

(Some of) What's new in iOS13

for Xamarin developers

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whoami

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- **essential-interfaces** – use DI/mockng with Xamarin.Essentials
- **dumpeditable-linqpad** – extensible inline object editor for LINQPad
- **jsondatacontext-linqpad** – json data context driver for LINQPad
- **sockets-for-pcl, sockethelpers** – socket comms in a PCL

(today you should use netstandard sockets why are you all still installing this)

to cover

- what is iOS13
- what's new
- demos, samples
- resources

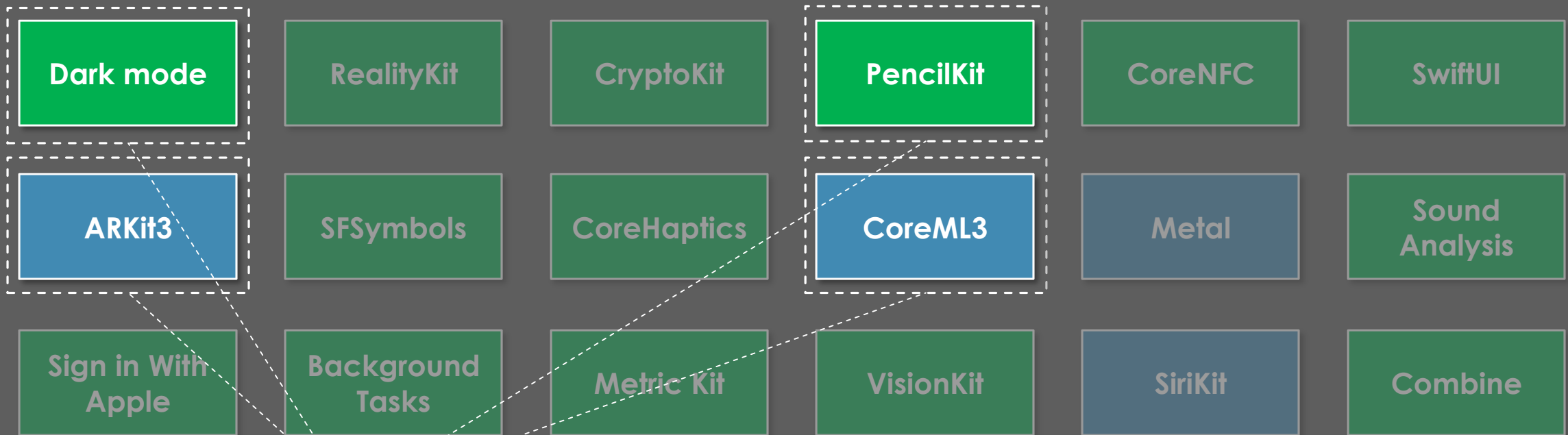
~~finally we get dark mode~~ iOS 13



- 13th public release of iOS, shipped alongside Xcode 11 and macOS 15
- Currently in beta, expected to release mid-September
- Lots of built in OS improvements – performance, security, core app updates
- Lots of new features and frameworks for developers
- **Dark mode**

what we get to work with

iOS 13 includes several new frameworks, as well as improvements to existing ones



Maybe we just look at these today

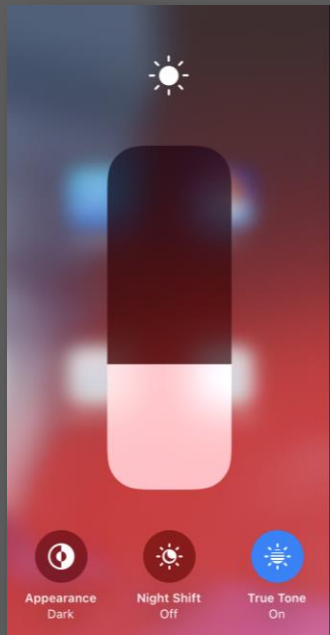


-= some of what's new in ios13 =-

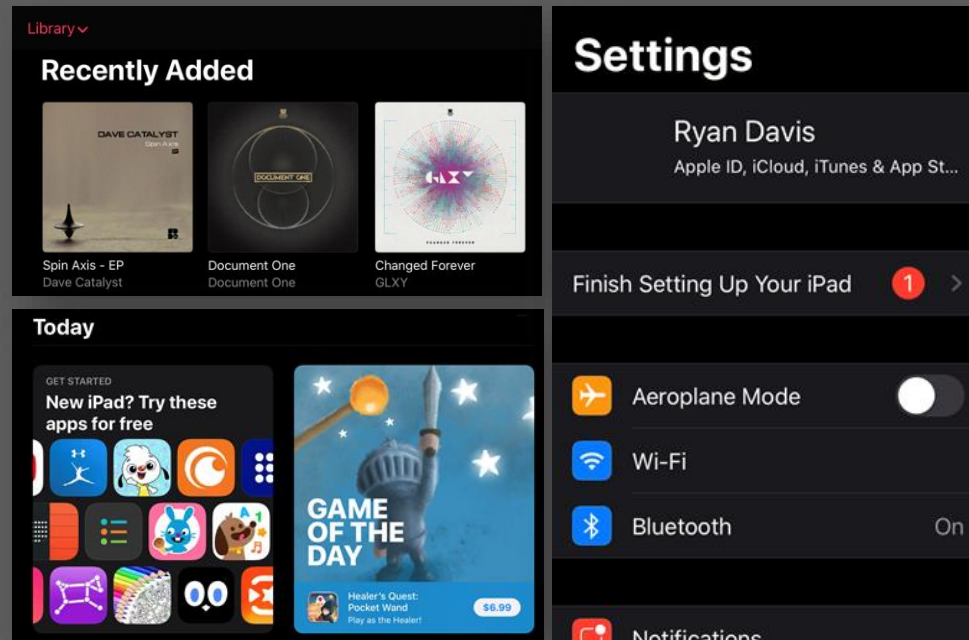
dark mode

dark mode is the hero we need

iOS 13 includes a system-wide dark/light theme setting



Schedule-based or manually toggled



Observed by all built-in apps

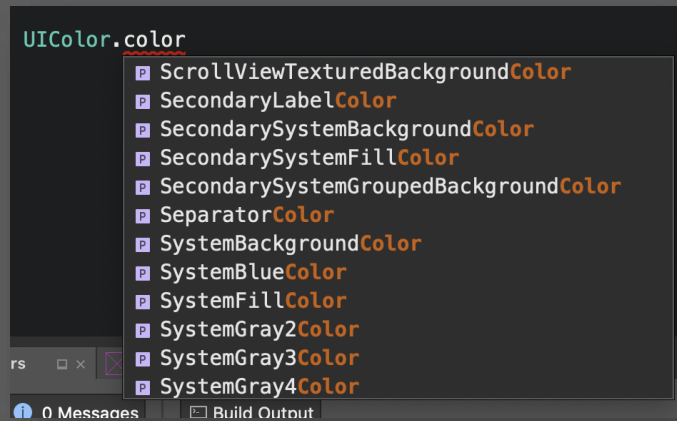


Observed by your app?

