

NAMRATA BANDEKAR

SO YOU WANT TO BUILD AN ARKIT APP



ARKIT BY TUTORIALS

By the raywenderlich.com Tutorial Team

Chris Language, Namrata Bandekar, Antonio Bello & Tammy Coron

PORTAL

PORTAL



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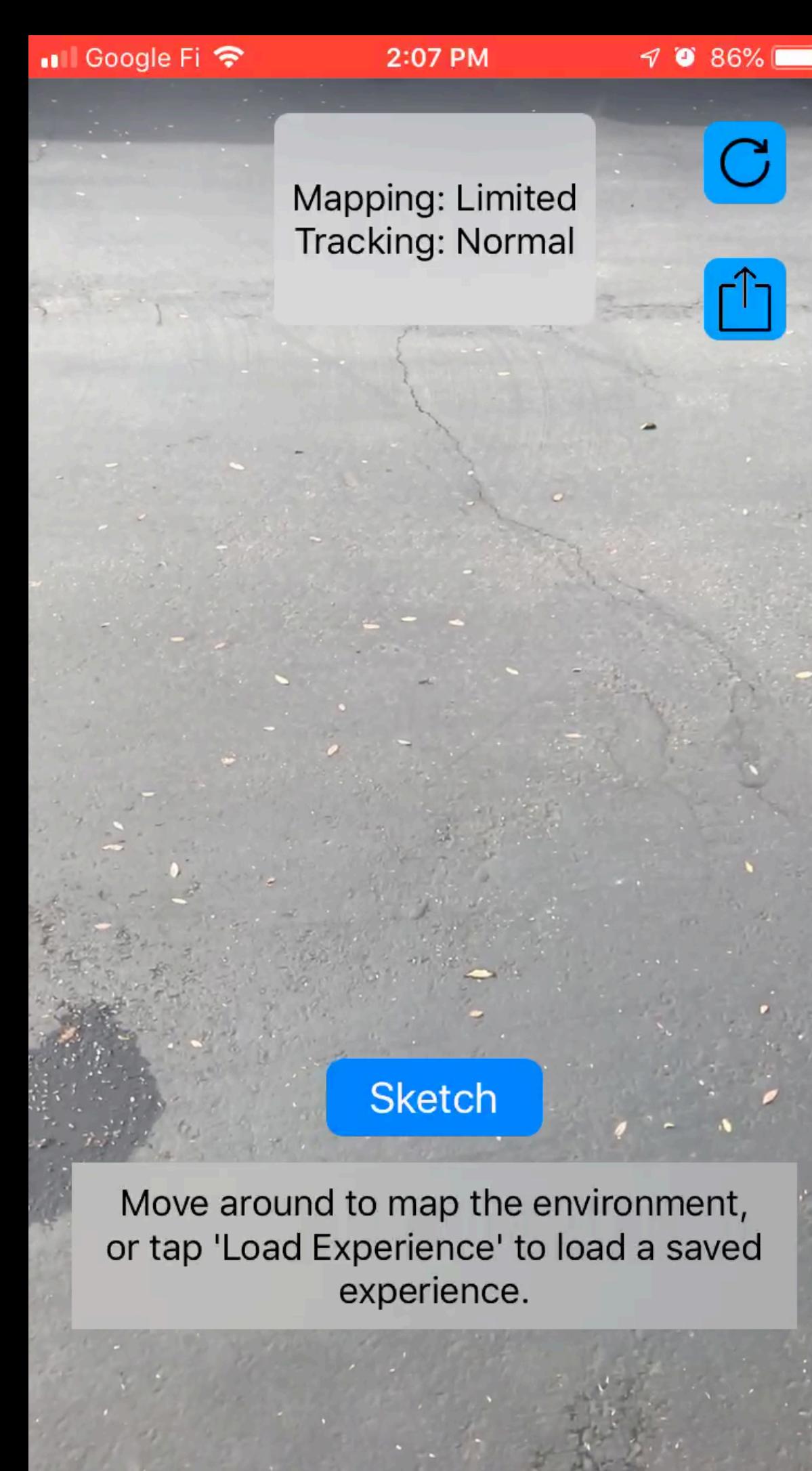
ARSKETCH



PORTAL



ARSKETCH



AUGMENTED REALITY EXPERIENCE

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- ▶ Detect and understand environment geometry

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- ▶ Render virtual 3D content

AUGMENTED REALITY EXPERIENCE

- ▶ Detect and understand environment geometry
- ▶ Render virtual 3D content
- ▶ User guidance

GETTING STARTED

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- ▶ Device Compatibility

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 - ▶ A9 processor or later

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- ▶ Handle unsupported devices and iOS versions

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```
<key>UILaunchStoryboardName</key>
<string>LaunchScreen</string>
<key>UIMainStoryboardFile</key>
<string>Main</string>
<key>UIRequiredDeviceCapabilities</key>
<array>
    <string>arkit</string>
</array>
```

AR Required

GETTING STARTED

- ▶ Device Compatibility
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```
guard ARFaceTrackingConfiguration.isSupported else {  
    updateMessage(text: "Face Tracking Not Supported.")  
    return  
}
```

AR Optional

GETTING STARTED

- ▶ Device permissions

```
<key>LSRequiresiPhoneOS</key>
<true/>
<key>NSCameraUsageDescription</key>
<string>Portal needs to use your camera.</string>
<key>UILaunchStoryboardName</key>
<string>LaunchScreen</string>
```

GETTING STARTED

▶ Privacy and data handling

The screenshot shows a mobile browser on an iPhone with a black background. The top status bar displays signal strength, 'lifecell', Wi-Fi, battery level at 86%, and the time 6:34 PM. The main content is a privacy policy page titled 'Privacy Policy' for the 'Medium Facebook app'. The page includes sections for the Data Controller and Owner, Types of Data collected, Mode and place of processing the Data, and Retention time. It also mentions the use of Cookies and the responsibility of users for third-party data.

Privacy Policy of the Medium Facebook app

In order to receive information about your Personal Data, the purposes and the parties the Data is shared with, contact the Owner.

Data Controller and Owner

221B Baker St, Marylebone, London NW1 6XE, UK,
example@medium.com

Types of Data collected

The owner does not provide a list of Personal Data types collected.

Other Personal Data collected may be described in other sections of this privacy policy or by dedicated explanation text contextually with the Data collection.

The Personal Data may be freely provided by the User, or collected automatically when using this Application.

Any use of Cookies - or of other tracking tools - by this Application or by the owners of third party services used by this Application, unless stated otherwise, serves to identify Users and remember their preferences, for the sole purpose of providing the service required by the User.

Failure to provide certain Personal Data may make it impossible for this Application to provide its services.

Users are responsible for any Personal Data of third parties obtained, published or shared through this Application and confirm that they have the third party's consent to provide the Data to the Owner.

Mode and place of processing the Data

Methods of processing

The Data Controller processes the Data of Users in a proper manner and shall take appropriate security measures to prevent unauthorized access, disclosure, modification, or unauthorized destruction of the Data.

The Data processing is carried out using computers and/or IT enabled tools, following organizational procedures and modes strictly related to the purposes indicated. In addition to the Data Controller, in some cases, the Data may be accessible to certain types of persons in charge, involved with the operation of the site (administration, sales, marketing, legal, system administration) or external parties (such as third party technical service providers, mail carriers, hosting providers, IT companies, communications agencies) appointed, if necessary, as Data Processors by the Owner. The updated list of these parties may be requested from the Data Controller at any time.

Place

The Data is processed at the Data Controller's operating offices and in any other places where the parties involved with the processing are located. For further information, please contact the Data Controller.

Retention time

The Data is kept for the time necessary to provide the service requested by the User, or stated by the purposes outlined in this document, and the User can always request that the Data Controller suspend or remove the data.

The use of the collected Data

The Data is used for the following purposes:

PRACTICAL TIPS



TRACKING



TRACKING

- ▶ ARAnchors fix position in real world 



TRACKING

- ▶ ARAnchors fix position in real world 
- ▶ ARAnchors adjust for drift



TRACKING

- ▶ ARAnchors fix position in real world 
- ▶ ARAnchors adjust for drift
- ▶ Don't use feature points to place content



TRACKING

- ▶ ARAnchors fix position in real world ⚓
- ▶ ARAnchors adjust for drift
- ▶ Don't use feature points to place content



