

Name: Muhammad Zaid Kamil
SID: 211890395

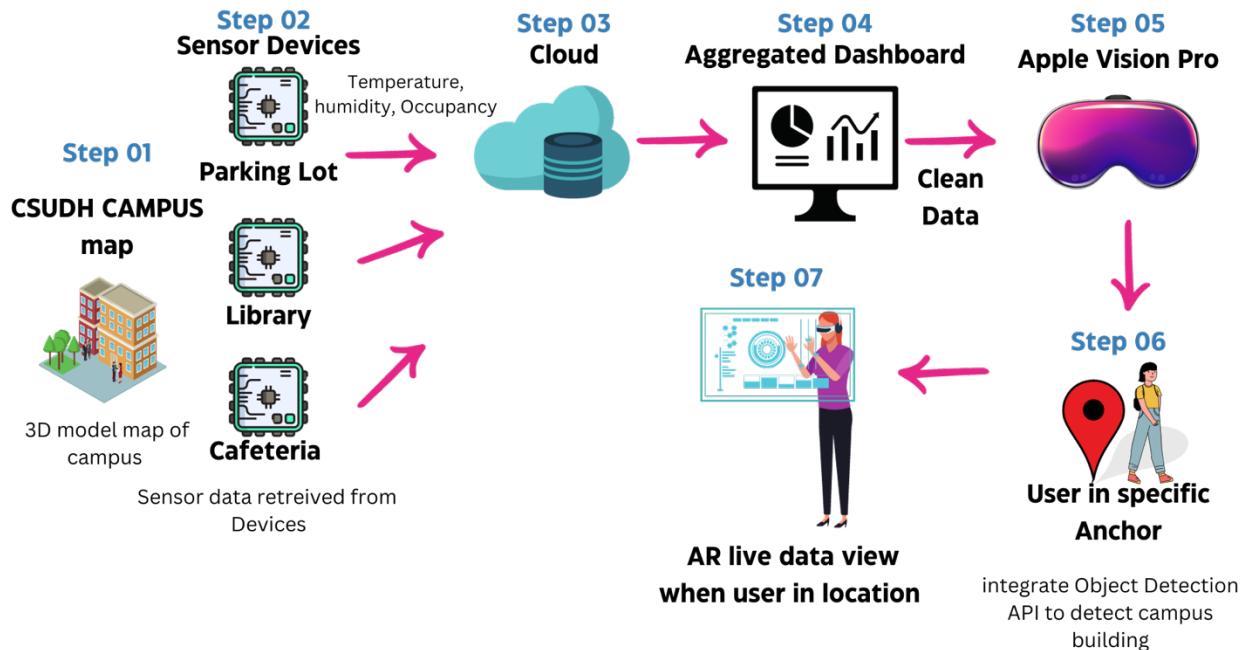
CSC590 – Master Project Progress Report (Fall 2023)

Student Name: Muhammad Zaid Kamil
Date: 10/31/2023

Project Title: Integration of real time sensor data to MR Campus Map

Estimate of the project that has been done so far (percentage): 30

This progress report will be showcasing the Build and the Scene development



Step 01: 3D model map of CSUDH campus

The Campus 3D model was developed based on the CSUDH Campus Map and ToroGIS. The CSUDH interactive campus map (Figure 2) and ToroGIS (Figure 3) data provided a detailed and accurate representation of the campus building layout, building locations, roadways, parking lots, and other key features. This information was utilized as a foundational base to develop a AR 3D model of the CSUDH campus. We want to ensure the virtual representation closely mirrored the real-world campus environment. The 3D model was developed using Unity3D software.

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CSUDH Interactive Campus Map

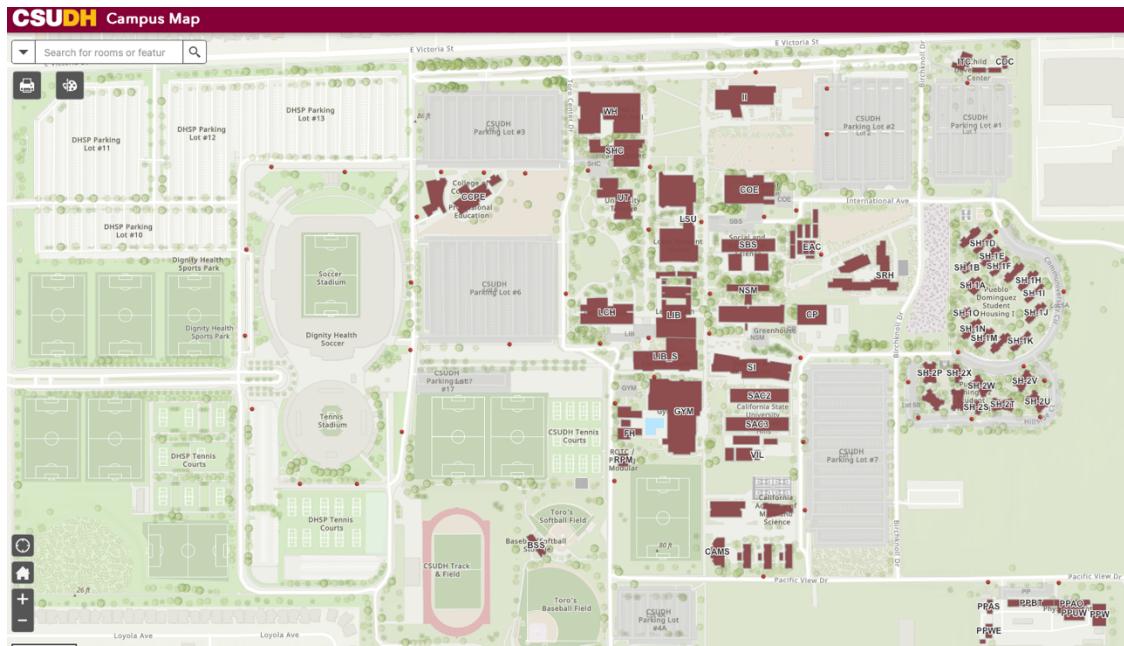


Figure 1: CSUDH Campus Map (Top View) [1]