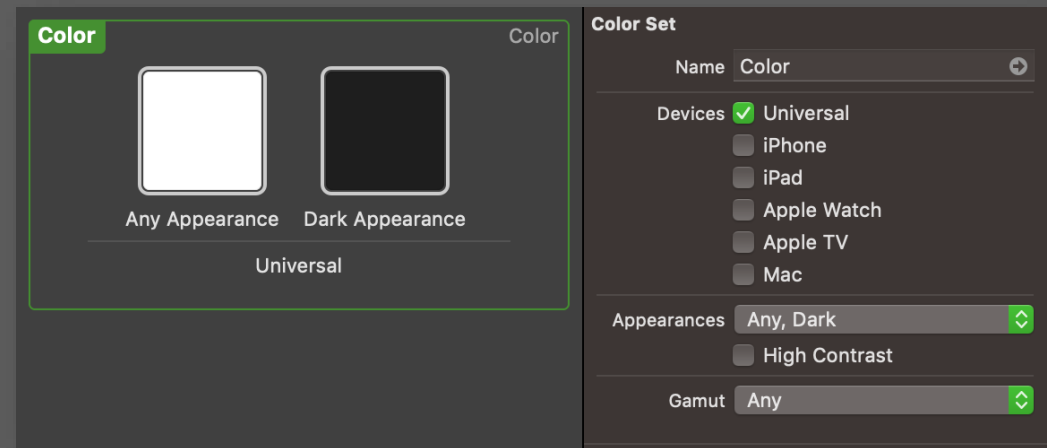
Once your app targets iOS13, it will also be influenced by the selection.

dynamic everything

- iOS adds functionality to colours and images to support dark mode
- Dynamic elements will automatically change to match the user's theme
- A new set of dynamic system colours have been added to UIColor
- Asset catalog includes support for defining theme-aware colours and images



Dynamic colours on UIColor are easily identified by the 'Color' suffix



Custom dynamic colours and images can be defined at build time in your asset catalog

some assembly required

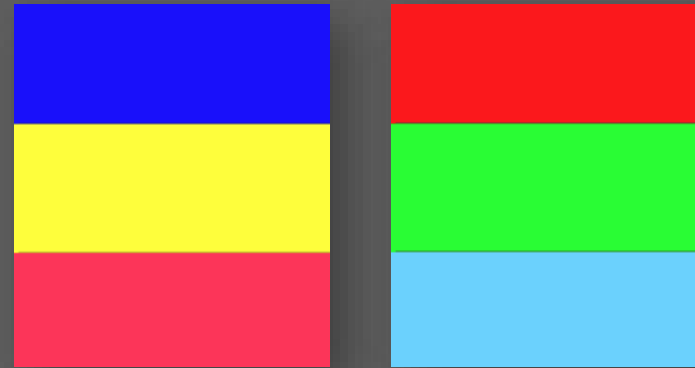
- Existing apps are likely to require some changes to support dark mode nicely
- Any use of non-dynamic colour will need to be considered
- You can programmatically define dynamic colours and images, which may simplify conversion
- You can perform arbitrary work on any ViewController in response to a theme change by overriding **TraitCollectionDidChange** and checking for the new theme
- If your app is not ready, you can target iOS13 but opt out of theming via Info.plist



demo – dark mode

SystemBackgroundColor	SystemBackgroundColor
SystemBlueColor	SystemBlueColor
SystemFillColor	SystemFillColor
SystemGray2Color	SystemGray2Color
SystemGray3Color	SystemGray3Color
SystemGray4Color	SystemGray4Color
SystemGray5Color	SystemGray5Color
SystemGray6Color	SystemGray6Color
SystemGrayColor	SystemGrayColor
SystemGreenColor	SystemGreenColor
SystemGroupedBackgroundColor	SystemGroupedBackgroundColor
SystemIndigoColor	SystemIndigoColor
SystemOrangeColor	SystemOrangeColor
SystemPinkColor	SystemPinkColor
SystemPurpleColor	SystemPurpleColor

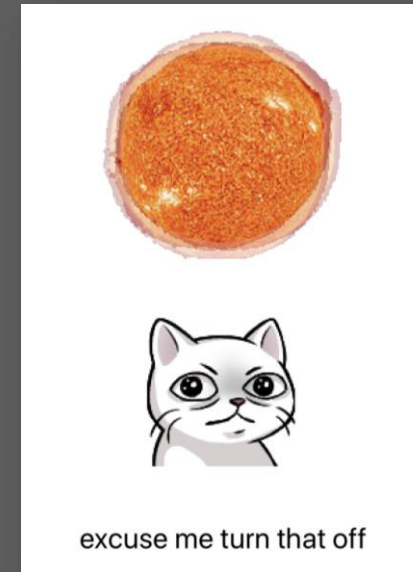
Compare light and dark
system colours



```
public UIColor[] Colours
=> new []
{
    Dynamic(UIColor.Blue, UIColor.Red),
    Dynamic(UIColor.Yellow, UIColor.Green),
    Dynamic(UIColor.SystemPinkColor, UIColor.SystemTealColor),
};
```

```
UIColor Dynamic(UIColor light, UIColor dark)
=> new UIColor(t =>
    t.UIInterfaceStyle.HasFlag(LightFlag)
    ? light
    : dark);
```

Create theme-aware colours
programmatically



```
public override void TraitCollectionDidChange(UITraitCollection prev)
{
    base.TraitCollectionDidChange(prev);

    if (TraitCollection.HasDifferentColorAppearanceComparedTo(prev))
        UpdateUIForThemeChange();
}
```

Perform arbitrary work
in response to theme change

-= some of what's new in ios13 =-

pencilkit

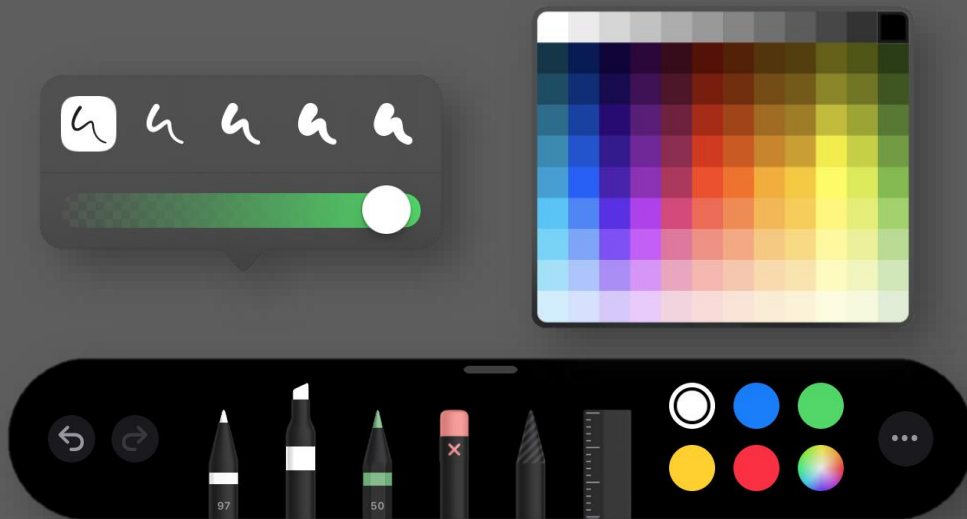
precise, performant pencil input

or finger!
^

PencilKit is a high performance input framework that lets you provide users with a sophisticated drawing environment with just a few lines of code.