TRACKING QUALITY

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- ▶ Ambient light

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- ▶ Ambient light



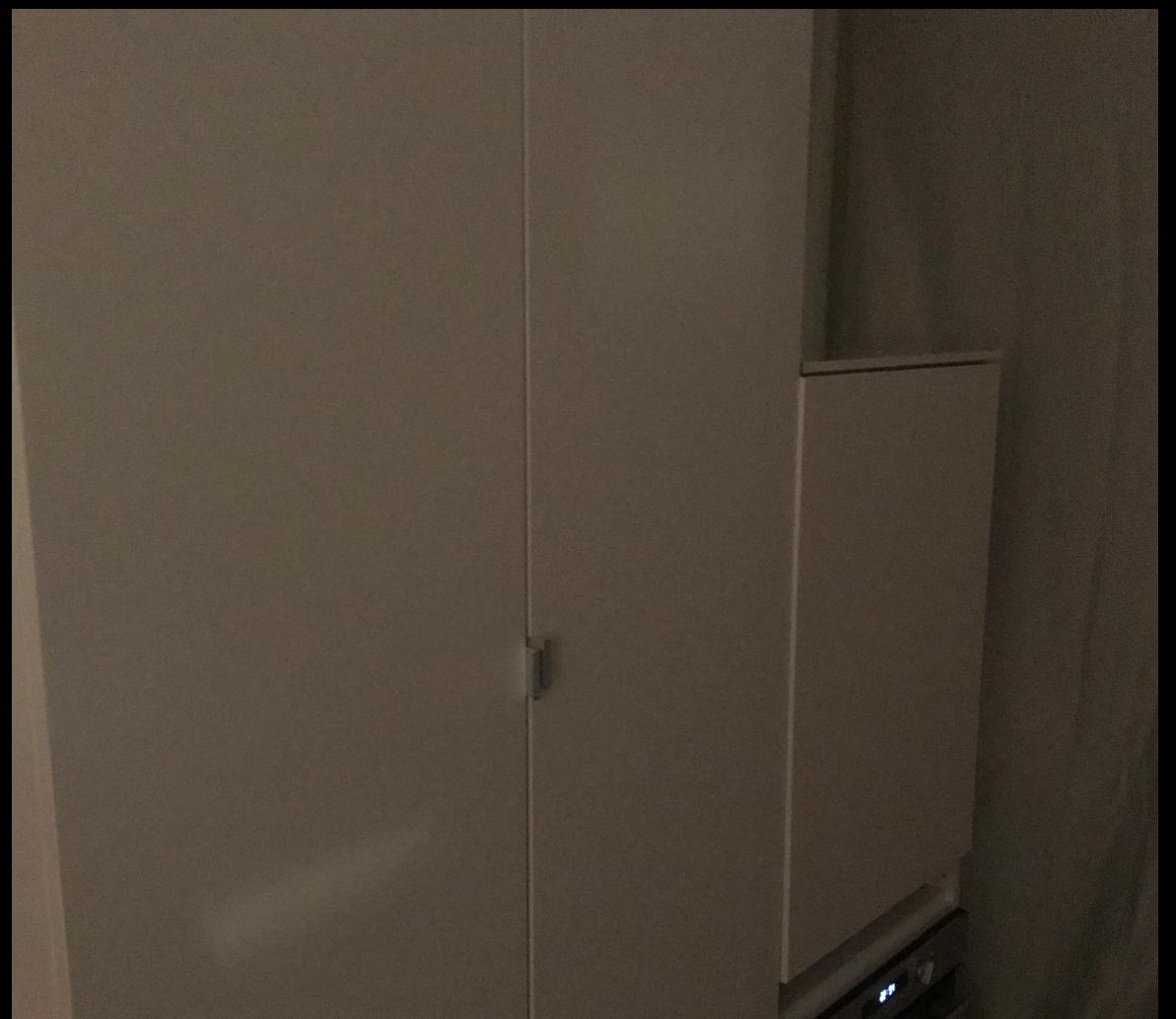
TRACKING QUALITY

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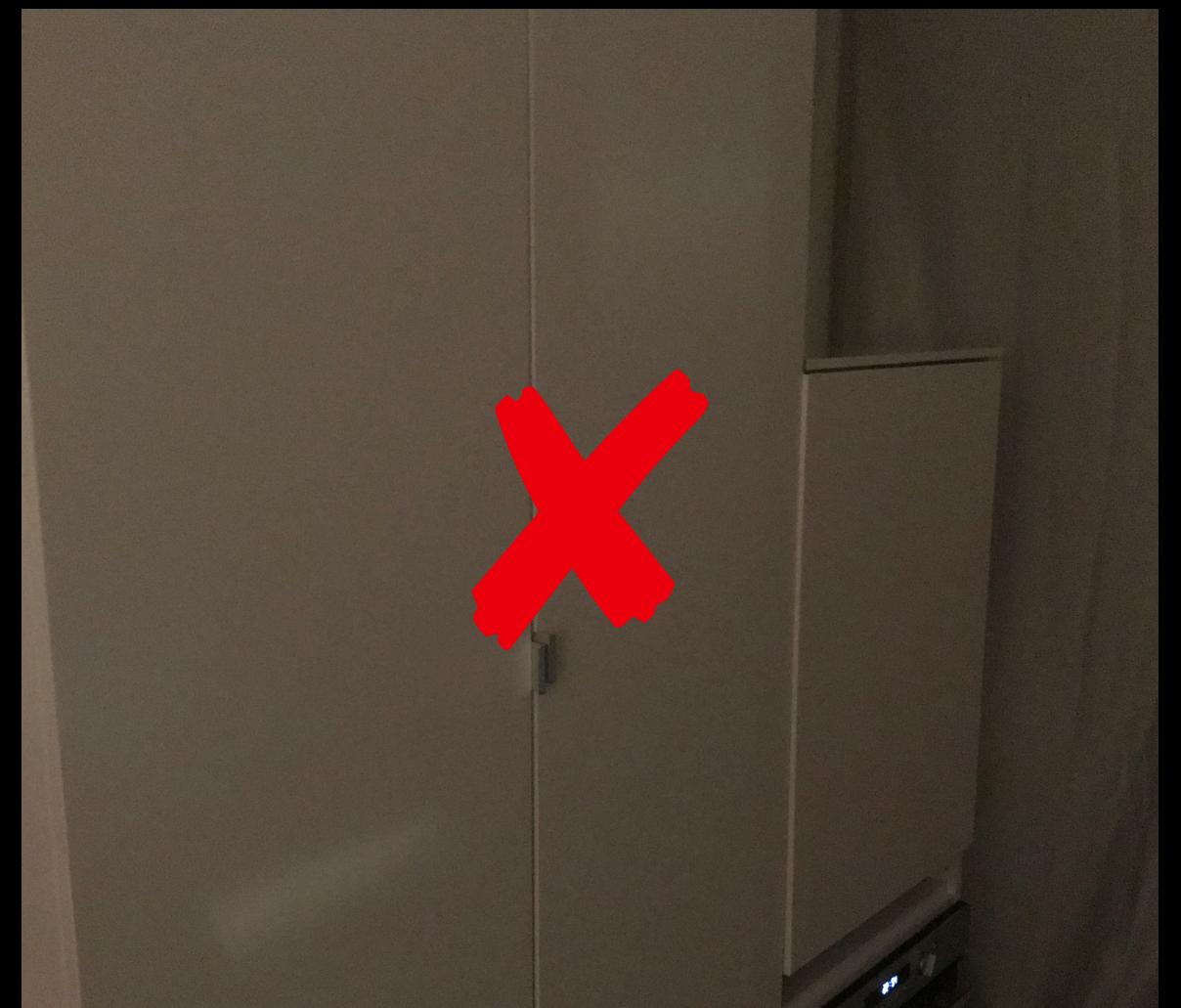
TRACKING QUALITY

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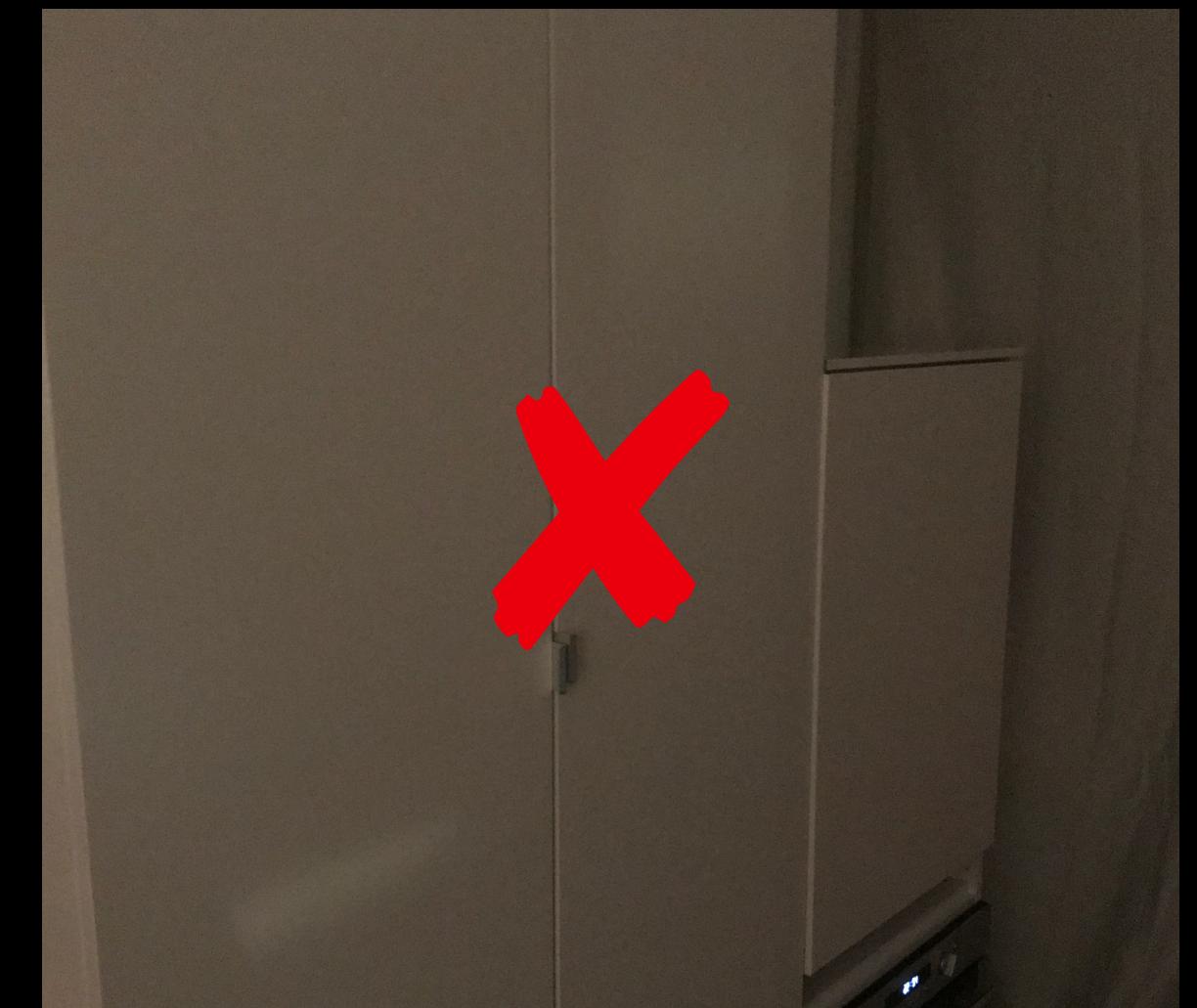
TRACKING QUALITY