ToroGIS Campus Map

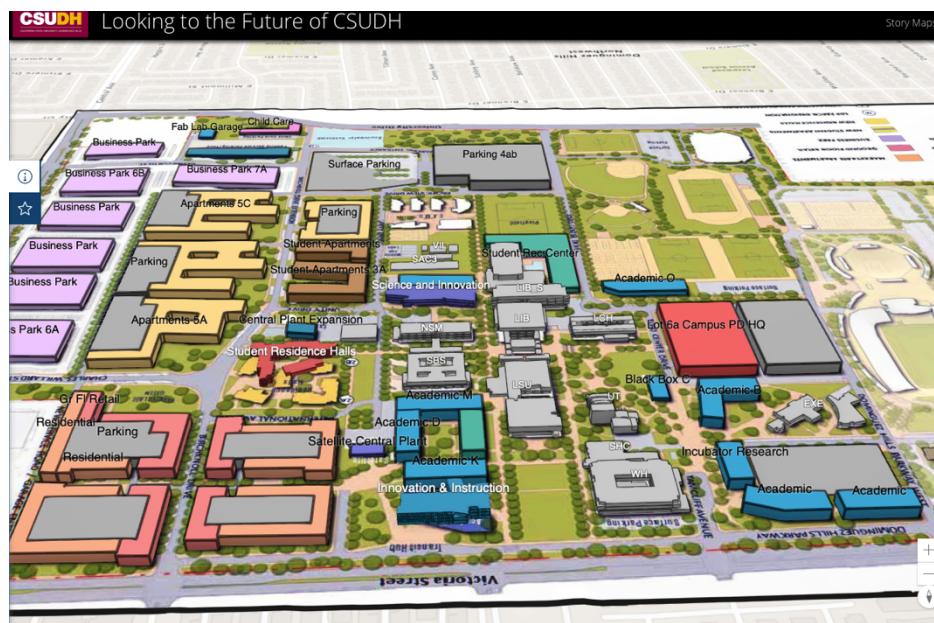


Figure 2: ToroGIS Campus Map (Perspective View) [2]

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Screenshots of different view designed using Unity Scene Editor:

Perspective View:

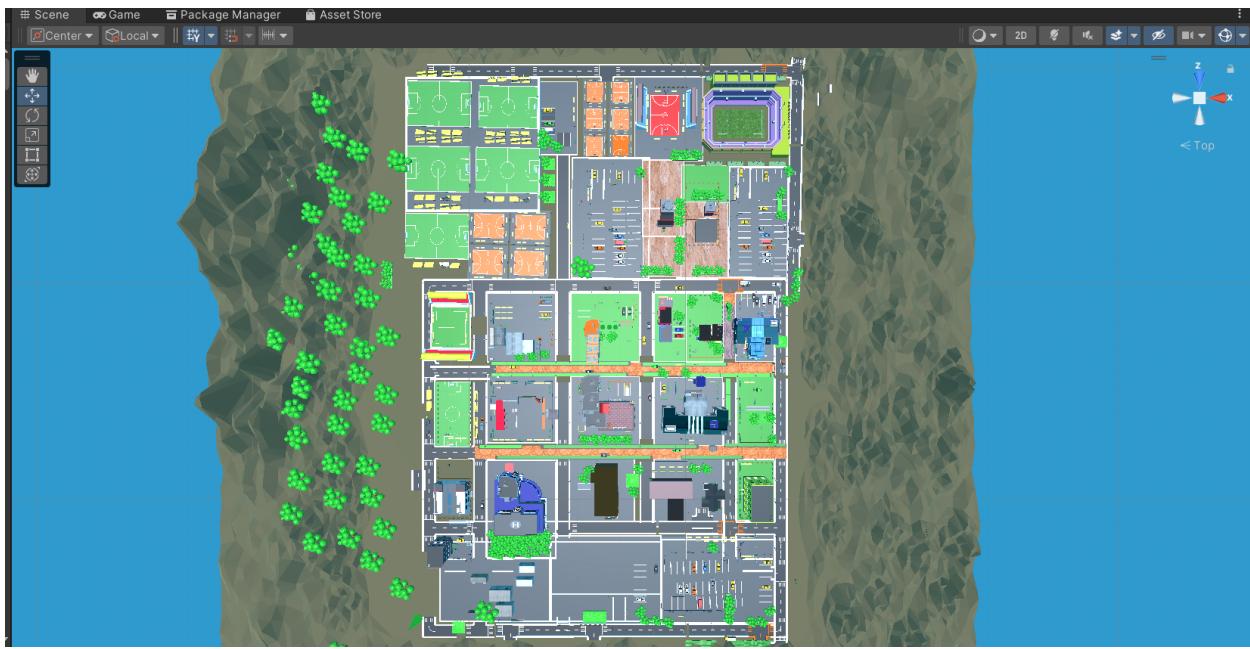


Night View:



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Top View:



Side View:



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Build:

I used two pathways for the build. First build was for the Oculus Quest 1 Headset. The second build was for the iPhone. The below Figure shows the process for the build for the two equipment.