Optimised for
(but does not require)
Apple Pencil



Includes familiar tooling UI with undo/redo,
vector-based select/erase



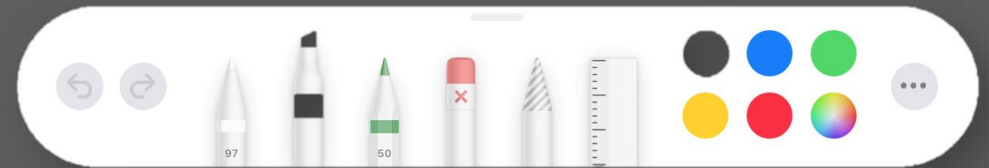
Transparently handles light
and dark mode themes

two classes, many superpowers



PKCanvasView

- Accepts input from user's finger or Pencil
- Provides change callbacks via a delegate
- Supports bitmap and vector interactions
- Recolours content on theme change



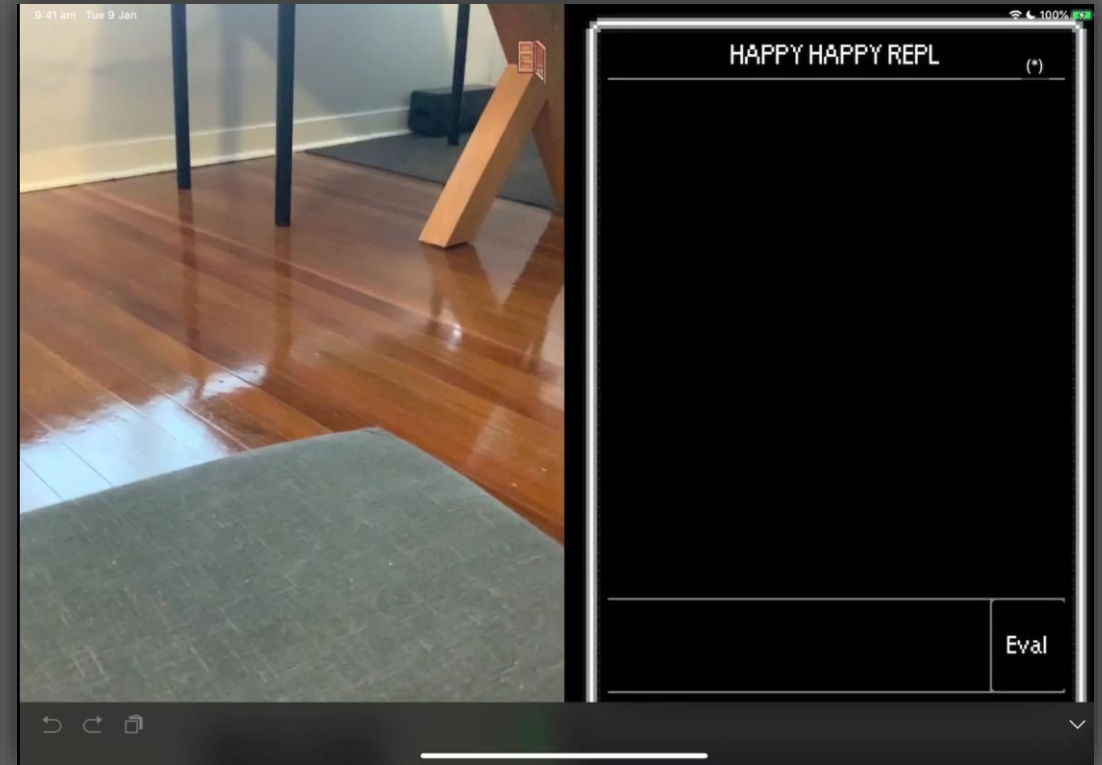
PKToolPicker

- Floating/dockable toolbox
- Colours, tools, lasso selection, undo/redo
- Consistent UI with built in iOS applications

demo – pencilkit



Use PencilKit to create a hand drawn pattern background



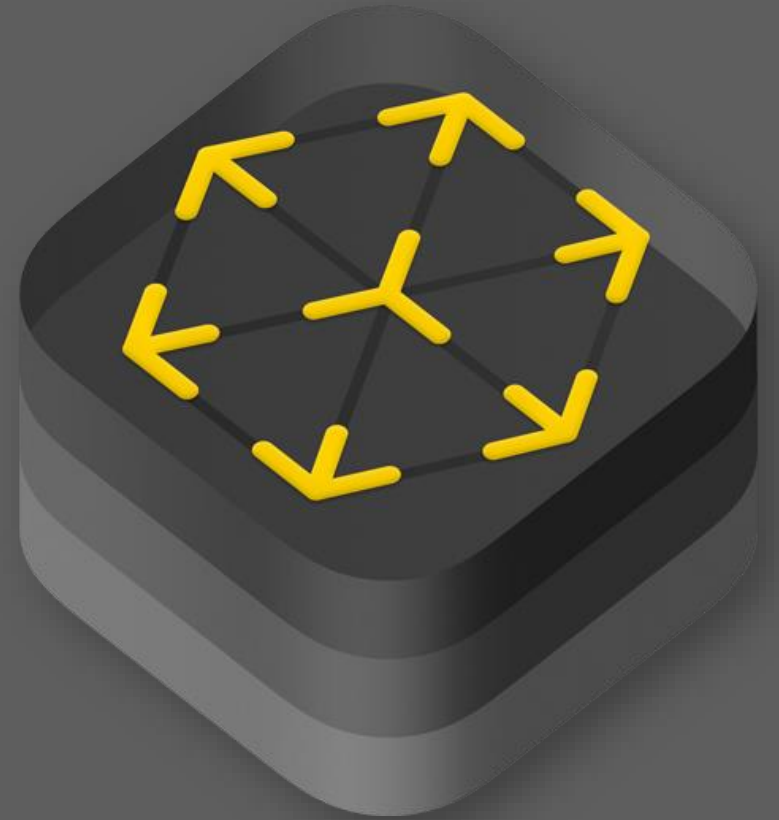
Use PencilKit to texture virtual content in ARKit