- ▶ Ambient light
- ▶ Static environments



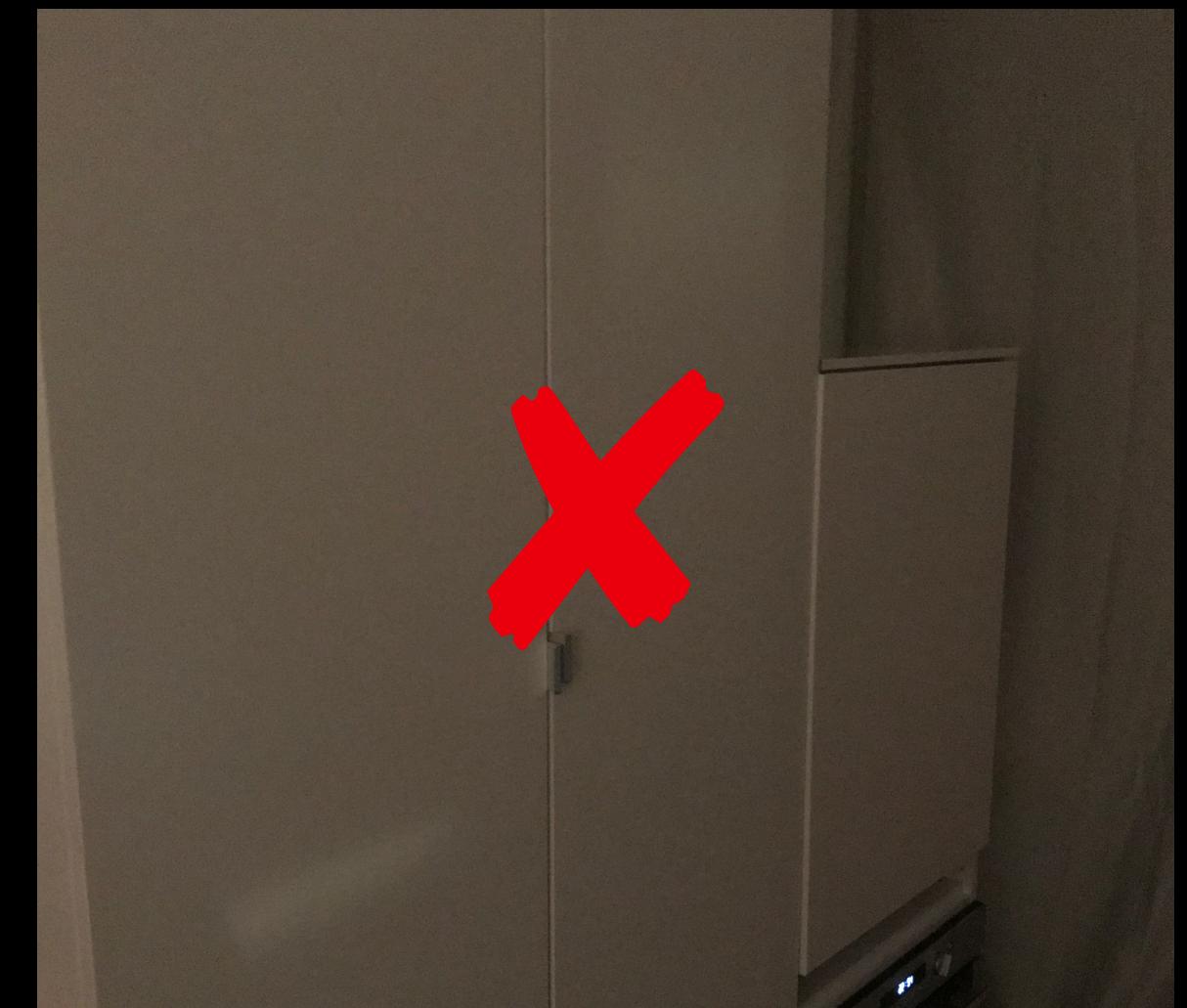
TRACKING QUALITY

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- ▶ Static environments



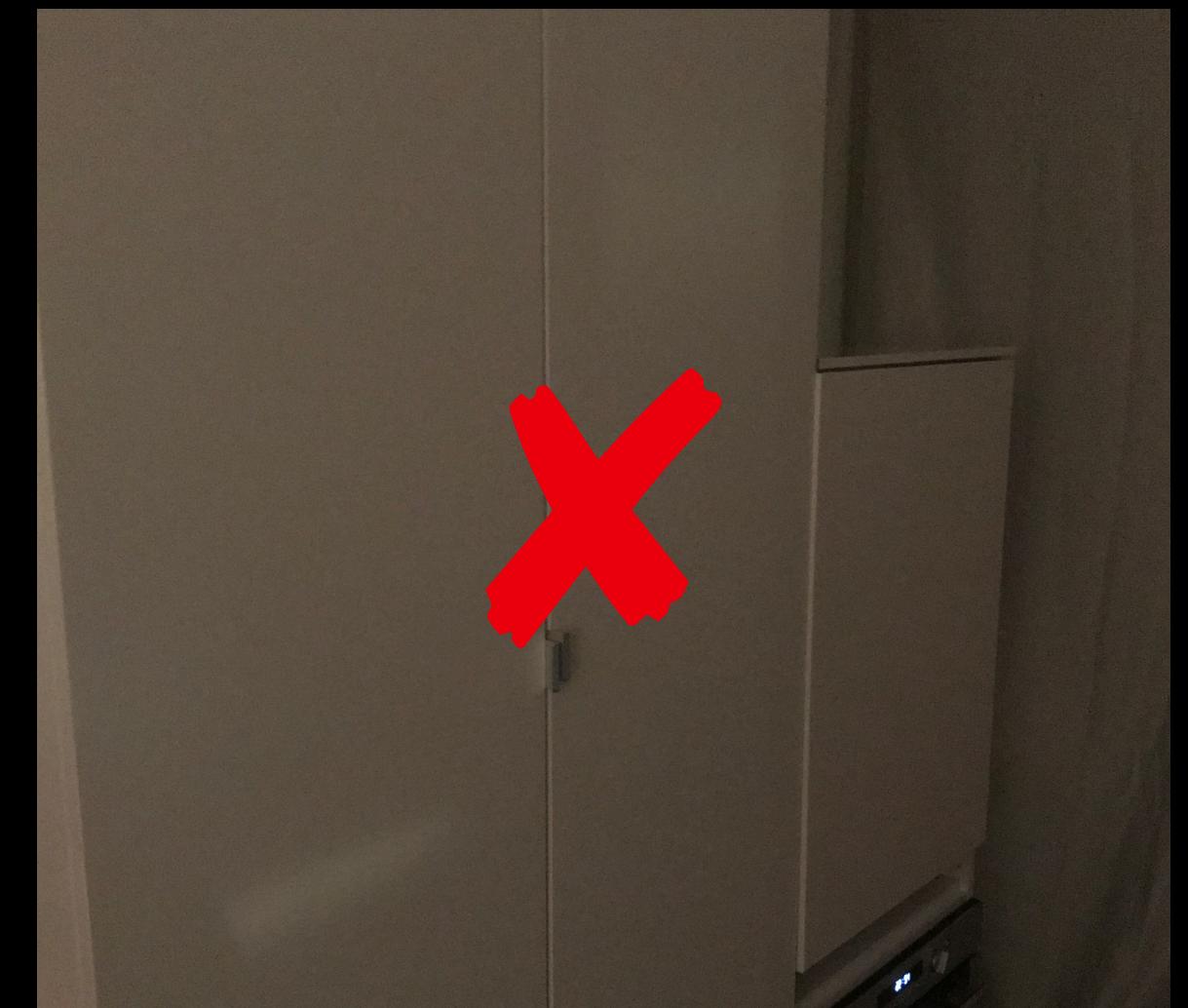
TRACKING QUALITY

- ▶ Ambient light
- ▶ Static environments



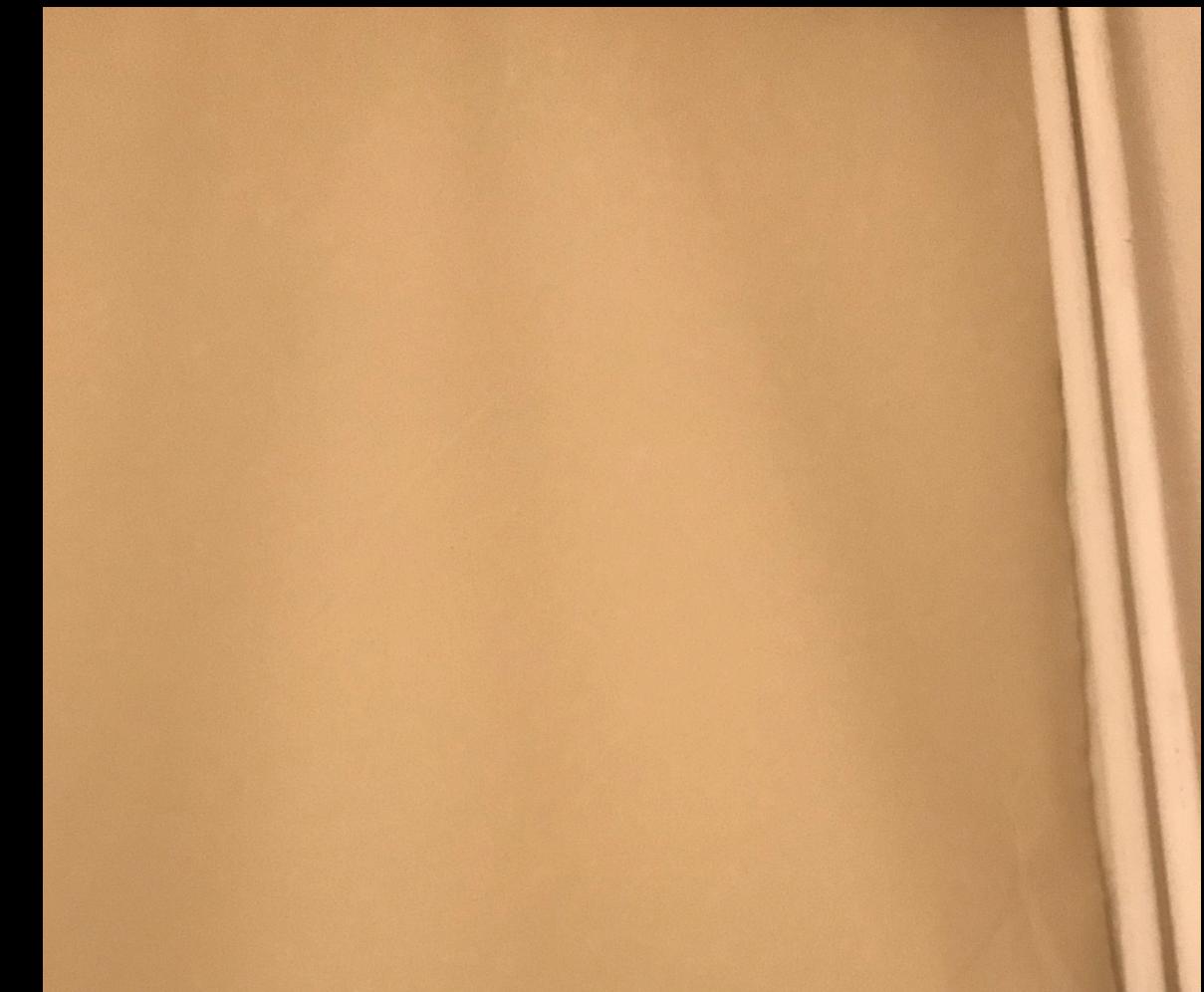
TRACKING QUALITY

- ▶ Ambient light
- ▶ Static environments
- ▶ Surface texture



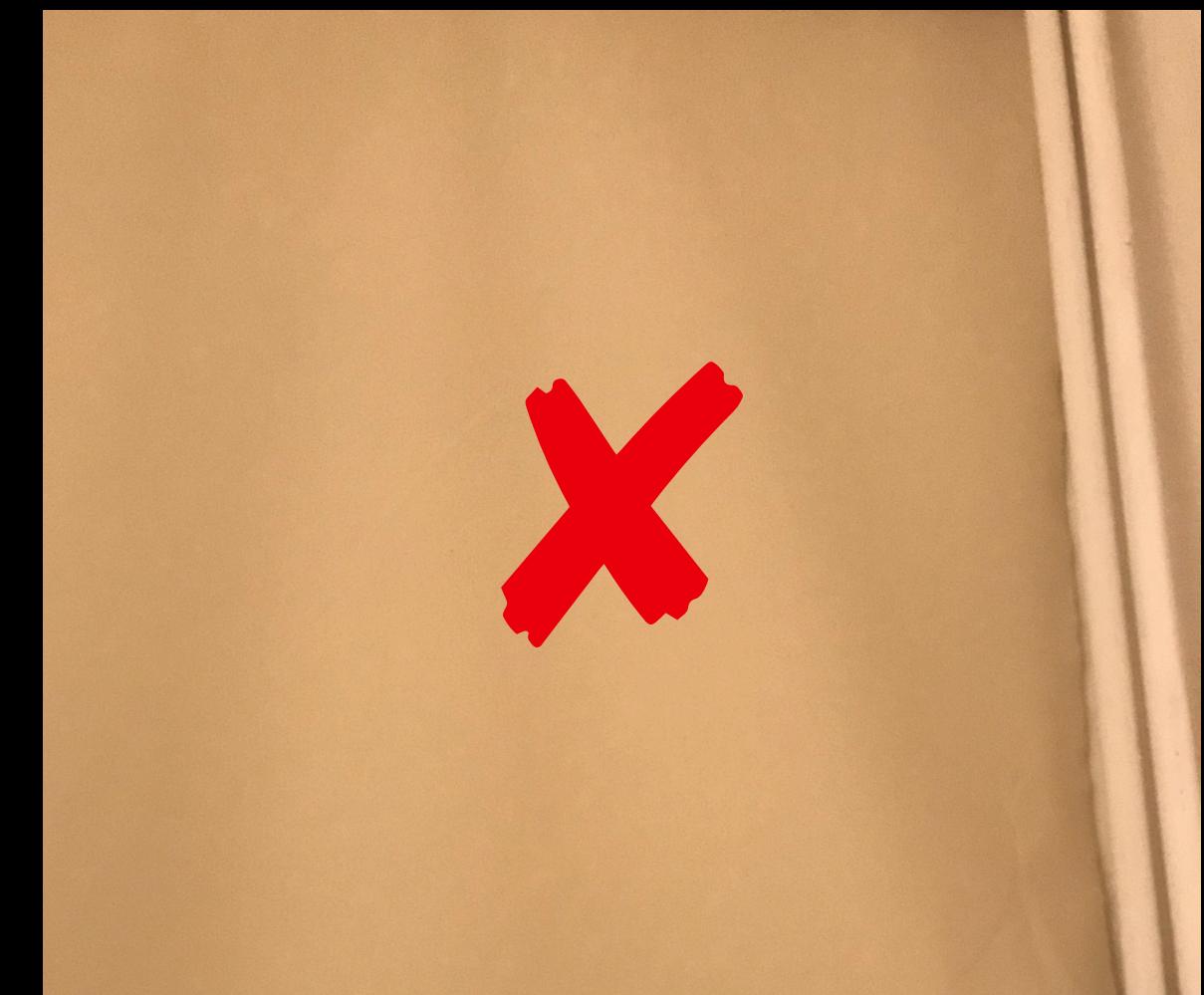
TRACKING QUALITY

- ▶ Ambient light
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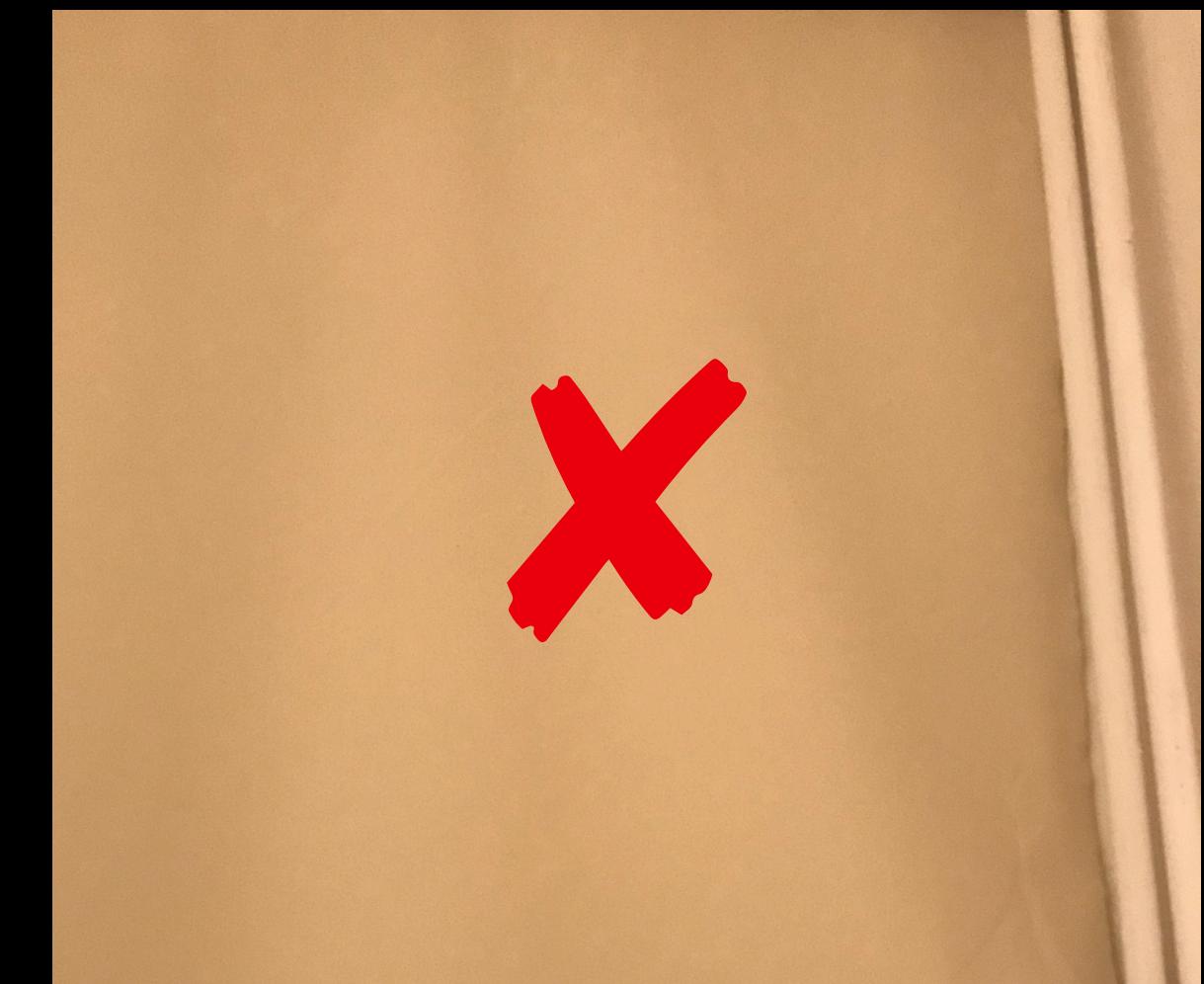