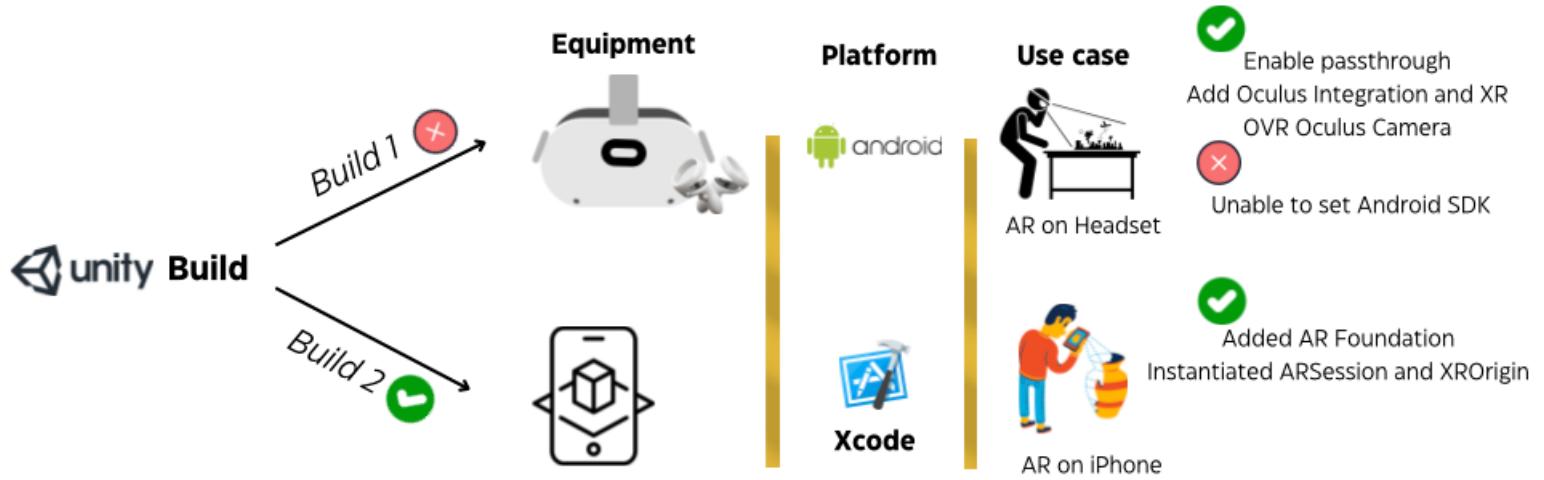
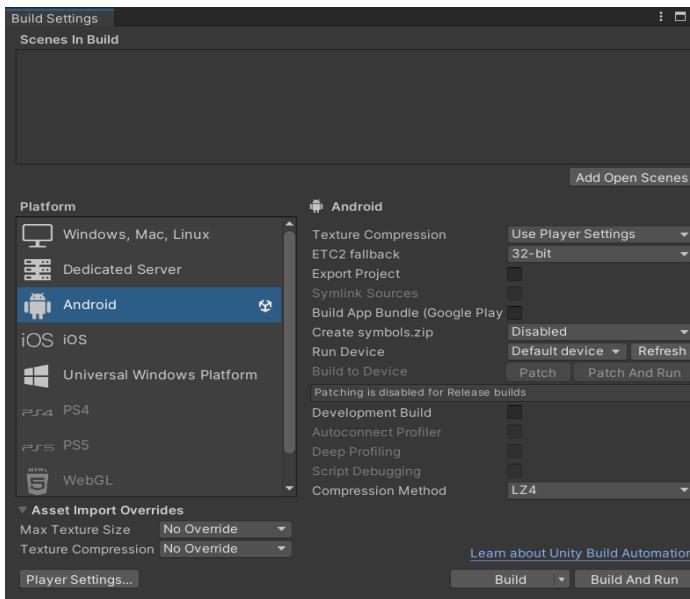


Figure 1: Campus Map AR Build process for the different devices

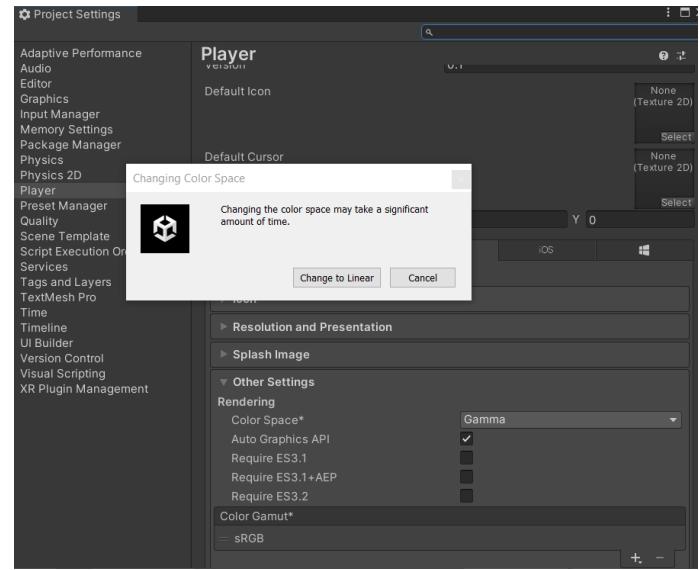
Oculus Build Process

From the above Figure 1, was unable to build the AR Campus Map for the Oculus headset. Since was giving an error message: Android SDK not found.

Step 1: Switch Build Platform to Android.



