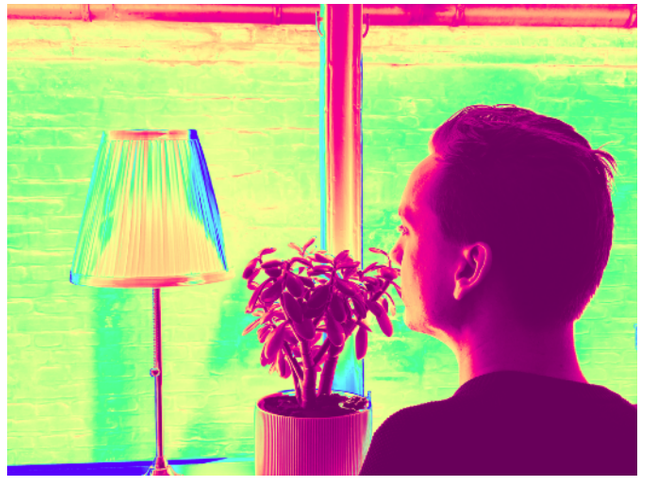
`Task1.swift`

Task #1

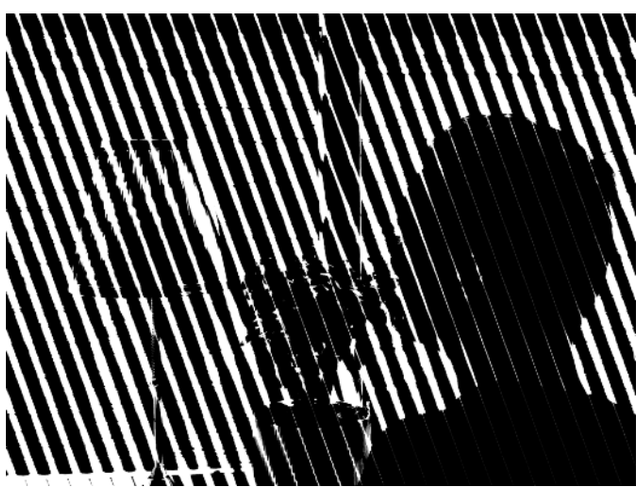
```
let filter = CIFilter(name: "CIPhotoEffectNoir")
filter?.setValue(originalImage,
                 forKey: "inputImage")
let result = filter?.outputImage
```

Task #2





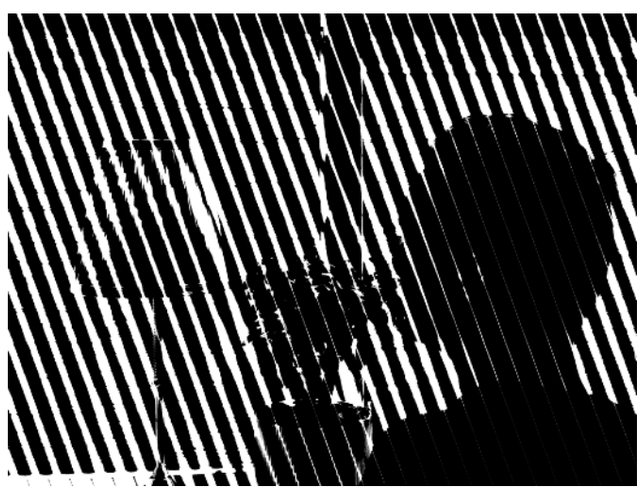
Task #2



Blur / Distortion / Stylize

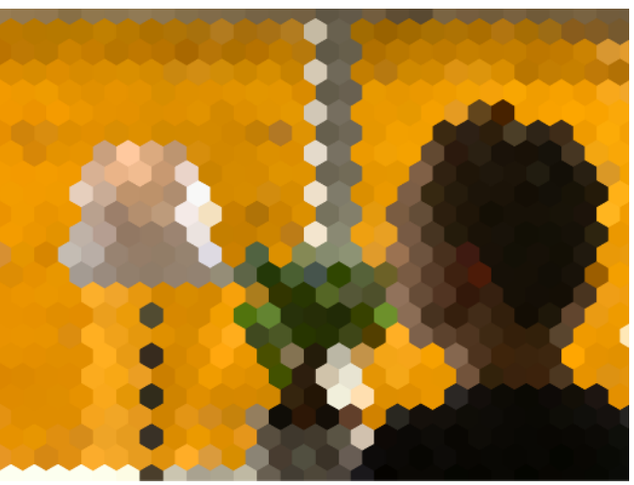
Task2.swift

Task #2

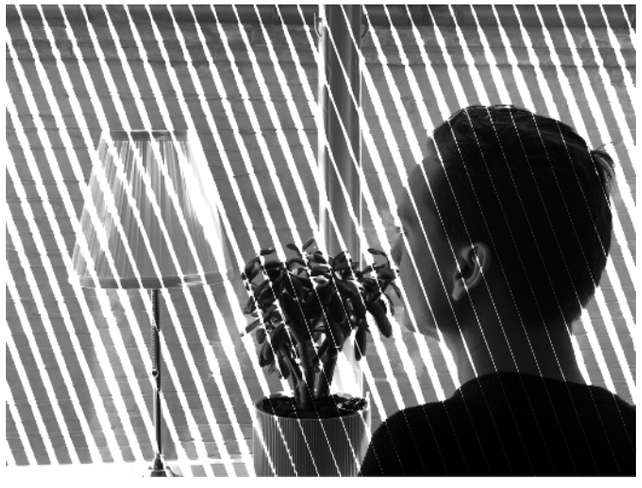


```
filter.setValue(10, forKey: "inputRadius")
```