-= some of what's new in ios13 =-

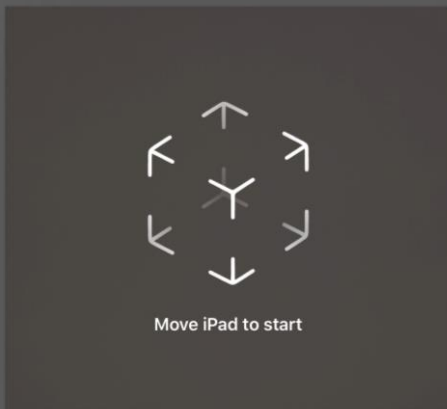
arkit 3

augmenting apple's augmented offering

- **Performance improvements** driven primarily by advances in apple's ML capability
- **Features to improve end-user experience** such as automated coaching and additions to collaborative experiences
- **New capabilities** like people occlusion, body motion tracking and dual camera AR

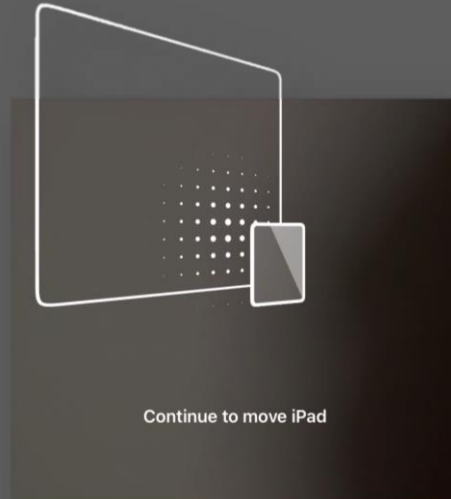


demo – automated coaching



```
Coach = new ARCoachingOverlayView
{
    ActivatesAutomatically = true,
    Delegate = new ARDelegate(this),
    Session = SCNView.Session
};
```

Set a goal and ARCoachingOverlayView automatically guides the user when it is not currently satisfied



```
Coach.Goal =
    ARCoachingGoal.|
    AnyPlane
    HorizontalPlane
    Tracking
    VerticalPlane
```

```
public class CoachingDelegate : ARCoachingOverlayViewDelegate
{
    readonly ARCoachingViewController Parent;

    public CoachingDelegate(ARCoachingViewController parent)
        => Parent = parent;

    public override void WillActivate(ARCoachingOverlayView _)
        => Parent.DimUserInterface(true);

    public override void DidDeactivate(ARCoachingOverlayView _)
        => Parent.DimUserInterface(false);

    public override void DidRequestSessionReset(ARCoachingOverlayView _)
        => Parent.ResetTracking();
}
```

Implement ARCoachingOverlayViewDelegate to be informed of coaching lifecycle events

demo – people occlusion

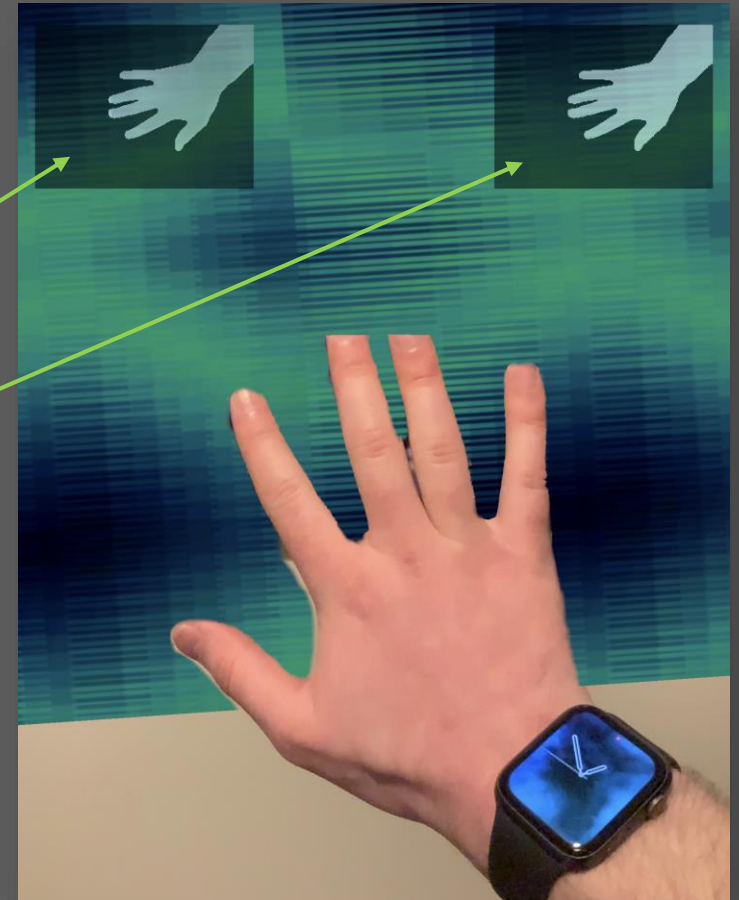
```
public override ARConfiguration GetARConfiguration()  
=> new ARWorldTrackingConfiguration  
{  
    ...  
    FrameSemantics =  
        ARFrameSemantics.  
};
```

- ☐ BodyDetection
- ☐ None
- ☐ PersonSegmentation
- ☒ PersonSegmentationWithDepth

Enable segmentation by setting the appropriate flag on the new FrameSemantics property

```
public override void OnFrameUpdate(ARSession s, ARFrame f)  
{  
    base.OnFrameUpdate(s, f);  
  
    var depth = f.EstimatedDepthData;  
    var seg = f.SegmentationBuffer;  
  
    // do phd things here  
}
```

If you are smarter than me you can make use of the depth and segmentation data that ARKit detects



So realistic I could put my hand through it

demo – multi camera tracking



```
public override ARConfiguration GetARConfiguration()
=> new ARWorldTrackingConfiguration
{
    PlaneDetection = ARPlaneDetection.Horizontal,
    UserFaceTrackingEnabled = true
};
```

Rather than use `ARFaceTrackingConfiguration`, set the new `UserFaceTrackingEnabled` flag on `ARWorldTrackingConfiguration` to enable multi-camera tracking

```
public override void OnNodeAddedForAnchor(
    ISCNRenderer renderer, SCNNode node, ARAnchor anchor)
{
    switch (anchor)
    {
        case ARFaceAnchor faceAnchor:
            // do things with face
            break;

        case ARPlaneAnchor planeAnchor:
            // do things with plane
            break;
    }
}
```

In `OnNodeAdded/Updated/Removed` respond appropriately based on the type of anchor detected