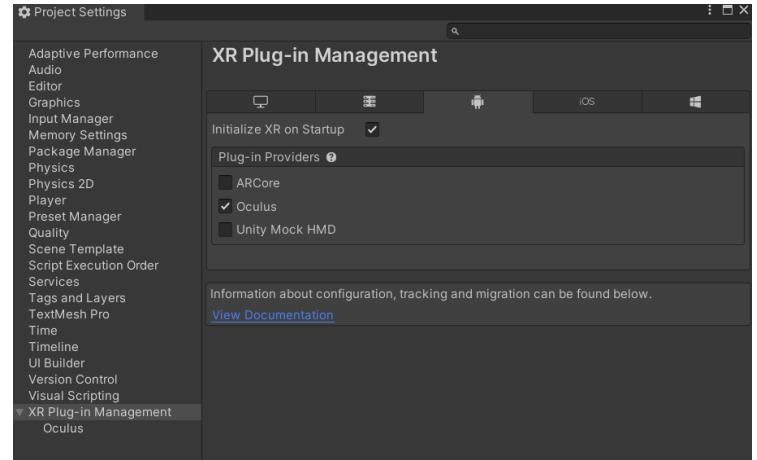
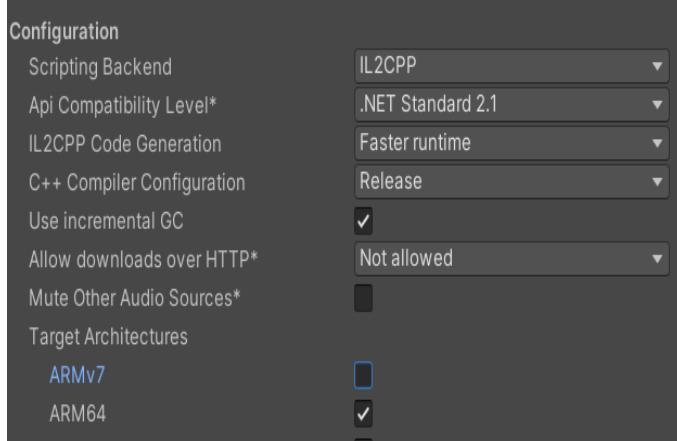
Step 2: Change Color Space to Linear



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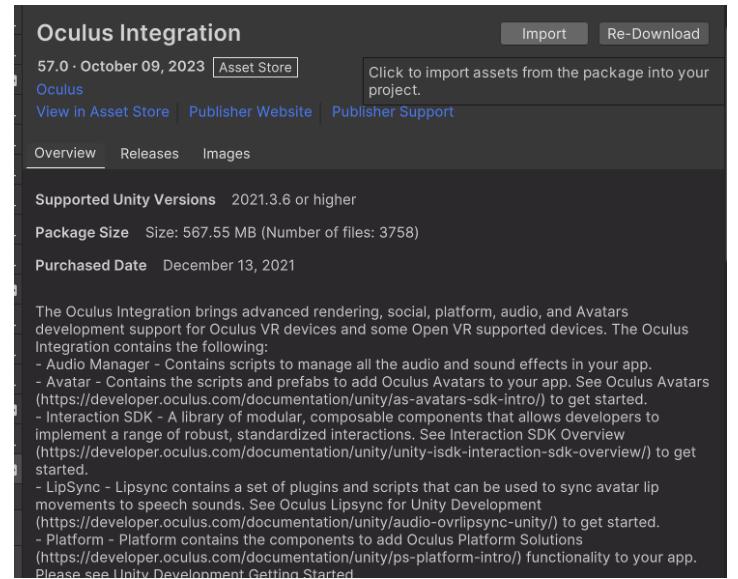
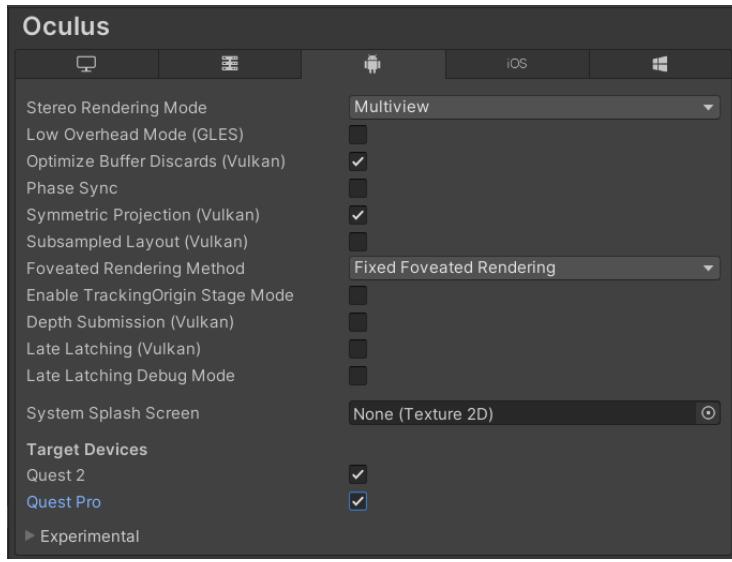
Step 3: Change Scripting Backend to IL2CPP and

Step 4: XR Plugin Management set to Oculus and initialized on startup



Step 5: Set Target Devices are Quest 2 and Quest pro headset.

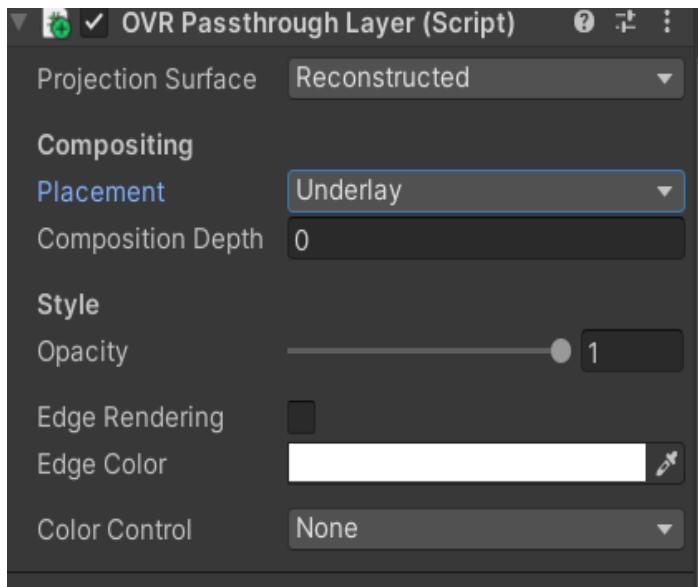
Step 6: Download and import Oculus Integration package