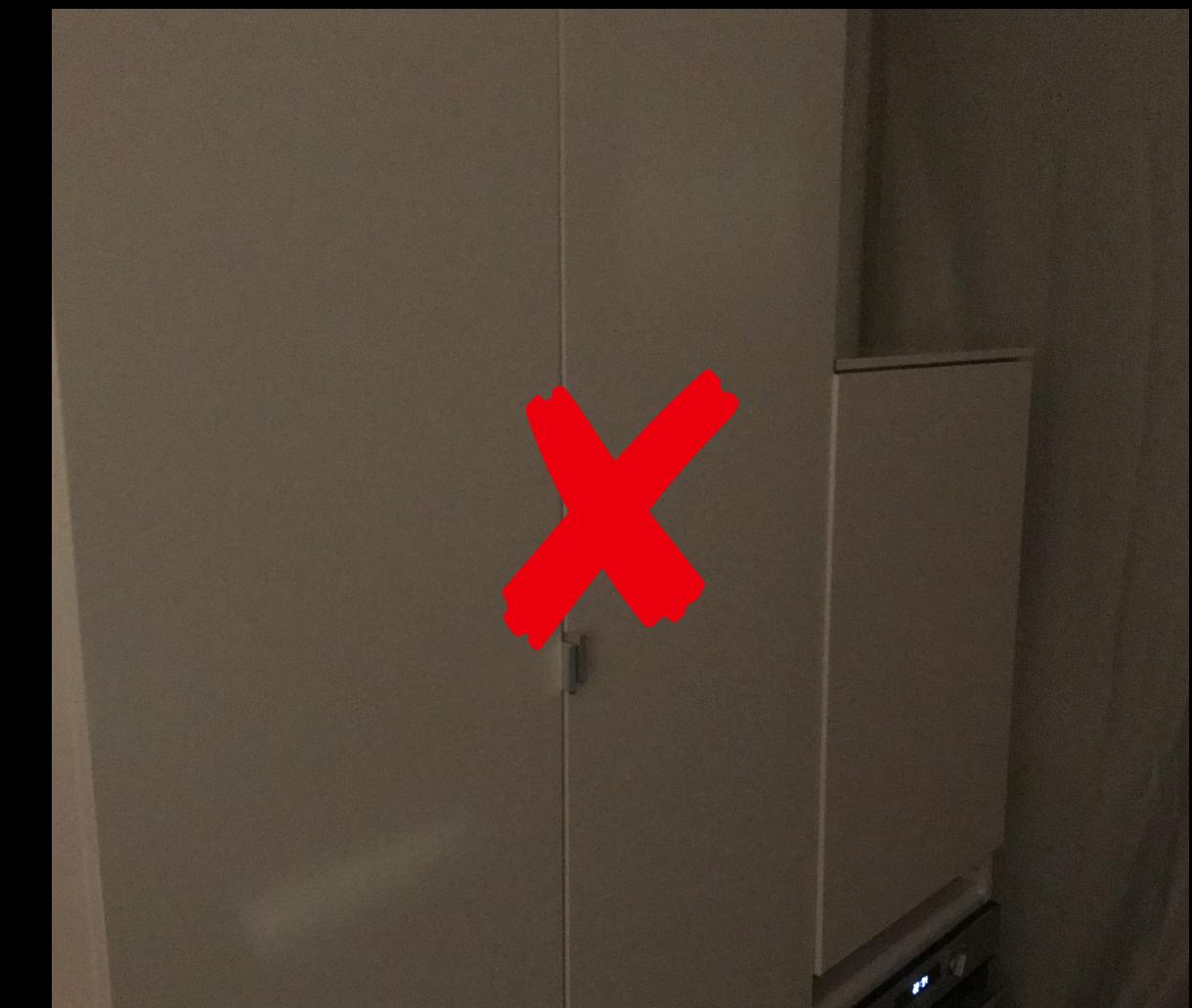
TRACKING QUALITY

- ▶ Ambient light
- ▶ Static environments
- ▶ Surface texture



TRACKING QUALITY

- ▶ Ambient light
- ▶ Static environments
- ▶ Surface texture
- ▶ Sensor data quality



TRACKING QUALITY

TRACKING QUALITY

```
ARWorldTrackingConfiguration
```

```
open class ARCamera : NSObject, NSCopying {
```

```
    open var transform: SIMD_float4x4 { get }
```

```
    open var trackingState: ARTrackingState { get }
```

```
    open var trackingStateReason: ARTrackingStateReason { get }
```

