

# *CoreML: Everyone's an Artist*

Building a Neural Style Transfer app with CoreML

# *Neural Style Transfer (or NST)*



+




# *Getting an NST CoreML model*

## **Online\***

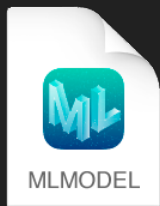
- Github, modelzoo.co...

## **DIY**

- GPU + some  for Python
- Training : Turi Create, Tensorflow, Pytorch...
- Misc : ONNX, coremltools

\*check the licence!

# *Importing a CoreML model (1/2)*



Drag & drop



# Importing a CoreML model (2/2)

## Machine Learning Model

Name	StarryNight
Type	Neural Network
Size	854 KB
Author	Monoque
Description	starry_night, linear 16 bit
License	Commercial, all rights reserved

## Model Class

 StarryNight 

Automatically generated Swift model class

## Model Evaluation Parameters

Name	Type	Description
▼ Inputs		
inputImage	Image (Color 720 x 720)	Image to stylize
▼ Outputs		
outputImage	Image (Color 720 x 720)	Stylized image



StarryNight.swift

```
1 //
2 // StarryNight.swift
3 //
4 // This file was
5 //
6
7 import CoreML
8
9
10 /// Model Predict
11 @available(macOS
12 class StarryNight
13
14 /// Image to
15 var inputImage
16
17 var featureNames
18 get {
19     return
20 }
21
22
23 func featureValue(for:
24     if (featureNames
25         return
26     }
27     return nil
```

StarryNightInput

inputImage  
featureNames  
featureValue(for:)  
init(inputImage:)

StarryNightOutput

provider  
outputImage  
featureNames

featureValue(for:)  
init(outputImage:)  
init(features:)

StarryNight

model  
urlOfModelInThisBundle  
init(contentsOf:)  
init()  
init(configuration:)  
init(contentsOf:configuration:)  
prediction(input:)  
prediction(input:options:)  
prediction(inputImage:)  
predictions(inputs:options:)

# *Using an NST CoreML model (1/2)*

## Handling input/output

- UIImage  $\leftrightarrow$  CVPixelBuffer
- Resize

# *Using an NST CoreML model (2/2)*

## **Optimizations**

- Threading
- Offload memory to disk

# Livecoding





# *One more thing*



# Resources

## This Talk

- Building a Neural Style Transfer app on iOS ([bit.ly/building\\_nst\\_ios](https://bit.ly/building_nst_ios))
- NST demo sources ([github.com/kirualex/NSTDemo](https://github.com/kirualex/NSTDemo))

## Apple

- What's new in CoreML part 1 & 2 (sessions 708 & 709)
- A guide to Turi Create (session 712)

## Other

- jcjohnson ([github.com/jcjohnson/fast-neural-style](https://github.com/jcjohnson/fast-neural-style))

*Thank you*



@alexiscreuzot



@kirualex