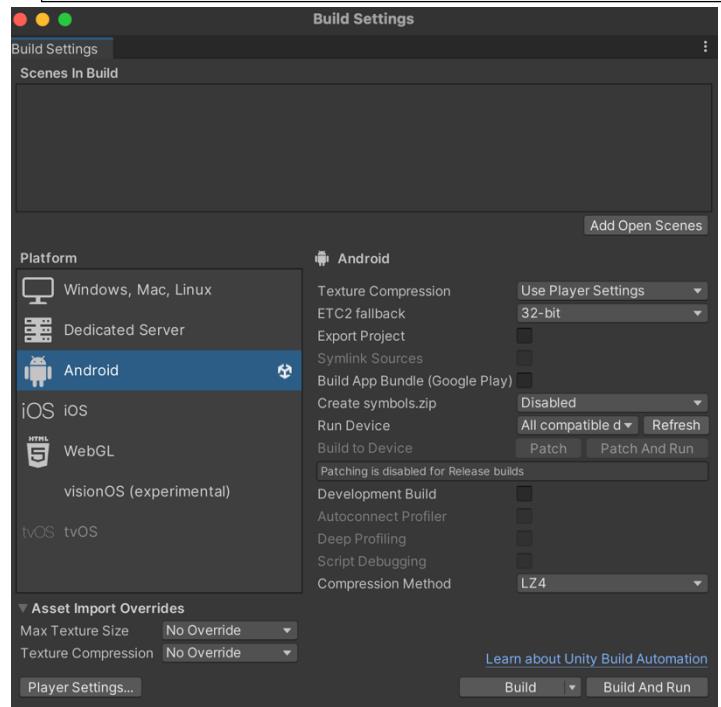
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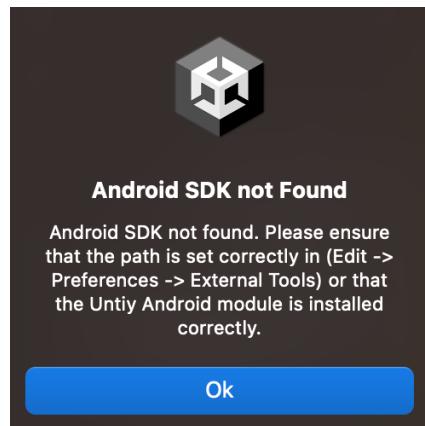
Step 7: Add the OVR Camera (Oculus) in the scene. Make sure the OVR Passthrough Layer is set to Underlay. Set to underlay. The AR object will be under the objects



Step 8: Try Build and Run



Troubleshooting Issues: Error unable to build on Android Platform (Need Help to resolve!)



I tried to change the Android SDK path from the editor

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Android

JDK Installed with Unity (recommended)

JDK /Applications/Unity/Hub/Editor/2022.3.5f1/PlaybackEngines/AndroidPlayer/OpenJDK

 JDK installed with Unity is based on OpenJDK 11.0.14.1+1.
License information is in the install folder (AndroidPlayer/Tools/OpenJDK).

Android SDK Tools Installed with Unity (recommended)

SDK /Applications/Unity/Hub/Editor/2022.3.5f1/PlaybackEngines/AndroidPlayer/SDK

Android NDK Installed with Unity (recommended)

NDK /Applications/Unity/Hub/Editor/2022.3.5f1/PlaybackEngines/AndroidPlayer/NDK

Gradle Installed with Unity (recommended)

Gradle /Applications/Unity/Hub/Editor/2022.3.5f1/PlaybackEngines/AndroidPlayer/Tools/gradle

Stop Gradle daemons on exit

Kill ADB server on exit

I installed the Java Development Kit to integrate the Android SDK. But it prompt installation error.



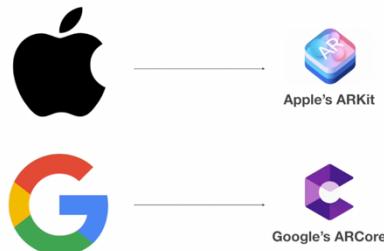
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iOS Build Process

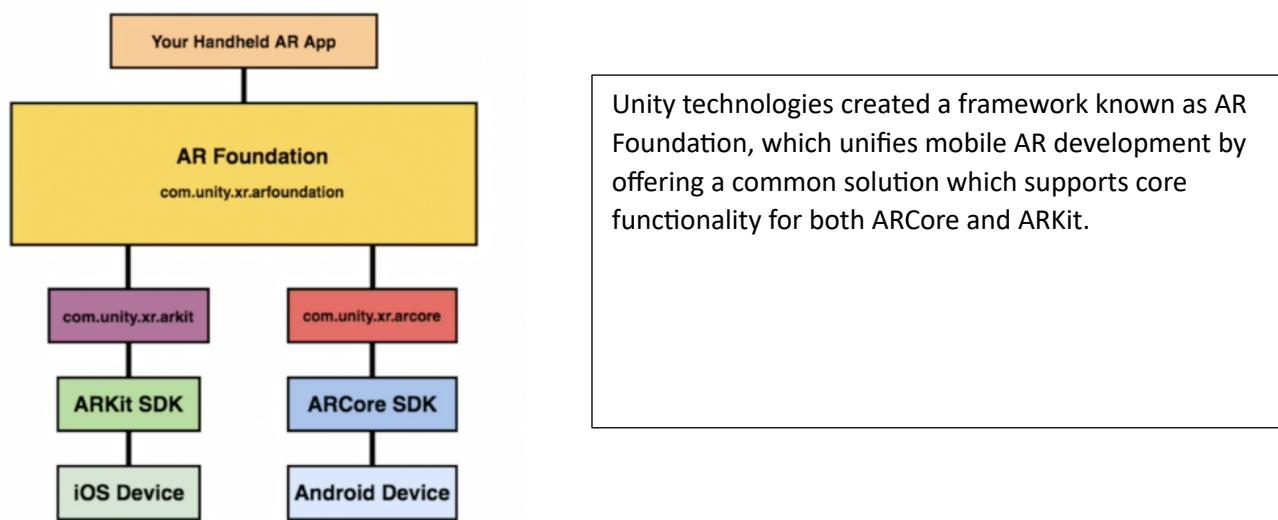


For iPhone Build: Packages required to install in Unity are

- ARKit XR Plugin
- ARCore XR Plugin
- AR Foundation



The Google's ARCore package is used to create AR apps for Android devices, and Apple's ARKit package is used to create AR apps for iOS devices. So if we download these two frameworks we would be able to deploy the AR app for both platforms iOS and Android Mobile phones.