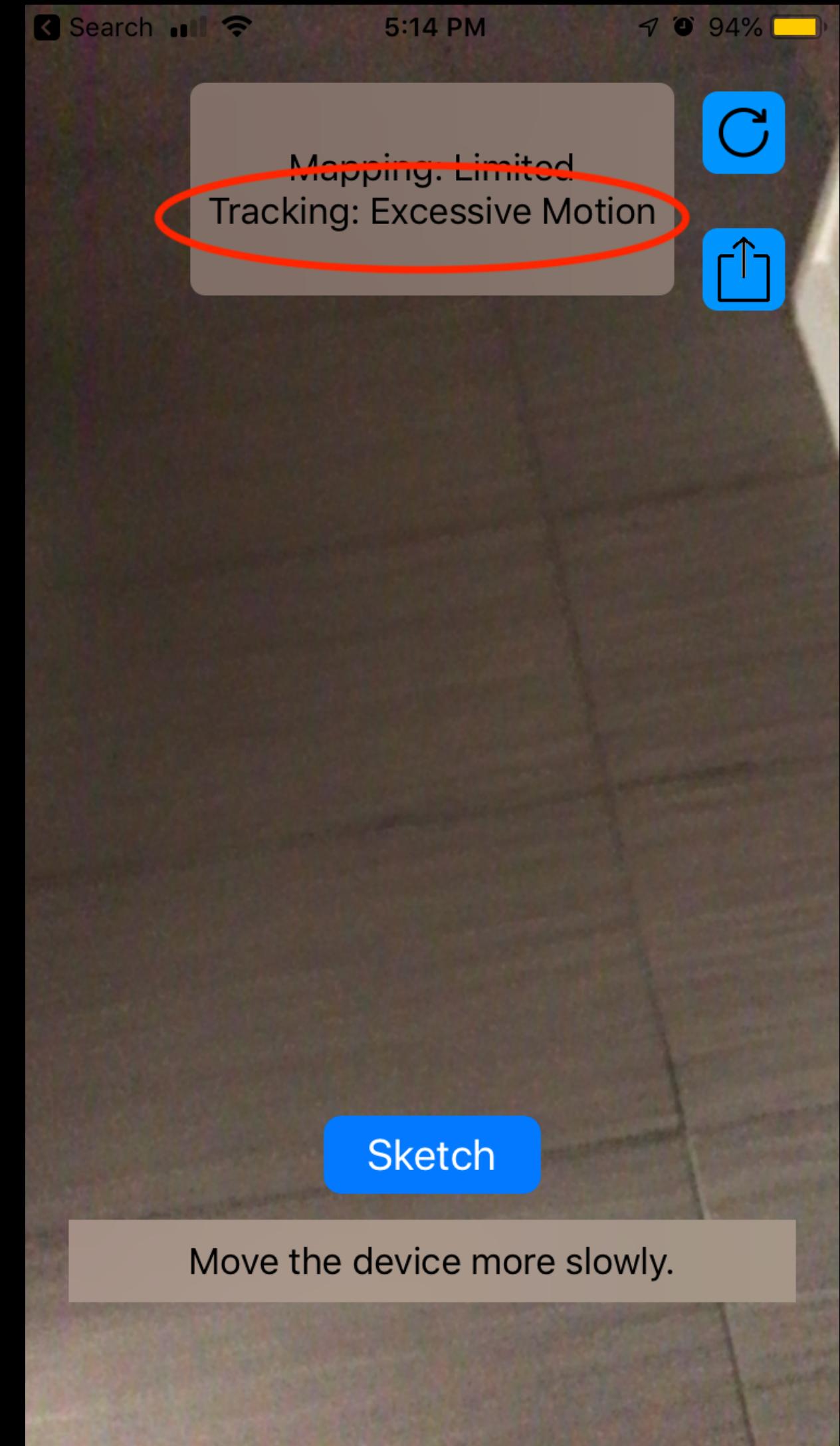
```
...
```

```
}
```

TRACKING QUALITY

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ARWorldTrackingConfiguration
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    ...  
}
```



TRACKING QUALITY

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ARWorldTrackingConfiguration
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open class ARCamera : NSObject, NSCopying {
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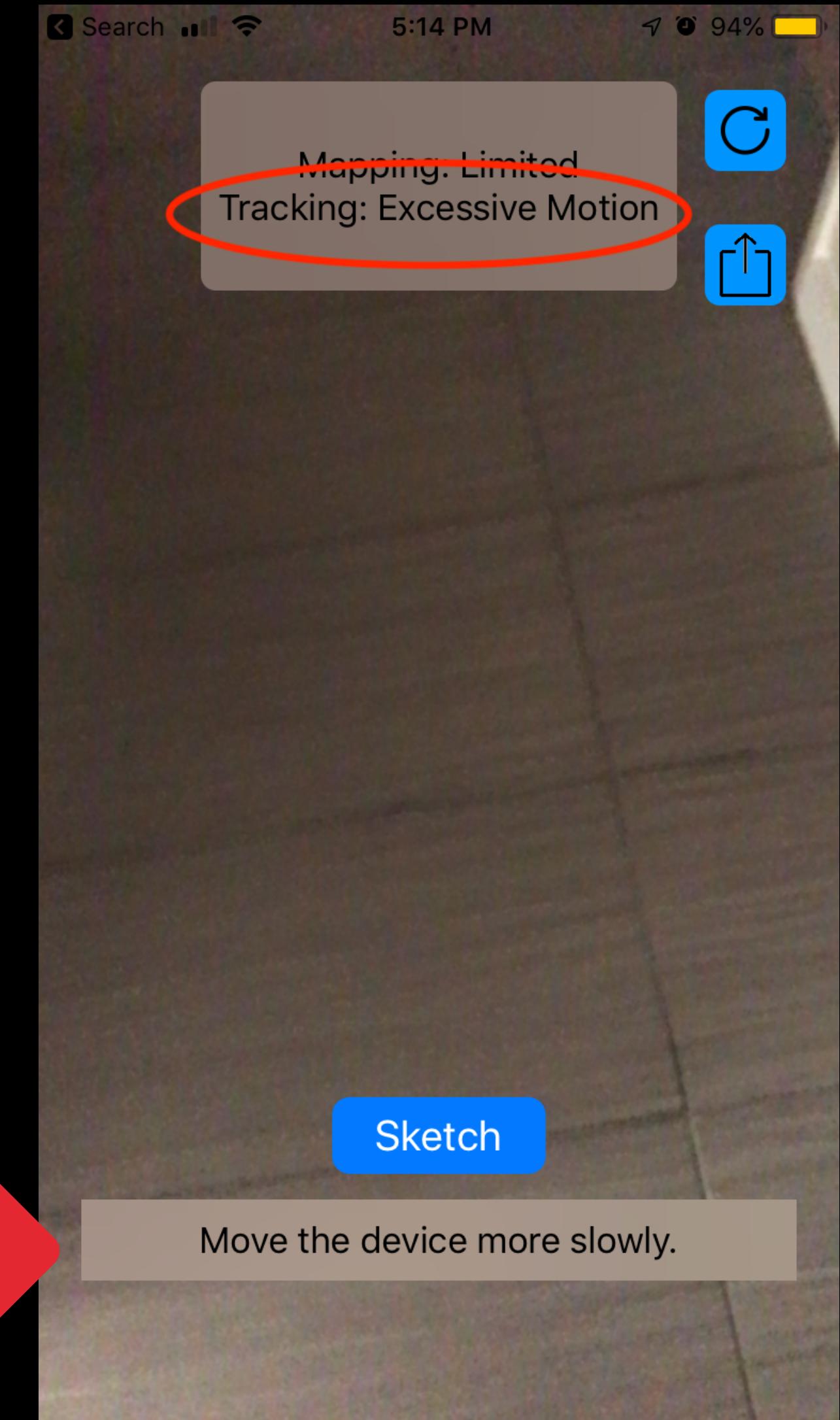
```
    open var transform: SIMD_float4x4 { get }
```

```
    open var trackingState: ARTrackingState { get }
```

```
    open var trackingStateReason: ARTrackingStateReason { get }
```

```
...
```

```
}
```



TRACKING FEEDBACK

```
extension ARCamera.TrackingState {  
    var localizedFeedback: String {  
        switch self {  
        case .normal:  
            return "All good!"  
        case .notAvailable:  
            return "Tracking unavailable."  
        case .limited(.excessiveMotion):  
            return "Move the device more slowly."  
        case .limited(.insufficientFeatures):  
            return "Point the device at an area with visible surface detail, or improve lighting conditions."  
        case .limited(.relocalizing):  
            return "Resuming session – move to where you were when the session was interrupted."  
        case .limited(.initializing):  
            return "Initializing AR session."  
        }  
    }  
}
```

PERSISTING VIRTUAL CONTENT

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- ▶ ARWorldMap - serializable

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- ▶ Use NSSecureCoding protocol

PERSISTING VIRTUAL CONTENT

- ▶ ARWorldMap - serializable
- ▶ Use NSSecureCoding protocol
- ▶ ARAncors store object state and position

CAPTURING THE ARWORLDMAP

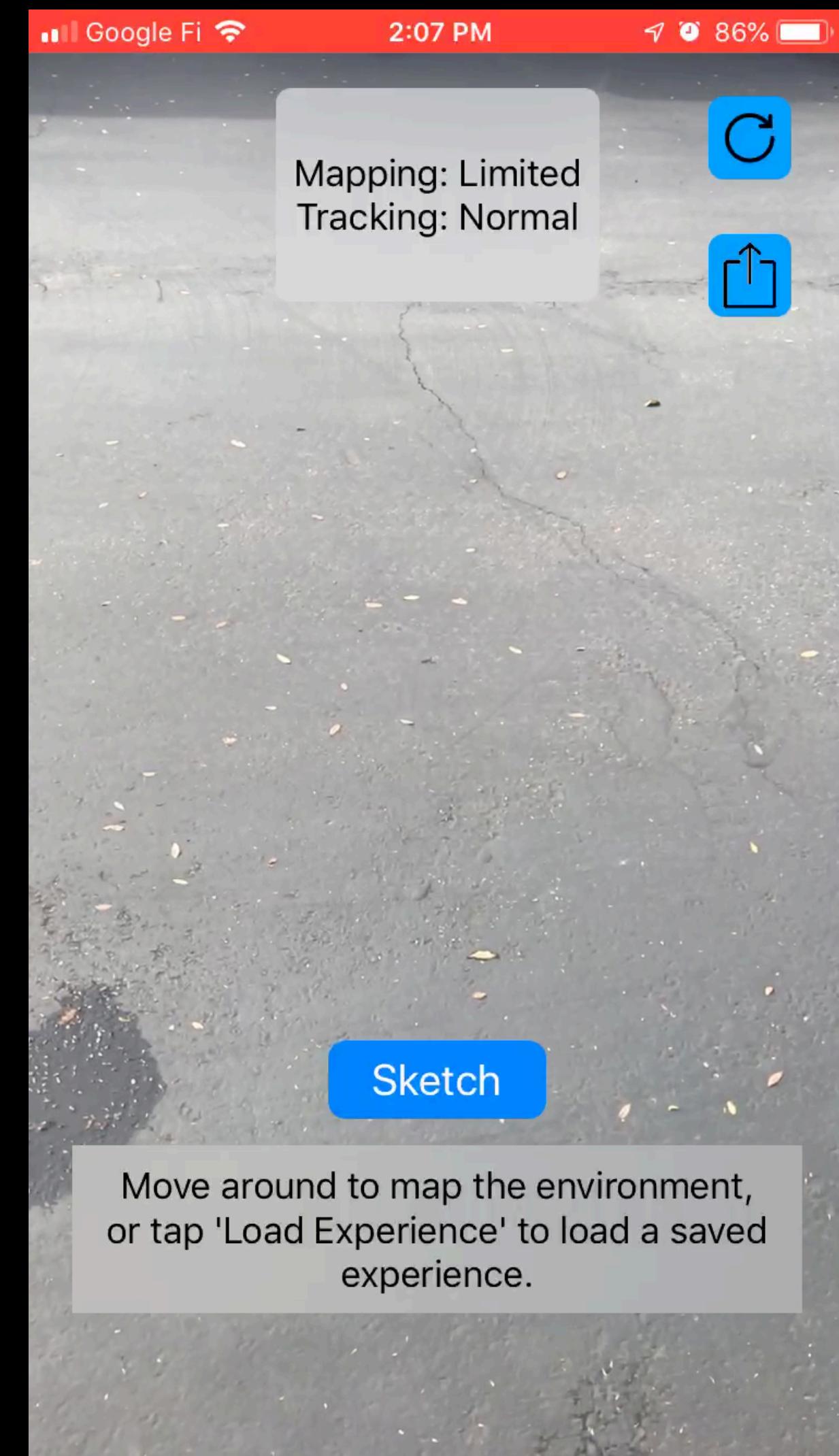
```
extension ARFrame.WorldMappingStatus: CustomStringConvertible {  
    public var description: String {  
        switch self {  
            case .notAvailable:  
                return "Not Available"  
            case .limited:  
                return "Limited"  
            case .extending:  
                return "Extending"  
            case .mapped:  
                return "Mapped"  
        }  
    }  
}
```

CAPTURING THE ARWORLDMAP

▶ Use WorldMappingStatus

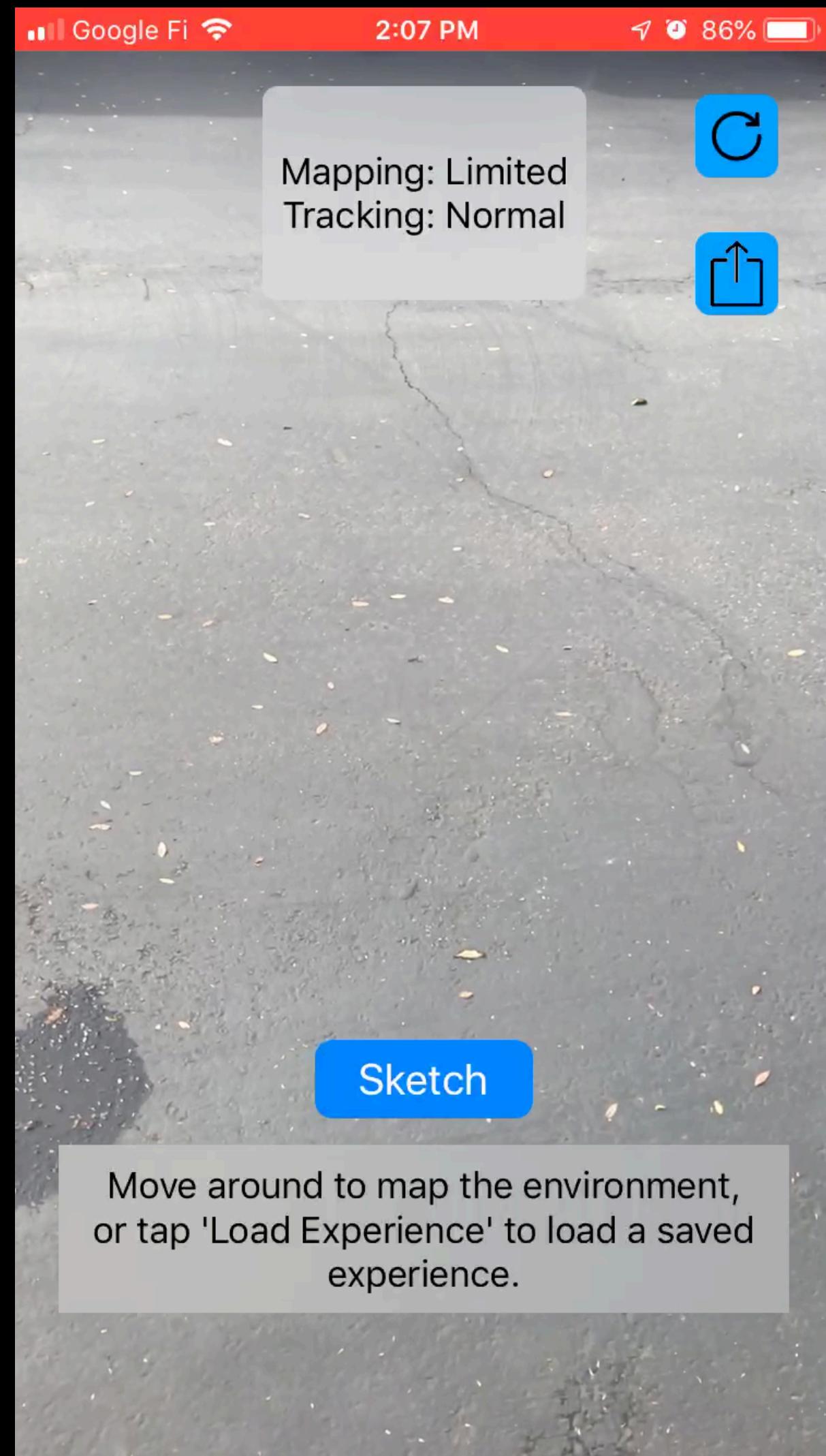
```
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```