-= some of what's new in ios13 =-

coreml 3

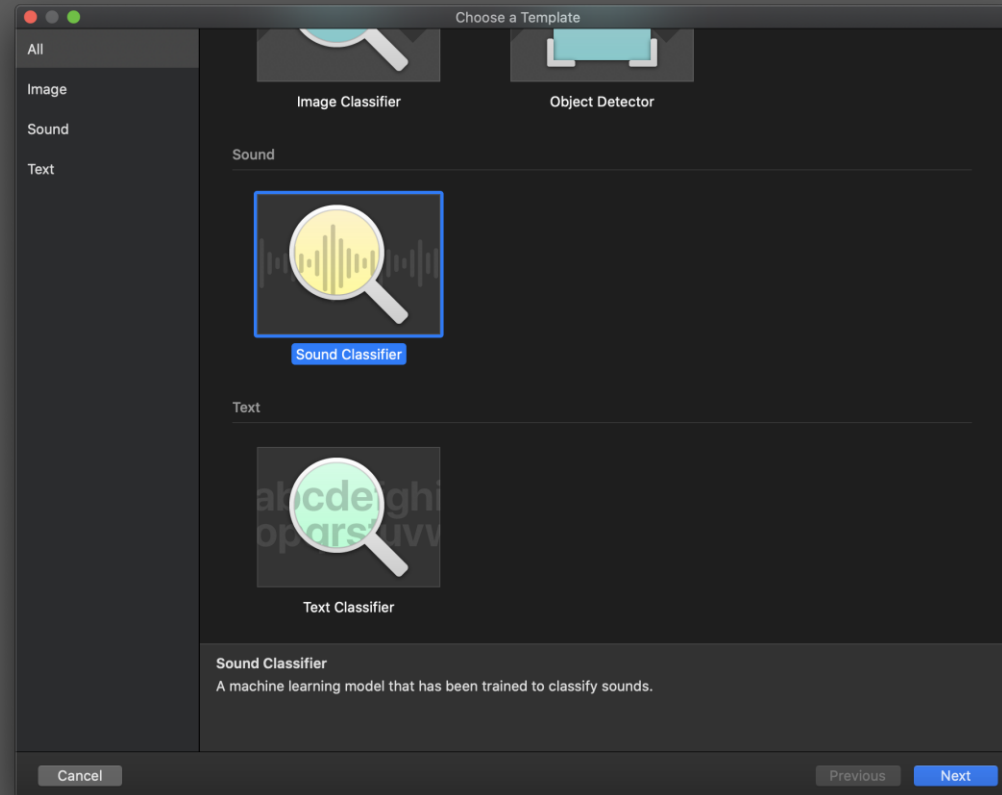
too many updates to mention

- New model types supported, kNN, ItemSimilarityRecommender, SoundAnalysisPreprocessor, LinkedModel
- Many new NN layer types (increased expression = greater external compatibility), including control flow layers
- Mutable models – on-device retraining (for a subset of model types)
- Improvements to CreateML – new tasks like Audio Classification
- Improvements to Turi Create



demo – SoundAnalysis with CreateML

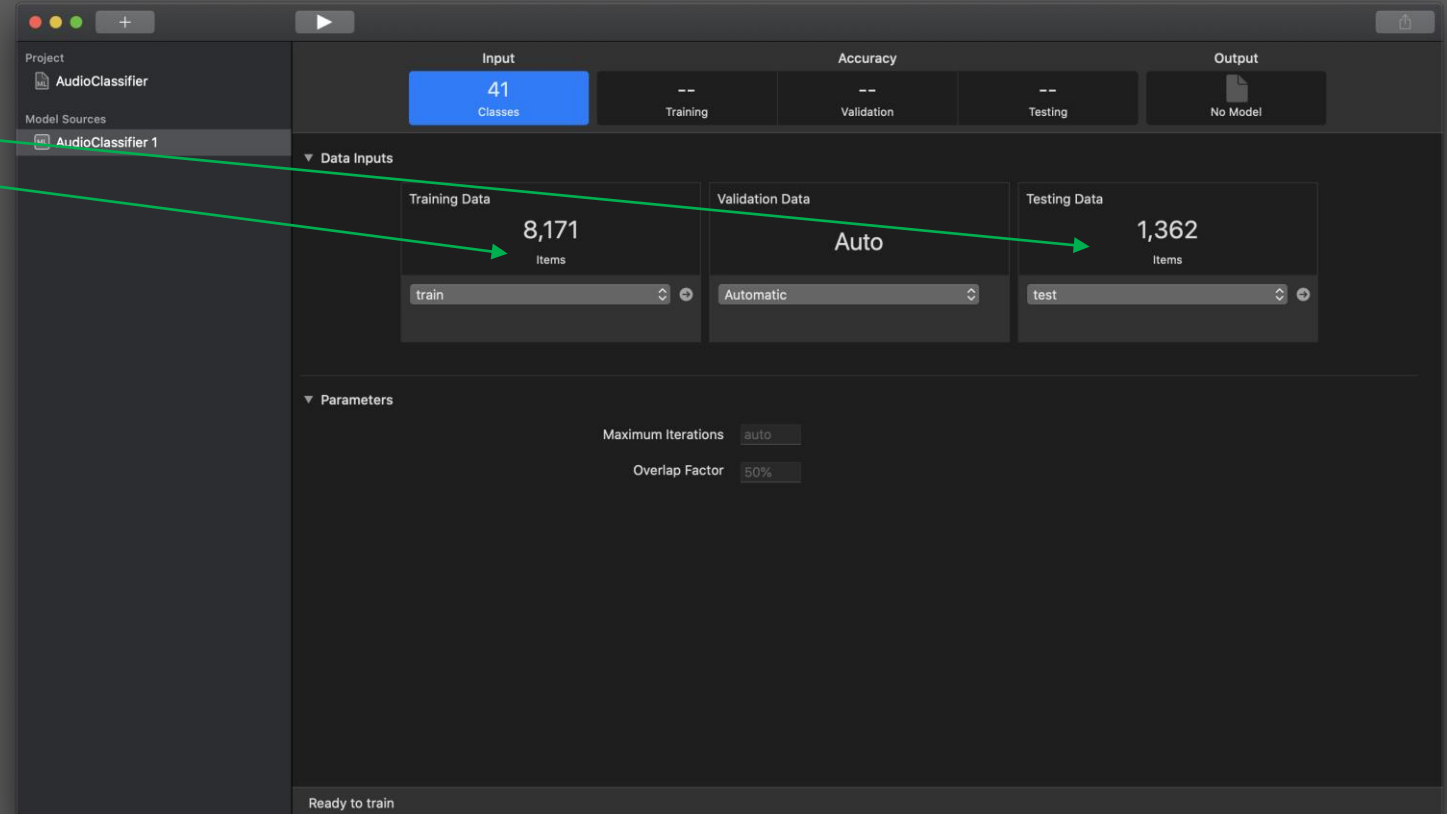
- CreateML has a new Sound Classifier template