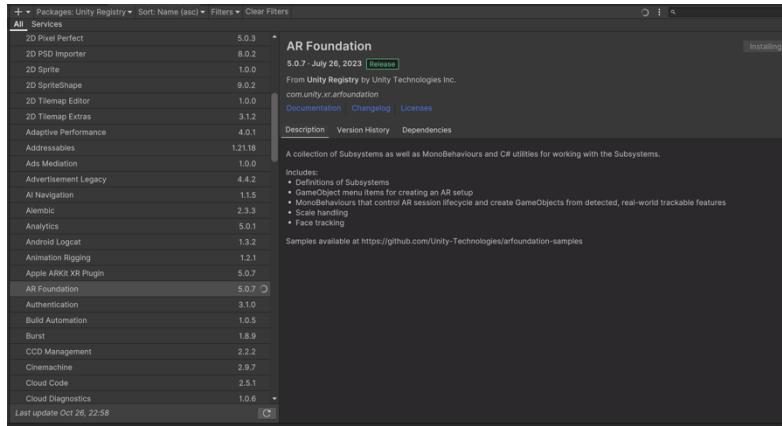


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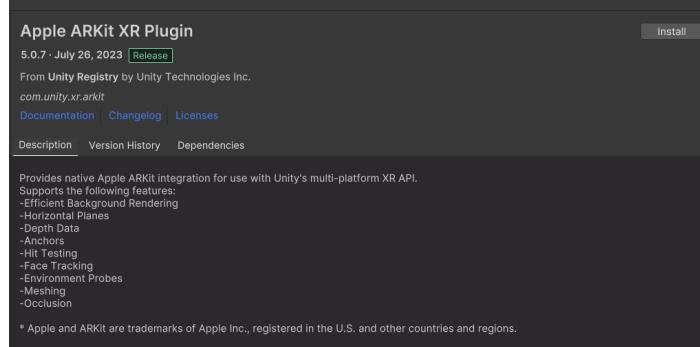
AR Experience: 2 objects

- ARSession: AR session origin has the AR camera, which represents our device camera.
- AR Session Origin: transforms those features into their final

Download and Import AR Foundation



Download and Import ARKit



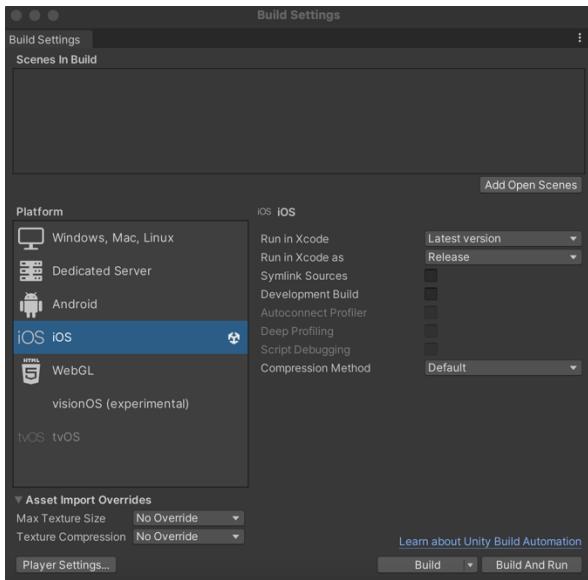
Download and Import ARCore



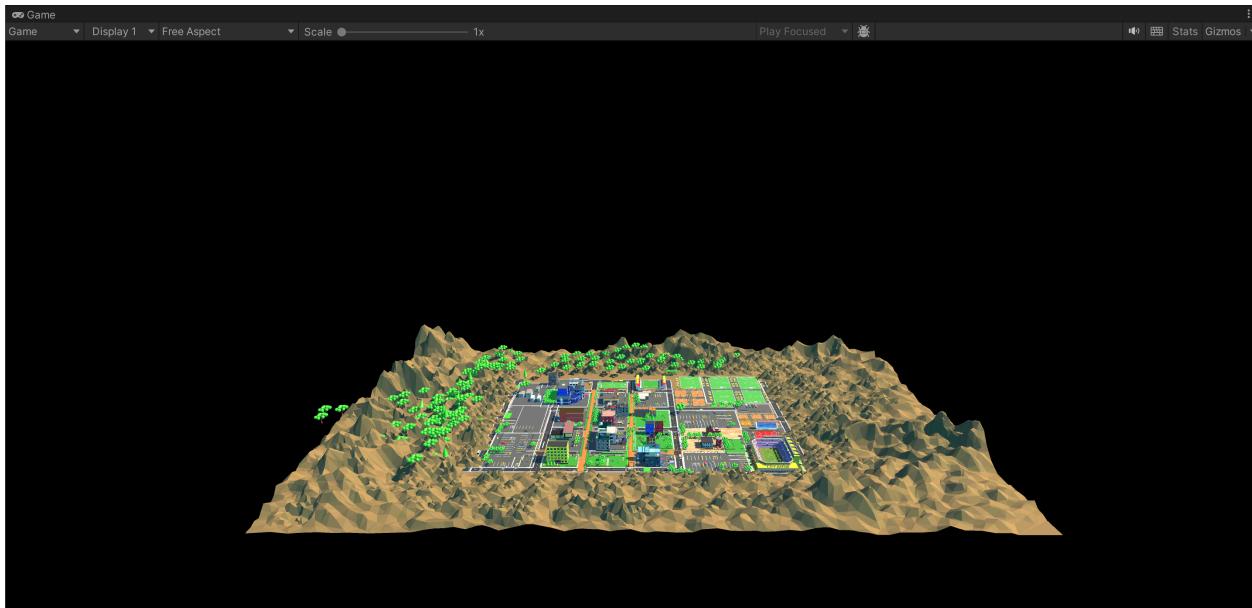
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Build Settings: Switch Platform to iOS

