

iOS GPUImageDemo Swift

Example of video capturing using GPUImage library

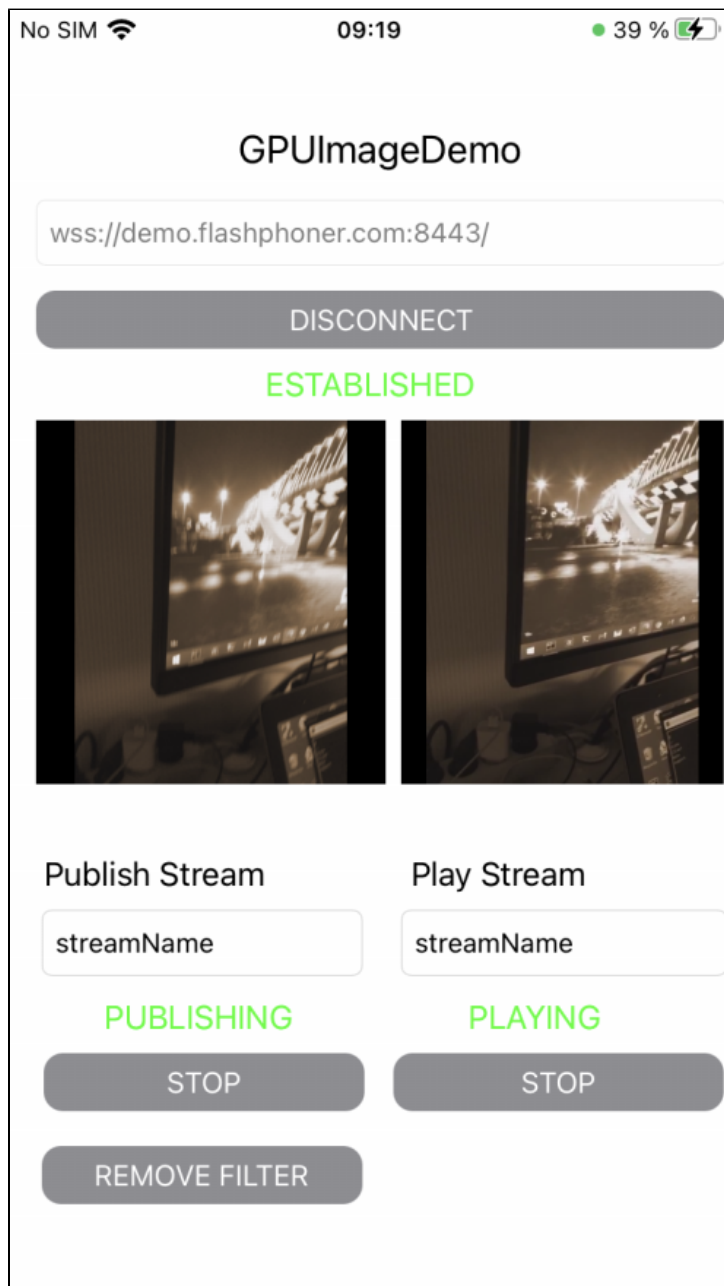
The application shows how to capture video from custom source using [GPUImage](#) Swift library implementation to apply filters.

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

Inputs

- 'WCS URL', wheredemo.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 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 parameter are set:

- WCS server URL
- server backend 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:CVPixelBuffer? = nil

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

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

    renderIntoPixelBuffer(pixelBuffer, texture:texture)
    capturer.captureOutput(pixelBuffer, time: frameTime)
    CVPixelBufferUnlockBaseAddress(pixelBuffer, [])
}

```

11. Rendering frame texture to pixel buffer

[code](#)

```

func renderIntoPixelBuffer(_ pixelBuffer:CVPixelBuffer, texture:Texture) {
    guard let pixelBufferBytes = CVPixelBufferGetBaseAddress(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 = CVPixelBufferGetBytesPerRow(pixelBuffer)
    let region = MTLRegionMake2D(0, 0, mtlTexture.width, mtlTexture.height)
    mtlTexture.getBytes(pixelBufferBytes, bytesPerRow: bytesPerRow, from: region, mipmapLevel: 0)
}

```