WORLD MAPPING



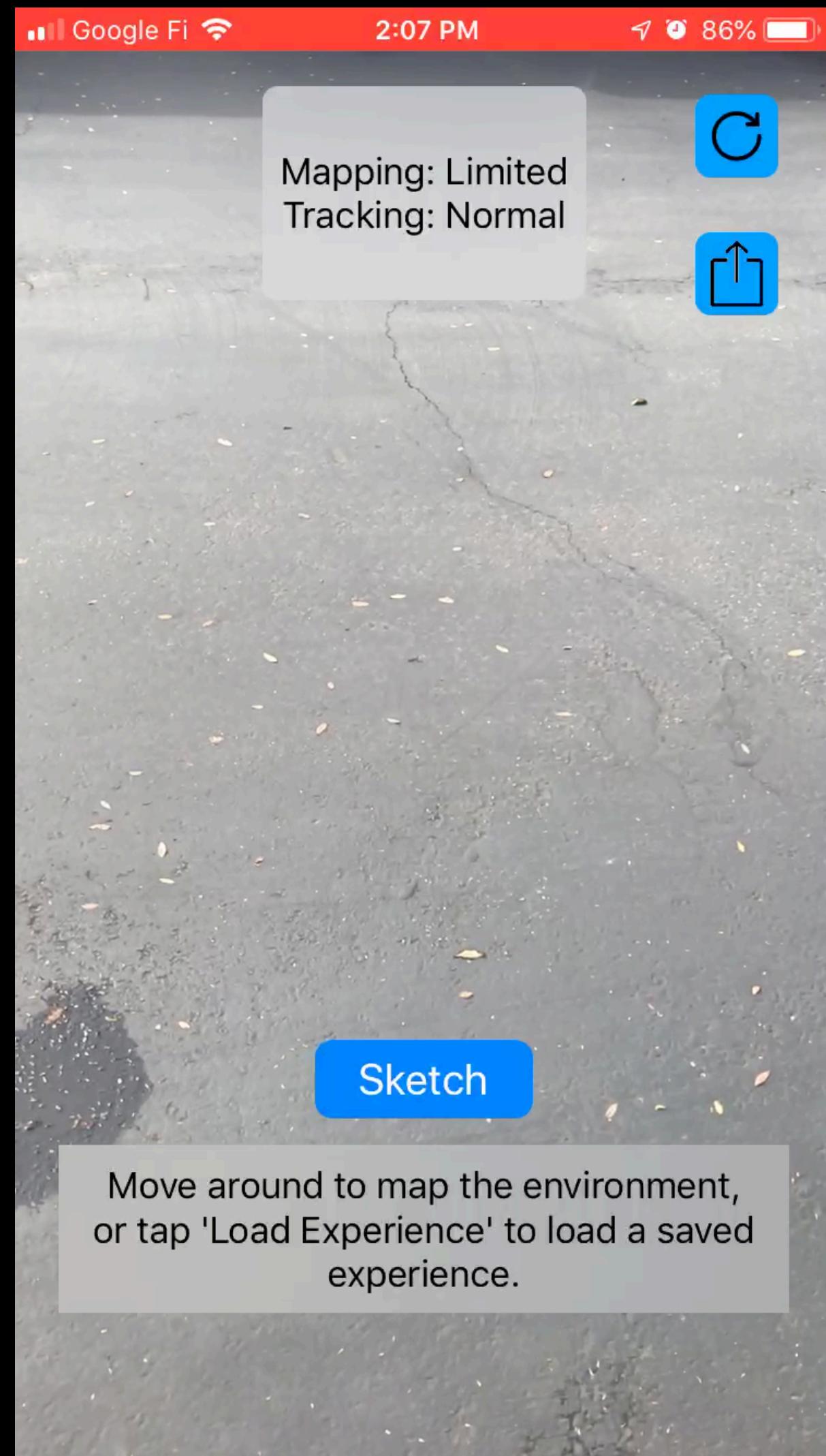
WORLD MAPPING

- ▶ Don't display UI until ready



WORLD MAPPING

- ▶ Don't display UI until ready



PERFORMANCE

TEST IN NON-IDEAL CONDITIONS



INITIALIZATION TAKES TIME.







BATTERY DRAIN!



LIMIT NUMBER OF ANCHORS



"There is such a thing as having too much of a good thing."

- Michelle Gomez



GHOST EFFECT



MAPPING FROM A DISTANCE WON'T WORK







LOWER FPS WHEN POSSIBLE



OTHER CONSIDERATIONS

DELEGATE CALLBACKS



SCENEKIT FOR AR

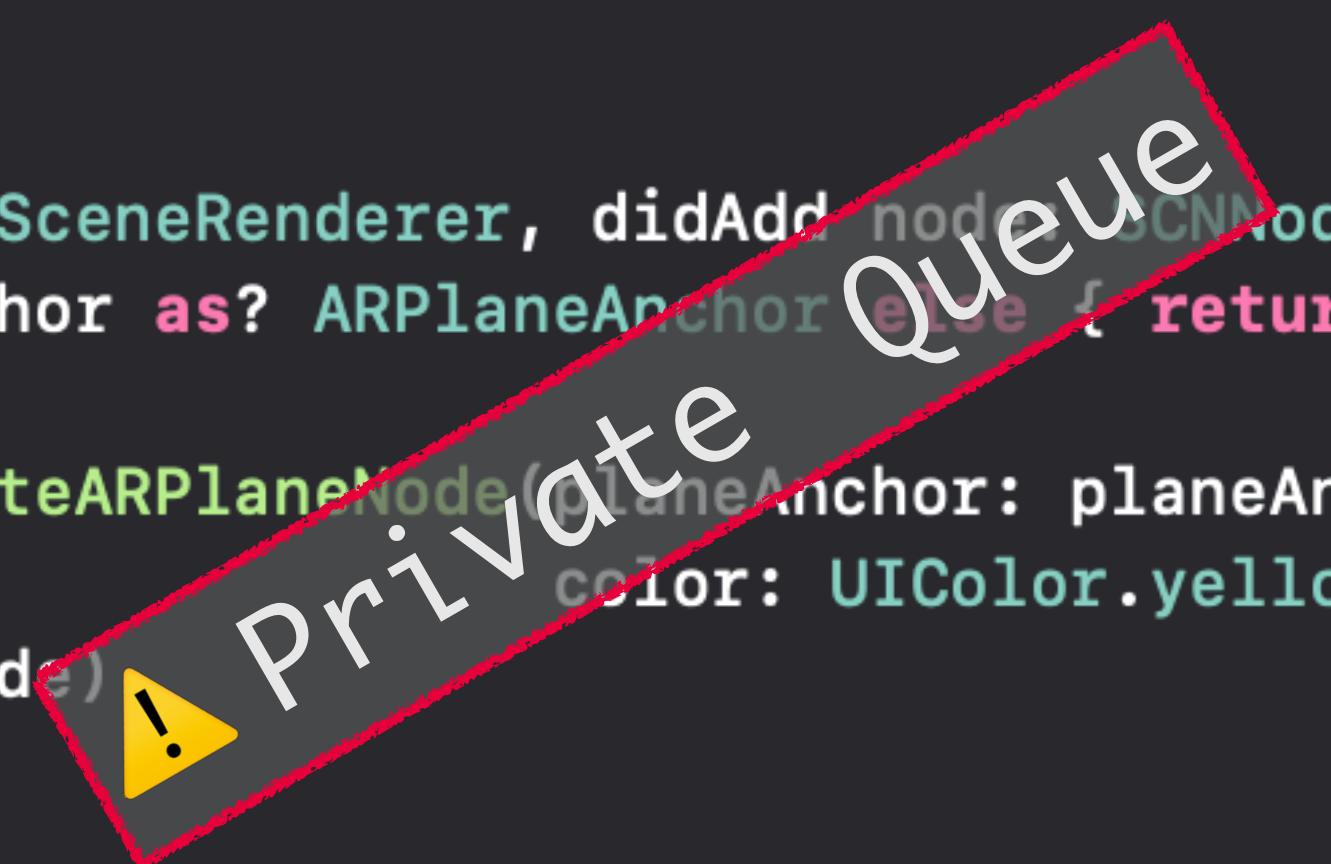
```
extension ViewController : ARSCNViewDelegate {
    func renderer(_ renderer: SCNSceneRenderer, updateAtTime time: TimeInterval) {
        DispatchQueue.main.async {
            selfStatusLabel.text = self.trackingStatus
        }
    }

    func renderer(_ renderer: SCNSceneRenderer, didAdd node: SCNNNode, for anchor: ARAnchor) {
        guard let planeAnchor = anchor as? ARPlaneAnchor else { return }
        DispatchQueue.main.async {
            let planeNode = self.createARPlaneNode(planeAnchor: planeAnchor,
                                                    color: UIColor.yellow.withAlphaComponent(0.5))
            node.addChildNode(planeNode)
        }
    }

    func renderer(_ renderer: SCNSceneRenderer, didUpdate node: SCNNNode, for anchor: ARAnchor) {
        guard let planeAnchor = anchor as? ARPlaneAnchor else { return }
        DispatchQueue.main.async {
            self.updateARPlaneNode(planeNode: node.childNodes[0], planeAnchor: planeAnchor)
        }
    }
}
```