demo – SoundAnalysis with CreateML

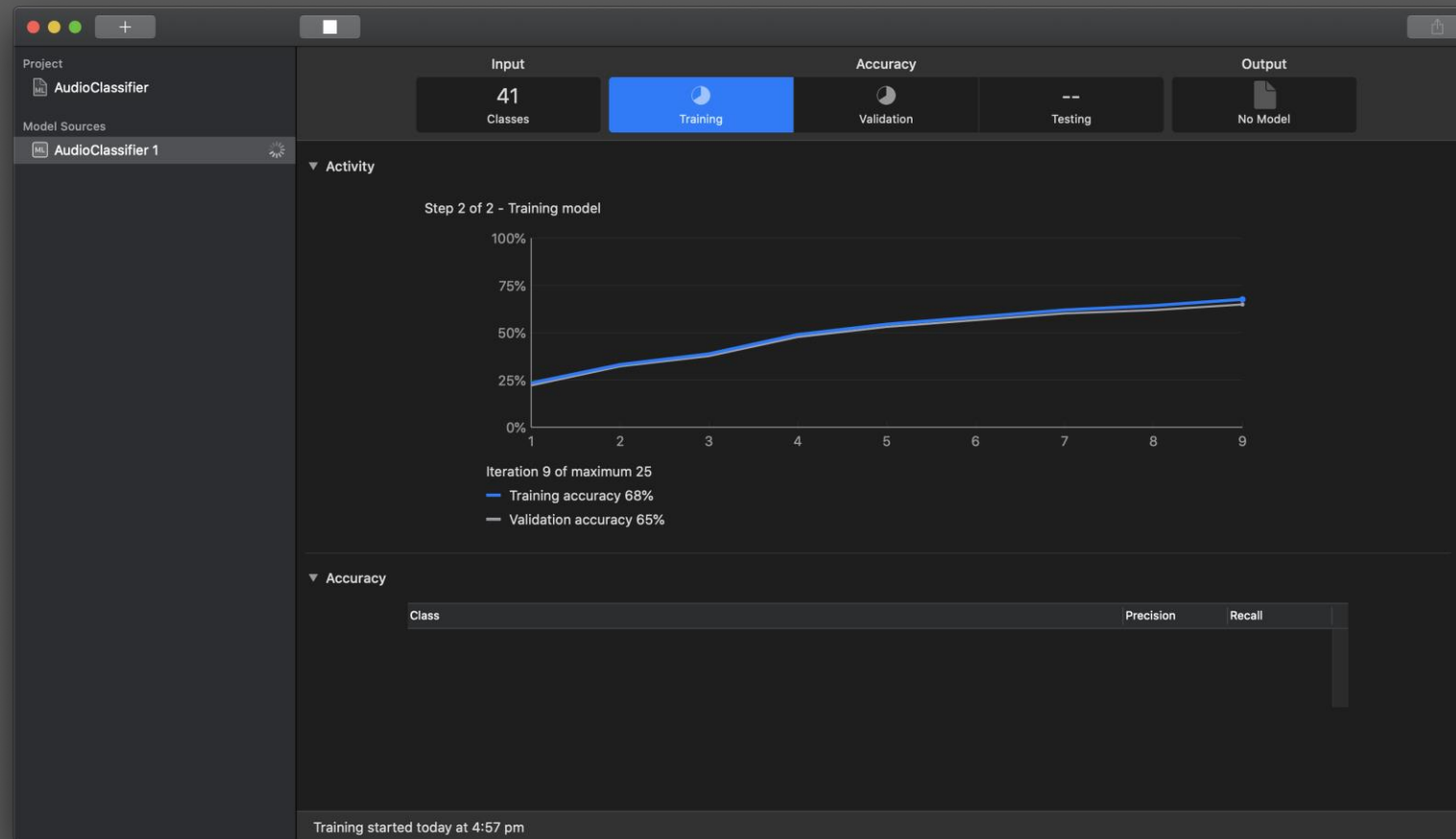
- Wizard flow is the same as for existing templates

Name	Date Modified	Size	Kind
▶ test	Today at 11:14 am	--	Folder
▼ train	Today at 11:14 am	--	Folder
▶ Acoustic_guitar	Yesterday at 4:34 pm	--	Folder
▶ Applause	Yesterday at 4:34 pm	--	Folder
▶ Bark	Yesterday at 4:34 pm	--	Folder
▶ Bass_drum	Yesterday at 4:34 pm	--	Folder
▶ Burping_or_eructation	Yesterday at 4:34 pm	--	Folder
▶ Bus	Yesterday at 4:34 pm	--	Folder
▶ Cello	Yesterday at 4:34 pm	--	Folder
▼ Chime	Yesterday at 4:34 pm	--	Folder
0b92a7e0.wav	28 Mar 2018 at 4:28 am	379 KB	Waveform audio
0e6e1f35.wav	28 Mar 2018 at 4:28 am	882 KB	Waveform audio
0f2903db.wav	28 Mar 2018 at 4:28 am	441 KB	Waveform audio
0fa3ee45.wav	28 Mar 2018 at 4:28 am	1.4 MB	Waveform audio
00fbb28b.wav	28 Mar 2018 at 4:28 am	1.5 MB	Waveform audio
0ffff94f.wav	28 Mar 2018 at 4:28 am	909 KB	Waveform audio
1c189121.wav	28 Mar 2018 at 4:28 am	2.4 MB	Waveform audio
1d1d0d72.wav	28 Mar 2018 at 4:28 am	570 KB	Waveform audio
1dbb4e4b.wav	28 Mar 2018 at 4:28 am	882 KB	Waveform audio
2a756789.wav	28 Mar 2018 at 4:28 am	365 KB	Waveform audio
2aa94643.wav	28 Mar 2018 at 4:28 am	513 KB	Waveform audio
2cc2a170.wav	28 Mar 2018 at 4:28 am	1.4 MB	Waveform audio
2f3ba7ab.wav	28 Mar 2018 at 4:28 am	743 KB	Waveform audio
3ac0e2ca.wav	28 Mar 2018 at 4:28 am	298 KB	Waveform audio
3ae08499.wav	28 Mar 2018 at 4:28 am	2.4 MB	Waveform audio
3b44e22f.wav	28 Mar 2018 at 4:28 am	617 KB	Waveform audio
3c71a915.wav	28 Mar 2018 at 4:28 am	236 KB	Waveform audio
3def93b9.wav	28 Mar 2018 at 4:28 am	672 KB	Waveform audio
4d089998.wav	28 Mar 2018 at 4:28 am	2.4 MB	Waveform audio
4fd80b5c.wav	28 Mar 2018 at 4:28 am	379 KB	Waveform audio
5a3deddf.wav	28 Mar 2018 at 4:28 am	427 KB	Waveform audio
5a3deddf.wav	28 Mar 2018 at 4:28 am	427 KB	Waveform audio