Task #3

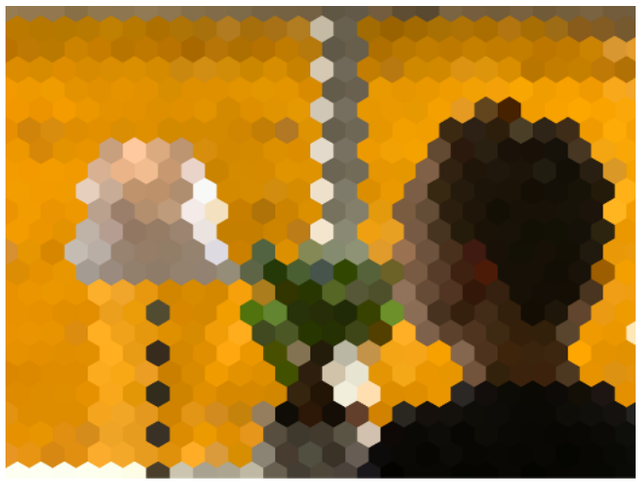


Task #3

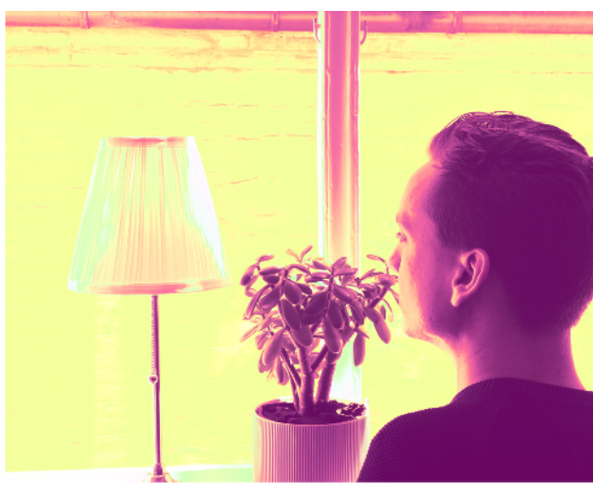


CICategoryCompositeOperation

Task #3

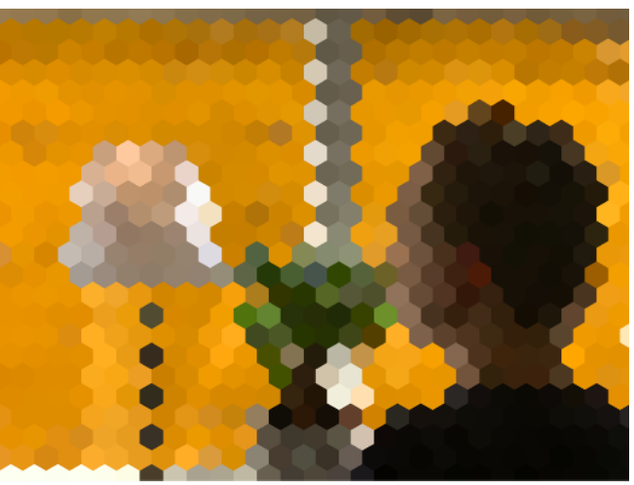


```
let filter = CIFilter(name: ”CIMultiplyCompositing”)
filter.setValue(task1, forKey: "inputBackgroundImage")
filter.setValue(task2, forKey: "inputImage")
let blendedImage = filter.outputImage
```