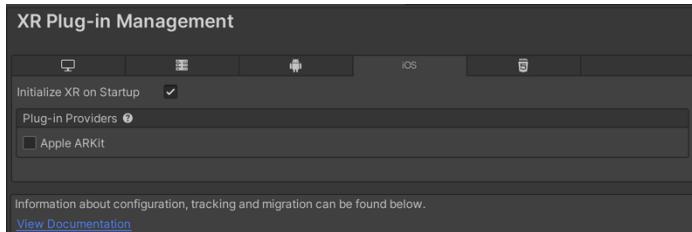


Game View in the Unity Editor. The background was black because it was not integrated to the Webcamera

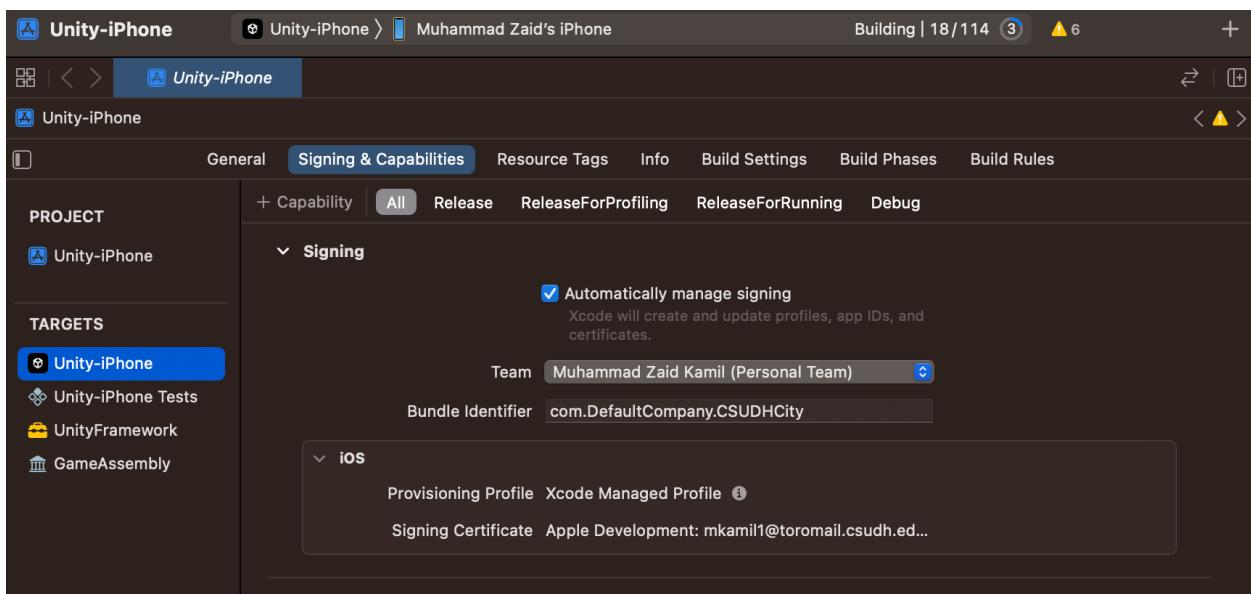
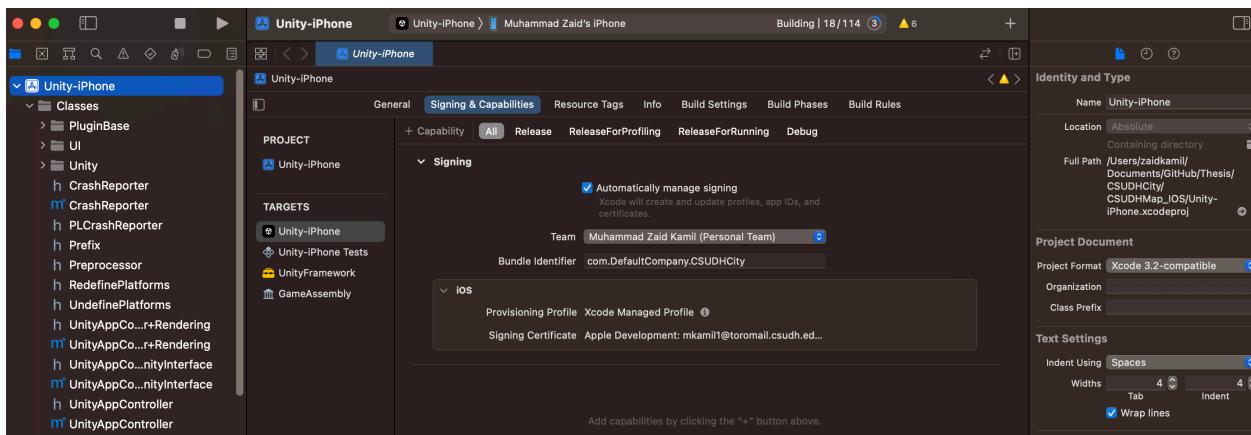


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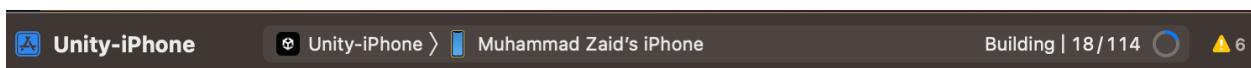
Check the AppleARKit in player Settings



Build application is an Xcode application on iPhone. Make sure the iPhone device is connected to PC via USB and USB debugging is turned on.