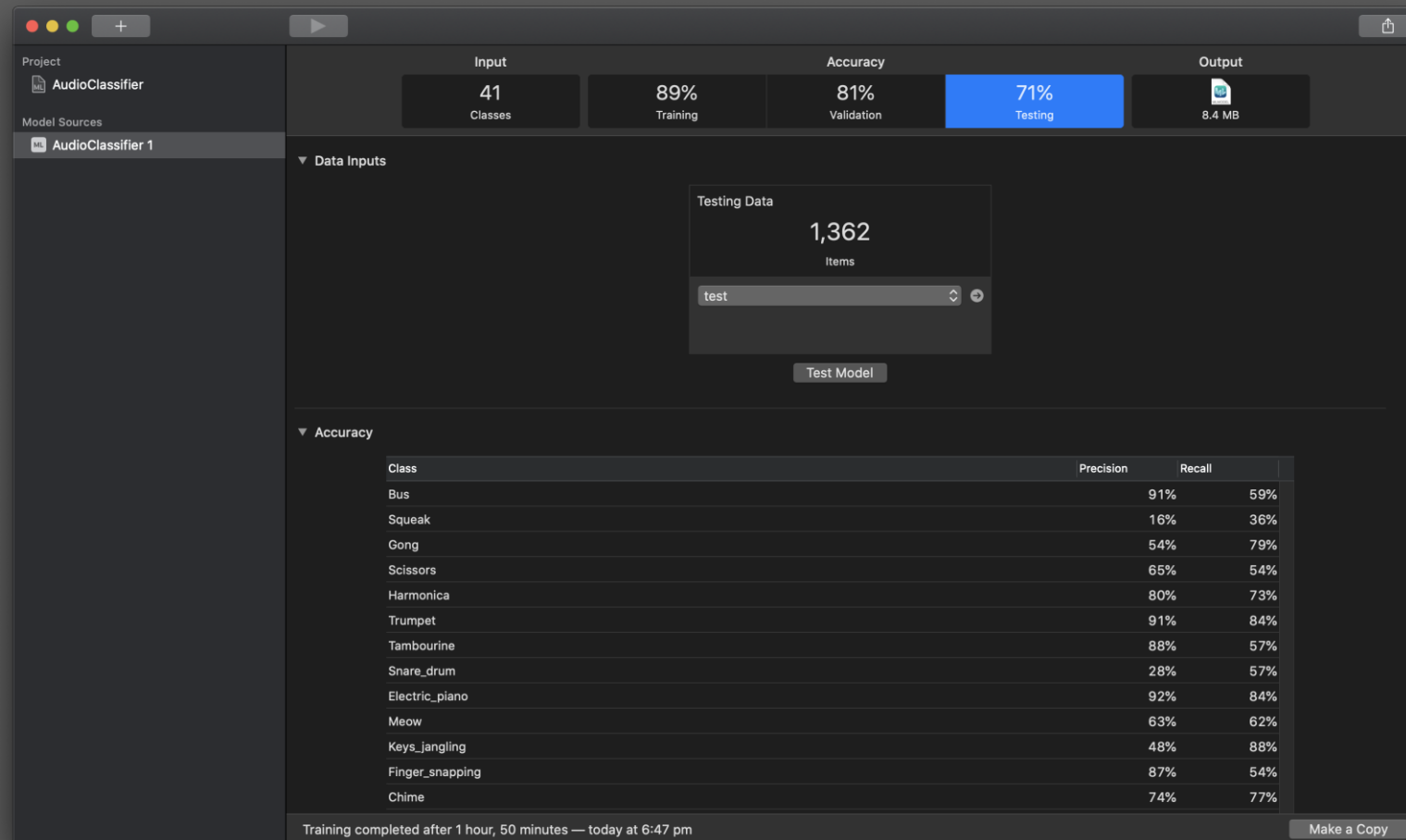
demo – SoundAnalysis with CreateML

- Training time depends on the number of examples and number of iterations



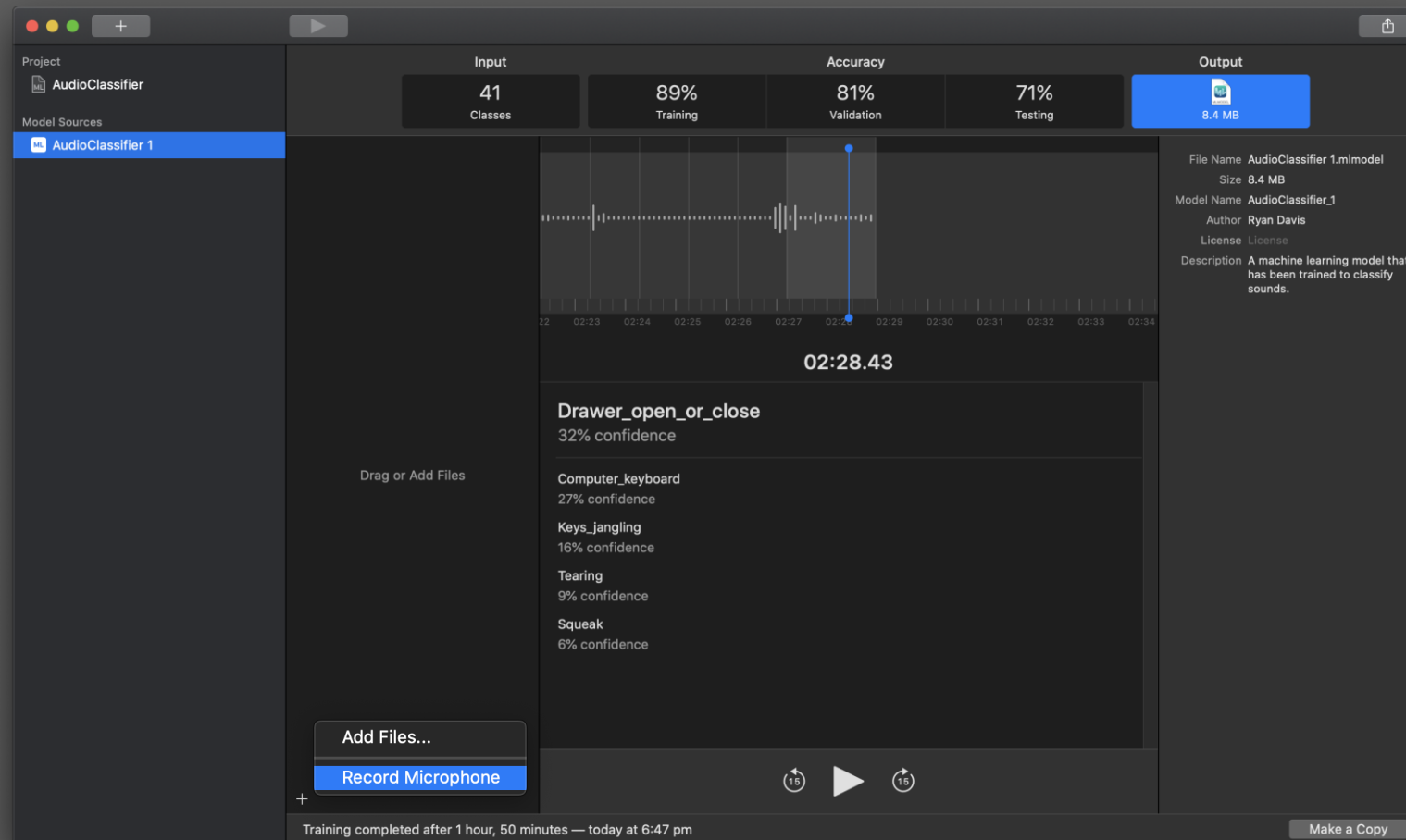
demo – SoundAnalysis with CreateML

- CreateML automatically evaluates the model and presents results

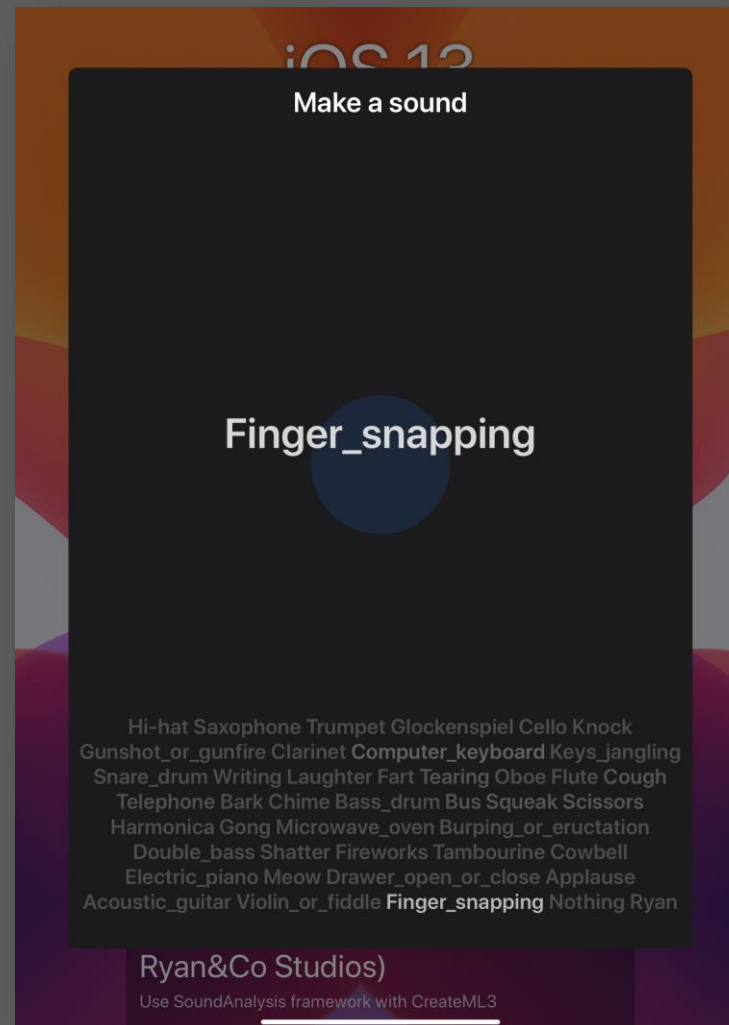


demo – SoundAnalysis with CreateML

- CreateML allows you to test the model using samples or your microphone



demo – SoundAnalysis in app



-= some of what's new in ios13 =-

wrapping up

how to get in on it

iOS13 releases mid-September, Xamarin will likely have same-day support

You can access previews of Xamarin.iOS from the [preview blog post](#) or [Github](#)

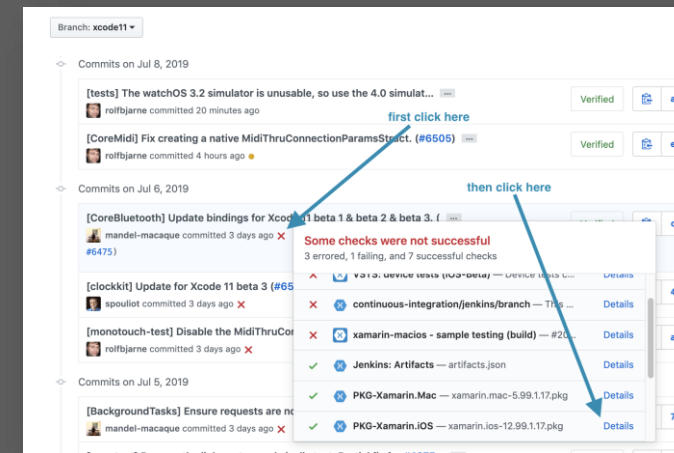
Update (August 21st): Preview 5 of our support for Xcode 11 and iOS 13 is now available. Huge thanks for community contributions to EventKit and HomeKit. Read our [release notes](#) for more information, and [visit the forums to discuss](#).

Update (August 7th): Preview 4 of our support for Xcode 11 and iOS 13 is now available. Read our [release notes](#) for more information, and [visit the forums to discuss](#).