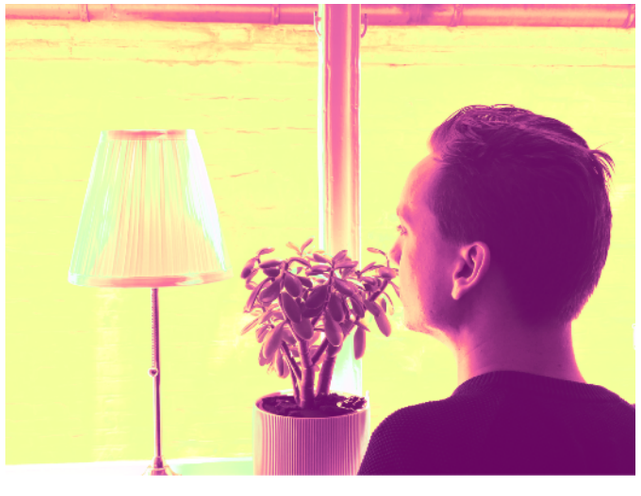


Custom

Task #4

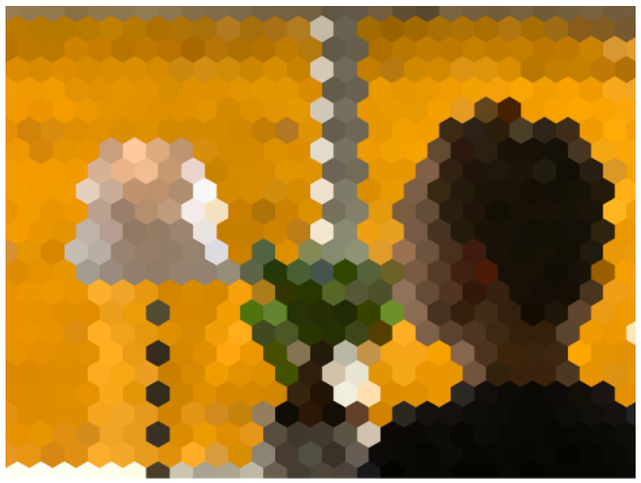


Task #4



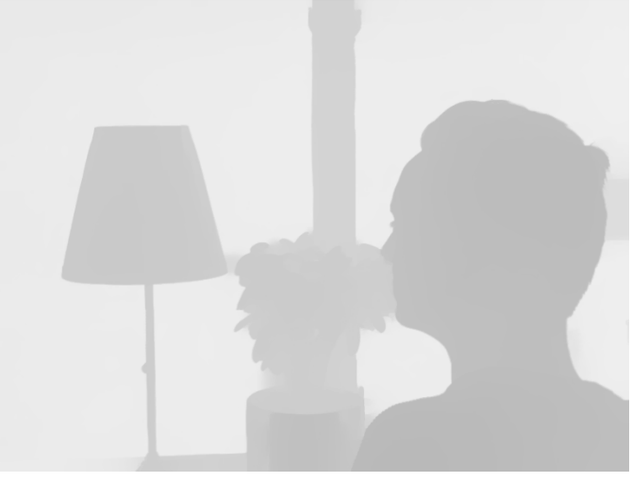
Task4.swift → Kernels.metal

Task #4

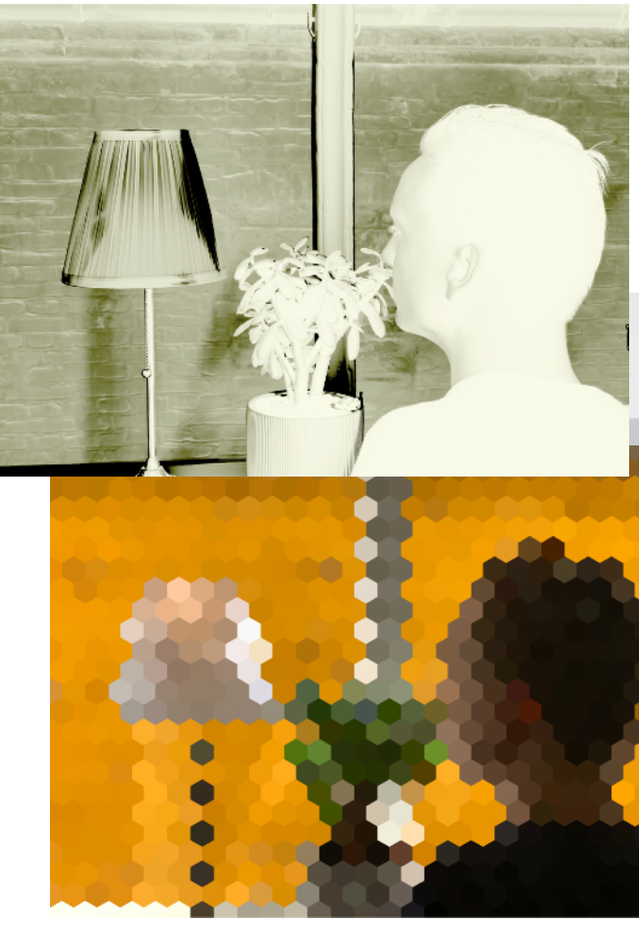


```
float4 kernel(sample_t foreground, sample_t background) {
    return foreground + background;
}
```

Task #5



Task #5



Task5.swift → Kernels.metal

Task #5

```
float4 task5(sample_t foreground,
             sample_t background,
             sample_t depthMap) {
    return /* float4 */;
}
```

Extensions

+

FreePlay

Appendices

- #1-7: CIKernel and Its Subtypes
- #8-9: CPU-Based Rendering
- #10-11: Core Graphics
- #12: Accelerate vImage
- #13: Metal Performance Shaders
- #14: CoreML

Core Image

Photo Editing in Color and Depth

Pragma Conference – October 9, 2019

by Tobias Due Munk