SCENEKIT FOR AR

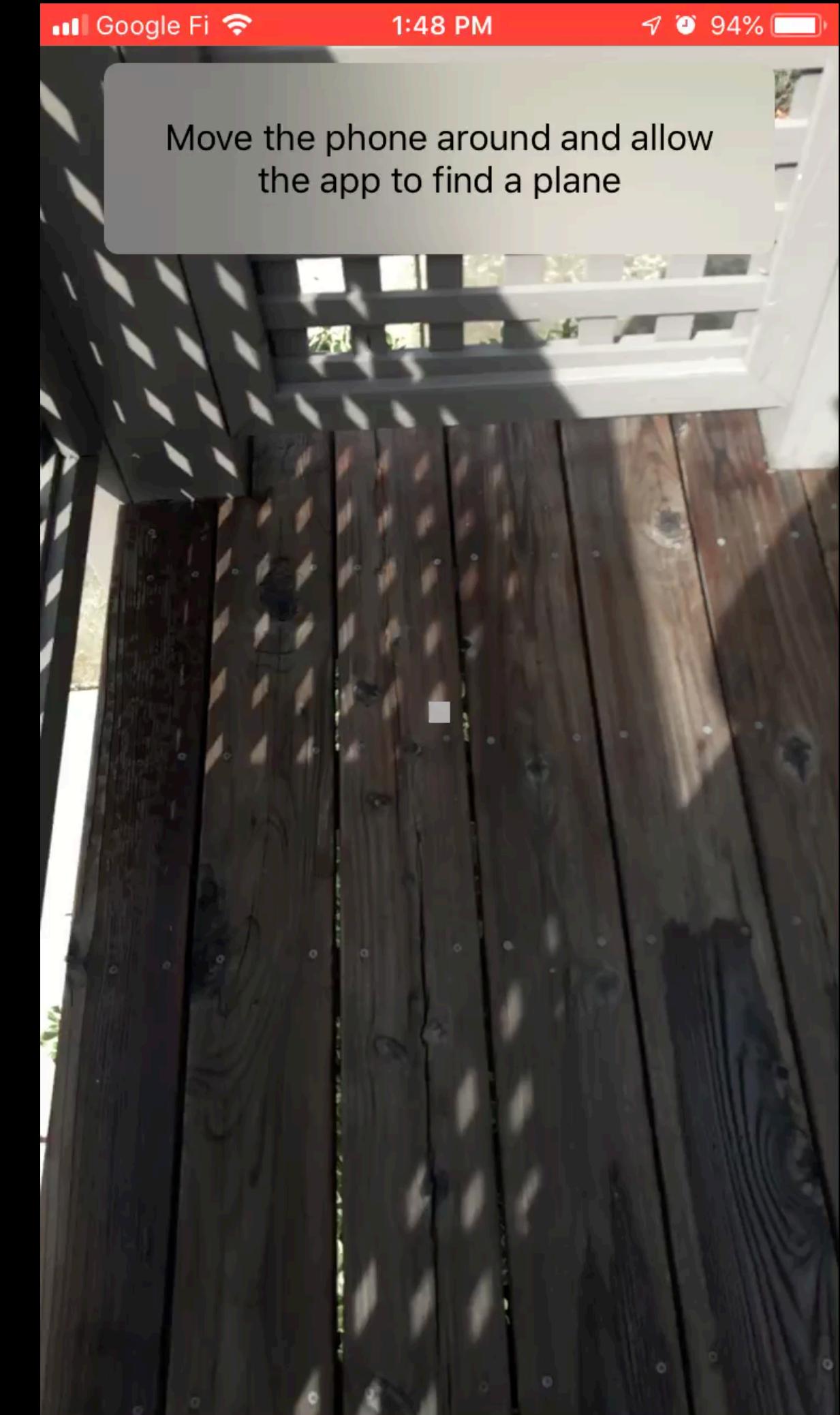
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        }  
    }  
}
```



USER GUIDANCE



IKEA Place

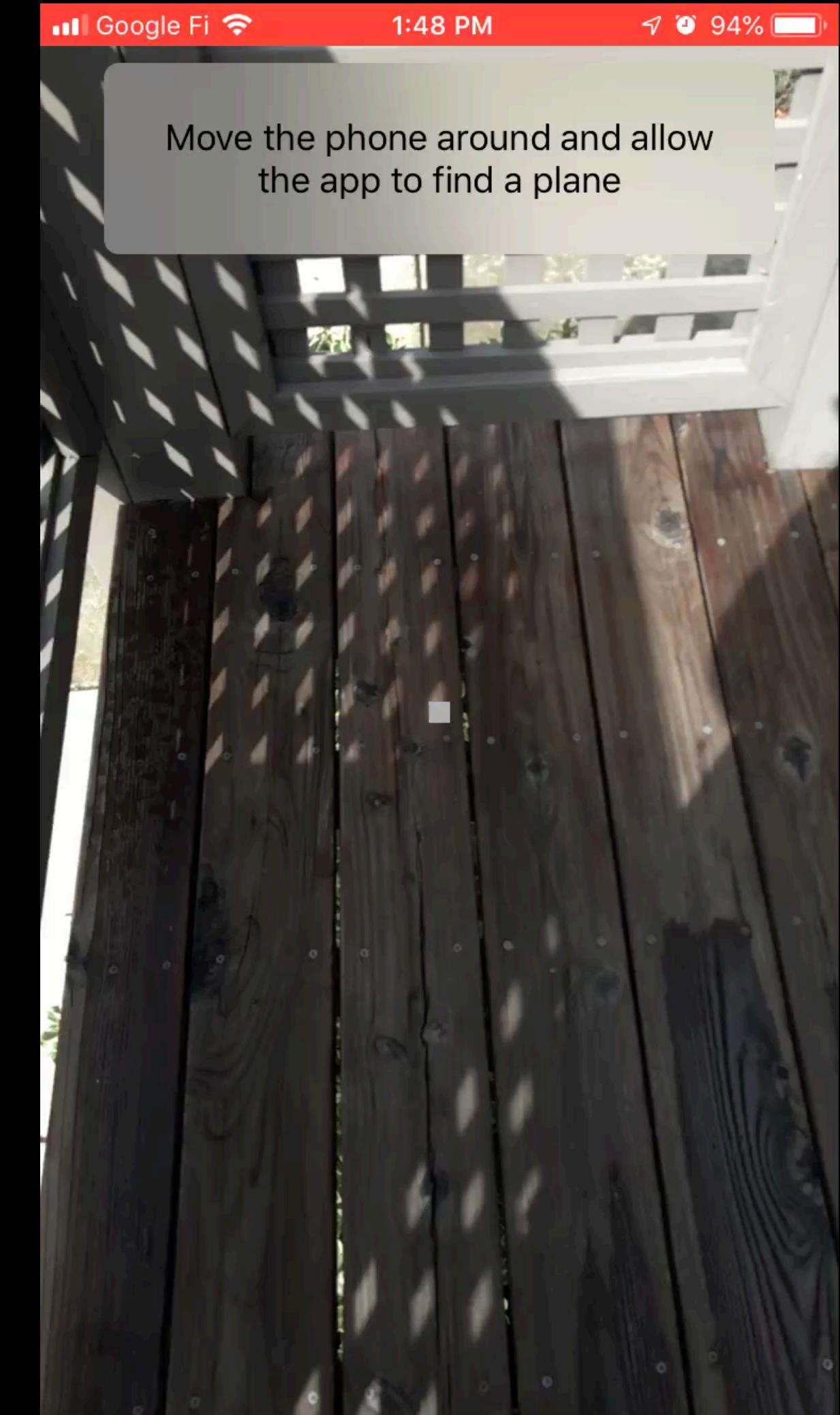


Portal

USER GUIDANCE



IKEA Place

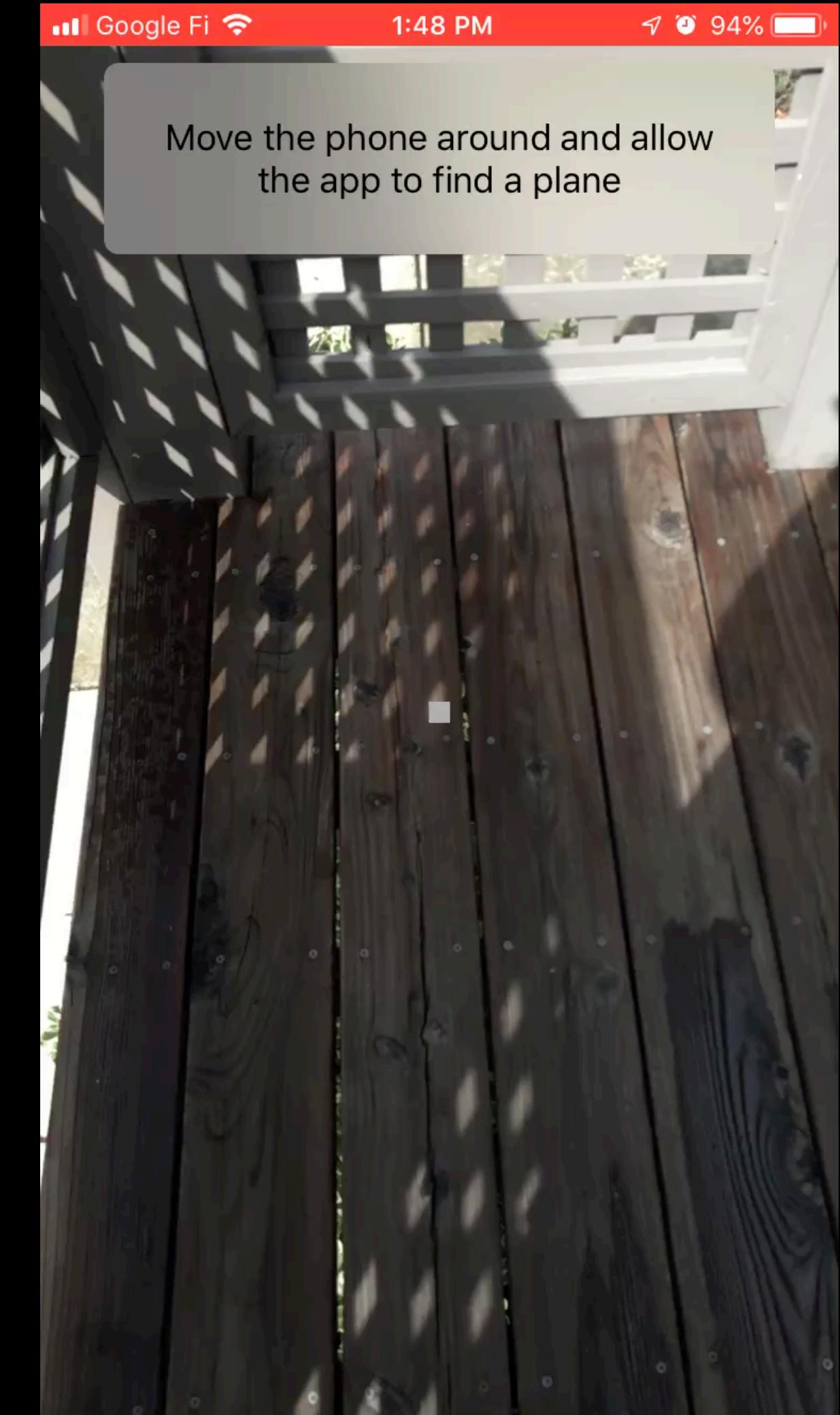


Portal

USER GUIDANCE



IKEA Place



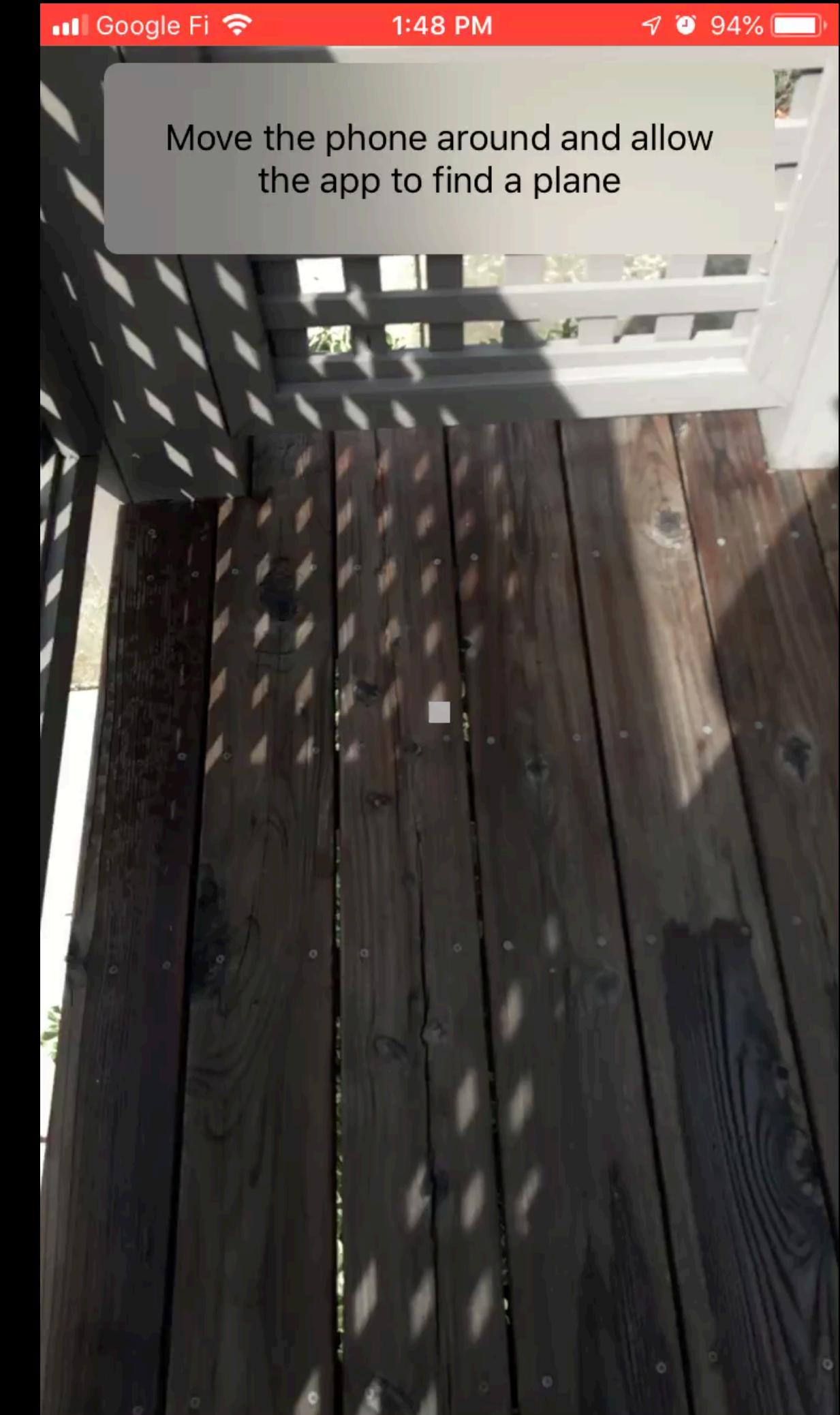
Portal

USER GUIDANCE

- ▶ Set your users up for success



IKEA Place



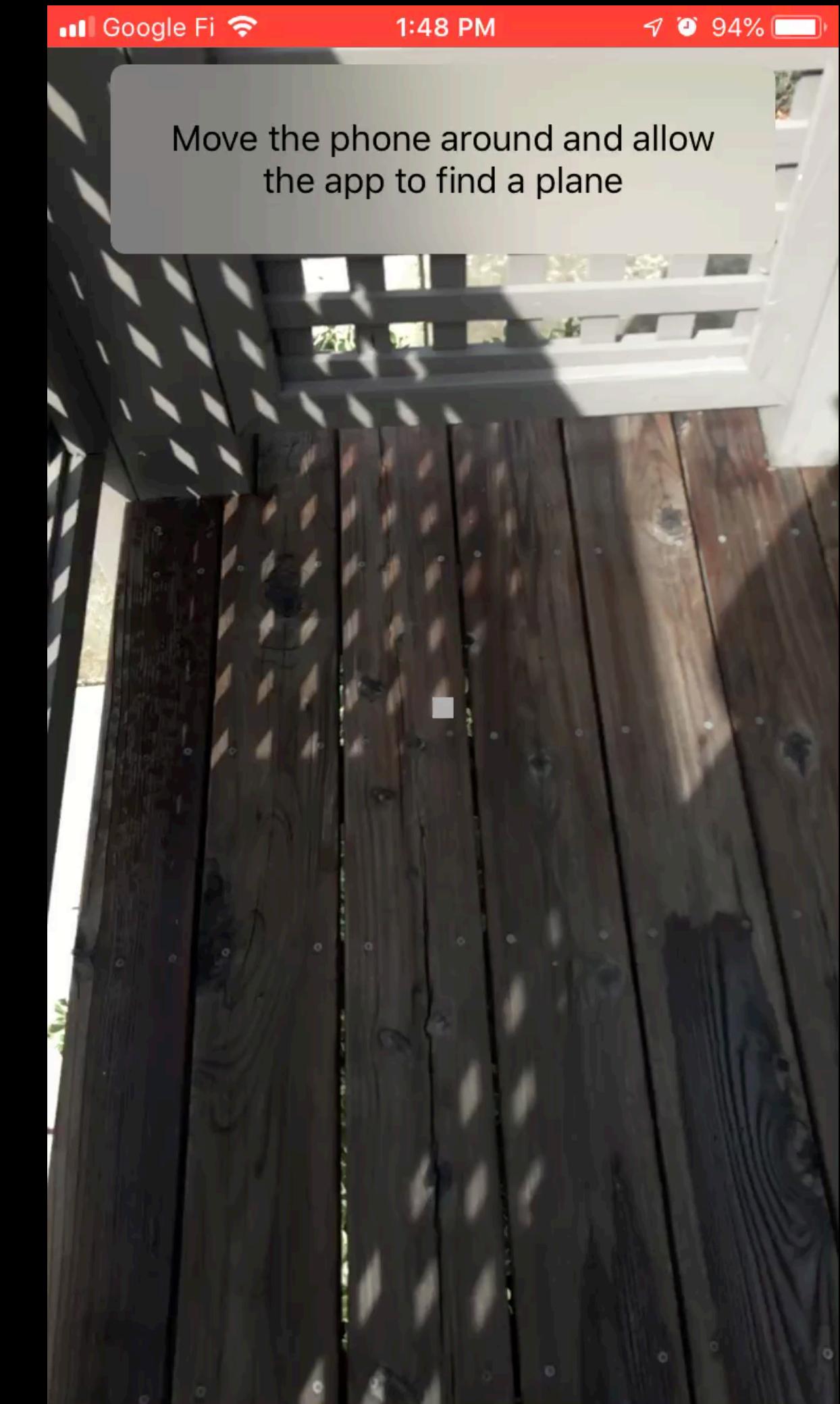
Portal

USER GUIDANCE