Update (July 26th): Preview 3 of our support for Xcode 11 and iOS 13 is now available. This release includes updates to many frameworks, including a wonderful community contribution to the [NotificationCenter](#) framework from Jonathan Conte. Thanks! Read our [release notes](#) for more information, and [visit the forums to discuss](#).

Update (July 10th): Preview 2 of our support for Xcode 11 and iOS 13 is now available. This release includes APIs for the [BackgroundTasks](#), [LinkPresentation](#), and [PencilKit](#) frameworks as well as updates to the API surface for existing frameworks. Read our release notes for more information.

The preview blog post is updated periodically with new releases, including release notes



The xcodel11 branch on Github has the latest and greatest framework bindings as soon as they have been merged

You can [roll your own build](#) if you like watching things compile or want Reflection.Emit

useful resources

- **iOS13 on Apple Developer**
<https://developer.apple.com/ios/>
- **WWDC2019 Videos**
<https://developer.apple.com/videos/wwdc2019/>
- **Xamarin iOS13 Preview blog post**
<https://devblogs.microsoft.com/xamarin/ios-13-xcode-11/>
- **Merge Conflict Podcast – WWDC Roundup**
<https://www.mergeconflict.fm/special-edition-wwdc19>
- **xamarin-macios xcode11 branch**
<https://github.com/xamarin/xamarin-macios/tree/xcode11>

questions