

# iOS GPUImageDemo Swift

## Example of video capturing using GPUImage library

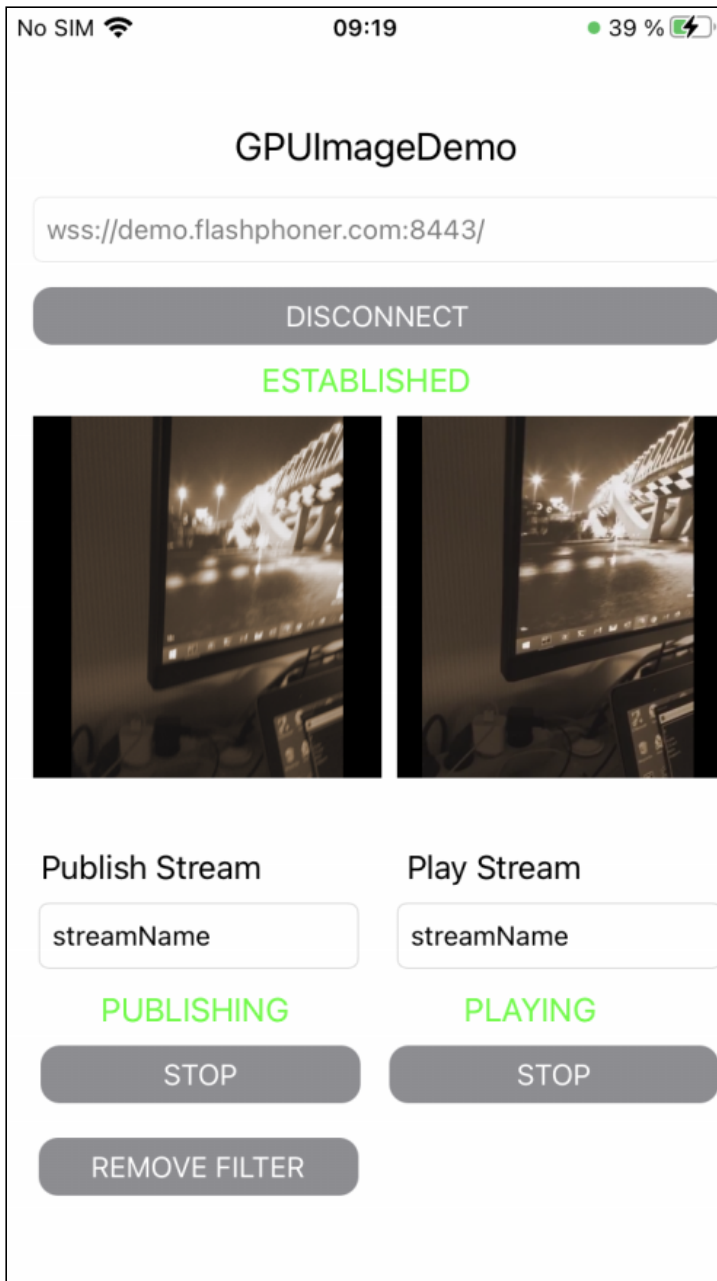
The application shows how to capture video from custom source using GPUImage Swift library implementation to apply filters.

On screenshot below, video is publishing with Monochrome filter applied from GPUImage kit

Inputs

- `WCS URL`, where `demo.flashphoner.com` is WCS server address
- `Publish Stream` to input stream name to publish
- `Play Stream` to input stream name to play

`Beautify Apply Filter/Remove Filter` button enables and disables the filter (the filter is enabled on screenshot)



## Analyzing the example code

To analyze the example code take ImageOverlaySwift example version which is available on [GitHub](#):

- `GPUImageDemoViewController` - main application view class (implementation file `GPUImageDemoViewController.swift`)
- `CameraVideoCapturer` - class to implement video capturing and handling (implementation file `CameraVideoCapturer.swift`)

### 1. API import

code

```
import FPWCSApi2Swift
```

## 2. Video capturer initialization

code

```
var capturer: CameraVideoCapturer = CameraVideoCapturer()
```

## 3. Session creation and connecting to the server

`WCSSession`, `WCSSession.connect` code

The following session parameters are set:

- WCS server URL
- server backend REST hook application name `defaultApp`

```
@IBAction func connectPressed(_ sender: Any) {
    changeViewState(connectButton, false)
    if (connectButton.title(for: .normal) == "CONNECT") {
        if (session == nil) {
            let options = FPWCSApi2SessionOptions()
            options.urlServer = urlField.text
            options.appKey = "defaultApp"
            do {
                try session = WCSSession(options)
            } catch {
                print(error)
            }
        }
        ...
        changeViewState(urlField, false)
        session?.connect()
    } else {
        session?.disconnect()
    }
}
```

## 4. Stream publishing

`WCSSession.createStream`, `WCSSStream.publish` code

The following parameters are passed to `createStream` method:

- stream name to publish

- local video view
- video capturer object

```

@IBAction func publishPressed(_ sender: Any) {
    changeViewState(publishButton, false)
    if (publishButton.title(for: .normal) == "PUBLISH") {
        let options = FPWCSEApi2StreamOptions()
        options.name = publishName.text
        options.display = localDisplay.videoView
        options.constraints = FPWCSEApi2MediaConstraints(audio: true,
videoCapturer: capturer);
        do {
            publishStream = try session!.createStream(options)
        } catch {
            print(error);
        }
        ...
        do {
            try publishStream?.publish()
            capturer.startCapture()
        } catch {
            print(error);
        }
    } else {
        do {
            try publishStream?.stop();
        } catch {
            print(error);
        }
    }
}
}

```

## 5. Stream playback

`WCSSession.createStream`, `WCSSStream.play` [code](#)

The following parameters are passed to `createStream` method:

- stream name to play
- remote video view

```

@IBAction func playPressed(_ sender: Any) {
    changeViewState(playButton, false)
    if (playButton.title(for: .normal) == "PLAY") {
        let options = FPWCSEApi2StreamOptions()
        options.name = playName.text;
        options.display = remoteDisplay.videoView;
        do {
            playStream = try session!.createStream(options)
        } catch {
            print(error)
        }
    }
}

```

```

    }
    ...
    do {
        try playStream?.play()
    } catch {
        print(error);
    }
} else{
    do {
        try playStream?.stop();
    } catch {
        print(error);
    }
}
}
}

```

## 6. Stop stream playback

`WCSSStream.stop` [code](#)

```

@IBAction func playPressed(_ sender: Any) {
    changeViewState(playButton, false)
    if (playButton.title(for: .normal) == "PLAY") {
        ...
    } else{
        do {
            try playStream?.stop();
        } catch {
            print(error);
        }
    }
}
}
}

```

## 7. Stop stream publishing

`WCSSStream.stop` [code](#)

```

@IBAction func publishPressed(_ sender: Any) {
    changeViewState(publishButton, false)
    if (publishButton.title(for: .normal) == "PUBLISH") {
        ...
    } else {
        do {
            try publishStream?.stop();
        } catch {
            print(error);
        }
    }
}
}
}
}

```

## 8. Invoke filter application function

code

```
@IBAction func applyFilterPressed(_ sender: Any) {
    if capturer.filter != nil {
        capturer.applyFilter(nil)
        applyFilterButton.setTitle("APPLY FILTER", for: .normal)
    } else {
        let filter = MonochromeFilter()
        capturer.applyFilter(filter)
        applyFilterButton.setTitle("REMOVE FILTER", for: .normal)
    }
}
```

## 9. Applying filter

code

```
func applyFilter(_ filter: BasicOperation?) {
    self.filter = filter

    if let cam = self.camera, capturing {
        cam.removeAllTargets()

        self.gpuImageConsumer.removeSourceAtIndex(0)

        if let fil = self.filter {
            cam --> fil --> self.gpuImageConsumer
        } else {
            cam --> self.gpuImageConsumer
        }
    }
}
```

## 10. Receiving frame texture from camera

code

```
public func newTextureAvailable(_ texture:Texture, fromSourceIndex:UInt) {
    // Ignore still ../images and other non-video updates (do I still need
    this?)
    guard let frameTime = texture.timingStyle.timestamp?.asCMTIME else {
        return }
    // If two consecutive times with the same value are added to the movie,
    it aborts recording, so I bail on that case
    guard (frameTime != previousFrameTime) else {
        return
    }
}
```

```

var pixelBufferFromPool:CVPixelFormat? = nil

let pixelBufferStatus = CVPixelFormatCreate(kCFAllocatorDefault,
texture.texture.width, texture.texture.height, kCVPixelFormatType_32BGRA,
nil, &pixelBufferFromPool);

guard let pixelBuffer = pixelBufferFromPool, (pixelBufferStatus ==
kCVReturnSuccess) else {
    return
}

CVPixelFormatLockBaseAddress(pixelBuffer, [])

renderIntoPixelFormat(pixelBuffer, texture:texture)
capturer.captureOutput(pixelBuffer, time: frameTime)
CVPixelFormatUnlockBaseAddress(pixelBuffer, [])
}

```

## 11. Rendering frame texture to pixel buffer

code

```

func renderIntoPixelFormat(_ pixelBuffer:CVPixelFormat, texture:Texture) {
    guard let pixelBufferBytes = CVPixelFormatGetBaseAddress(pixelBuffer)
else {
    print("Could not get buffer bytes")
    return
}
let mtlTexture = texture.texture;
guard let commandBuffer =
sharedMetalRenderingDevice.commandQueue.makeCommandBuffer() else {
fatalError("Could not create command buffer on image rendering.")}
commandBuffer.commit()
commandBuffer.waitUntilCompleted()

let bytesPerRow = CVPixelFormatGetBytesPerRow(pixelBuffer)
let region = MTLRegionMake2D(0, 0, mtlTexture.width, mtlTexture.height)
mtlTexture.getBytes(pixelBufferBytes, bytesPerRow: bytesPerRow, from:
region, mipmapLevel: 0)
}

```