- ▶ Set your users up for success
- ▶ Show feature points



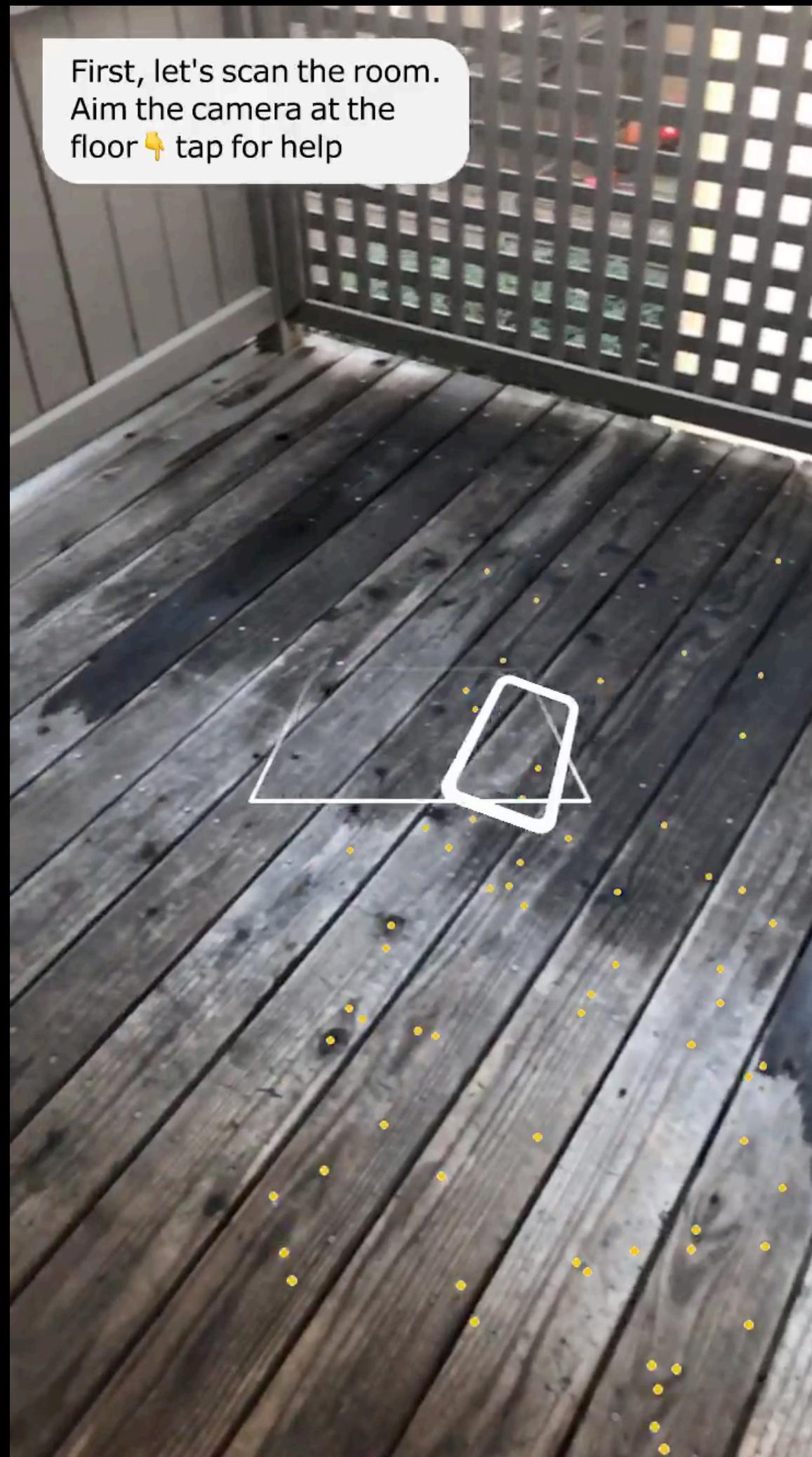
IKEA Place



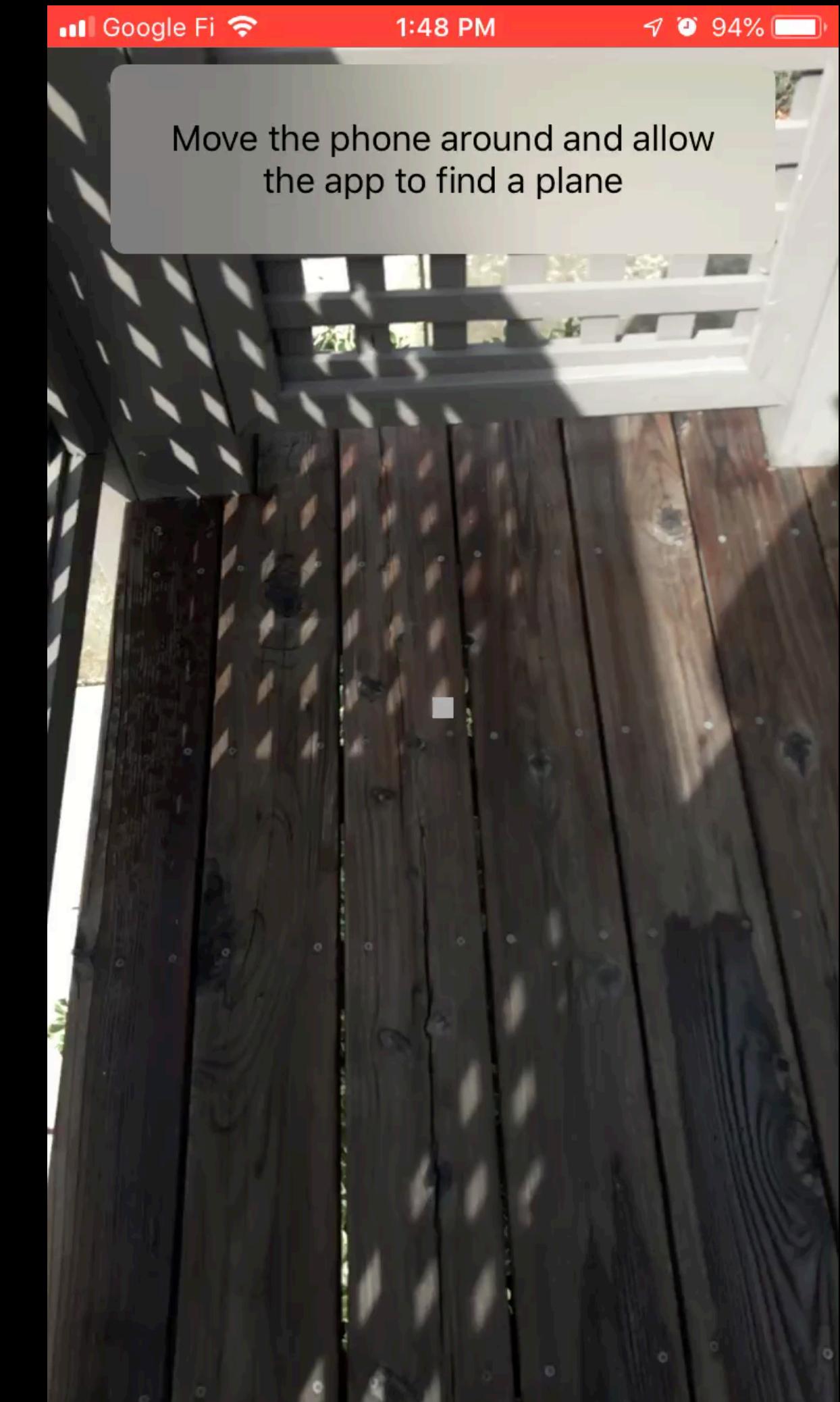
Portal

USER GUIDANCE

- ▶ Set your users up for success
- ▶ Show feature points
- ▶ Display detected plane



IKEA Place

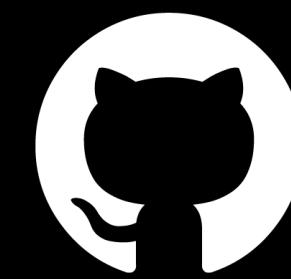


Portal

THANK YOU!



@NAMRATACODES



NAMRATABANDEKAR

Slides - <https://bit.ly/2ugwmw9>



<https://www.zynga.com/jobs/careers/>

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