Status of the Building Process



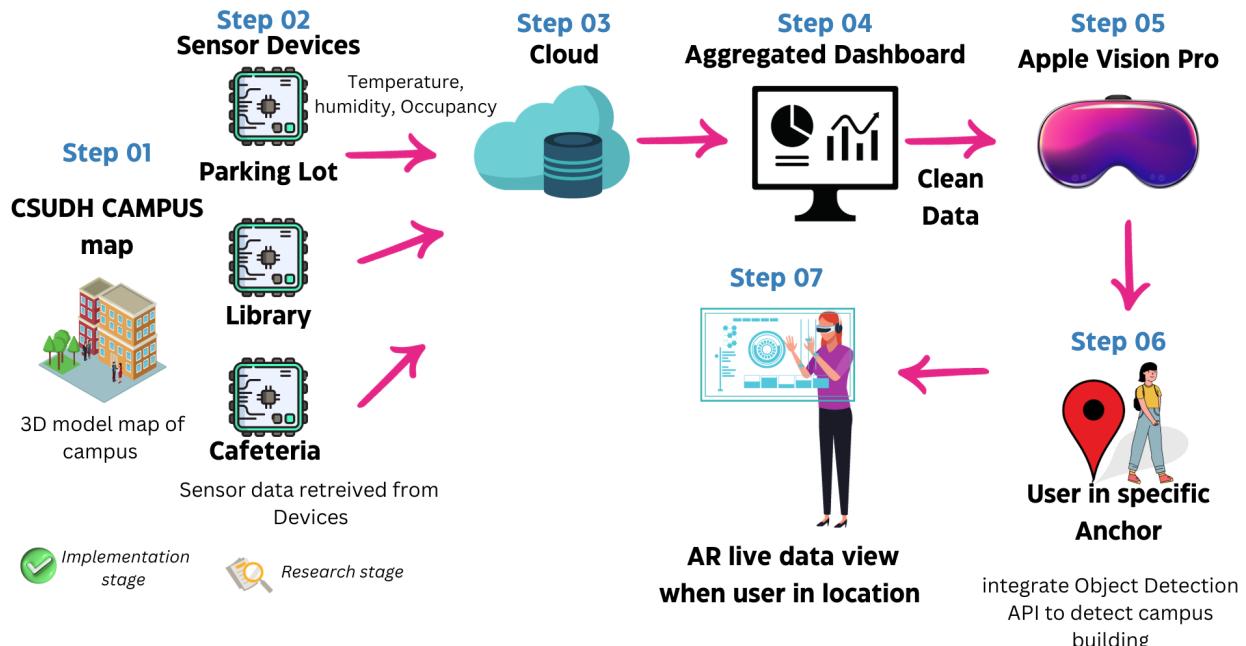
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Final AR view using the Apple iPhone device



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Step 01: CSUDH Campus Map

- Deploy the 3D Campus Model application to Oculus Quest device (Mixed Reality)
- Have to add interactions and UI to the AR application : Ex: Button, UI. Description upon user input (Gaze, touch), Animation
- Currently the Campus Map is in Augmented Reality. Have to develop the application to Mixed Reality provide the user more immersive view to integrate into Oculus Quest, HoloLens, Apple Vision Pro (Target Headset).

Step 02: Sensor Devices

- Type of Data to be collected: Temperature, Humidity, Occupancy.
- Data acquisition rate of real time data: Every 5 seconds
- Type of sensors to be used
- Have to request permission from the CSUDH network team to gain access for the Occupancy data. Number of smartphones in a specific building = Number of people in the building. Assuming each user owns one phone.

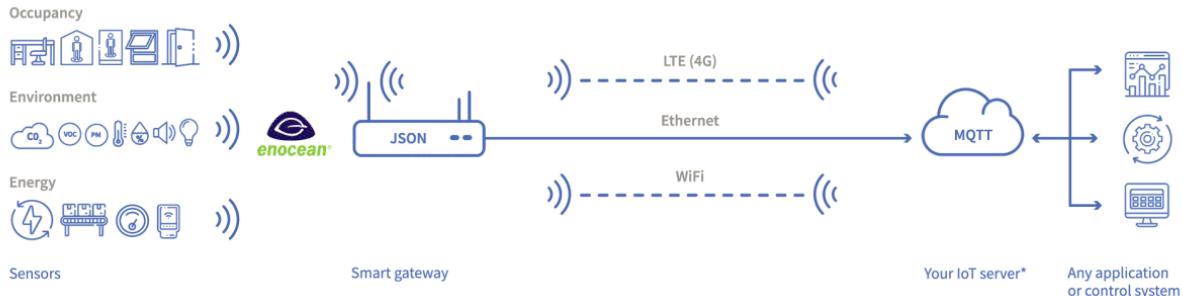
Step 03: Cloud

- Have to research on the cloud service to use like AWS IoT, Azure IoT Hub, or Google IoT Core to store and process the sensor data

Step 04: Dashboard

- Once we access the sensor data, what type of file format will we be able to view the data (Excel sheet)

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References/Sources:

- [1] CSUDH Interactive Campus Map: <https://csudh--maps.maps.arcgis.com/apps/webappviewer/index.html?id=903a5227f23143ffa0580ed5575d58aa>
- [2] ToroGIS Map: <https://toro-maps-csudh--maps.hub.arcgis.com/apps/d29a3f4cbe134280a2c9e4eca8425e4b/explore>