AR mobile tool for Engineering education
Instructor Manual

CONTENTS

SETUP

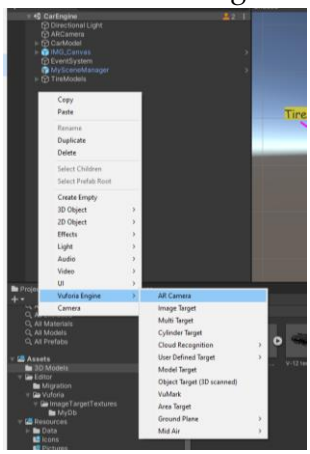
Some setup to do before creating the AR teaching content.

1. Install Unity editor using Unity Hub by following the instructions here https://docs.unity3d.com/Manual/GettingStartedInstallingHub.html
2. Learn the basics of using Unity by following the below tutorials:
    a. https://docs.unity3d.com/Manual/GettingStarted.html
    b. https://learn.unity.com/tutorials
3. Get started with Vuforia for Augmented Reality by creating developer account at https://developer.vuforia.com/vui/auth/register
4. Learn how to add use Vuforia in Unity by following the tutorial https://library.vuforia.com/articles/Training/getting-started-with-vuforia-in-unity.html
5. Learn how to add target in Vuforia Target Manager by reading the following tutorial https://library.vuforia.com/articles/Training/Getting-Started-with-the-Vuforia-Target-Manager

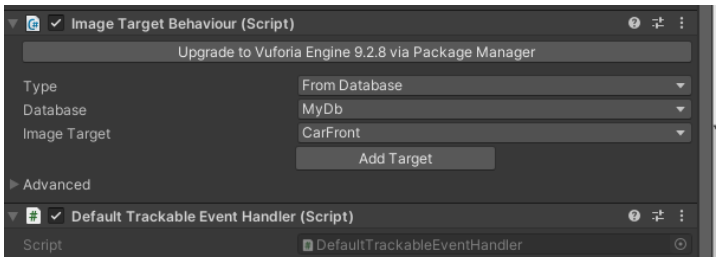
Create model in AR app with target image (marker based)

1. Open the provided Unity project and open scene CarEngine. This is the main AR scene and you can rename it based on your project.
2. Download the database from Vuforia and add it to the Unity project.

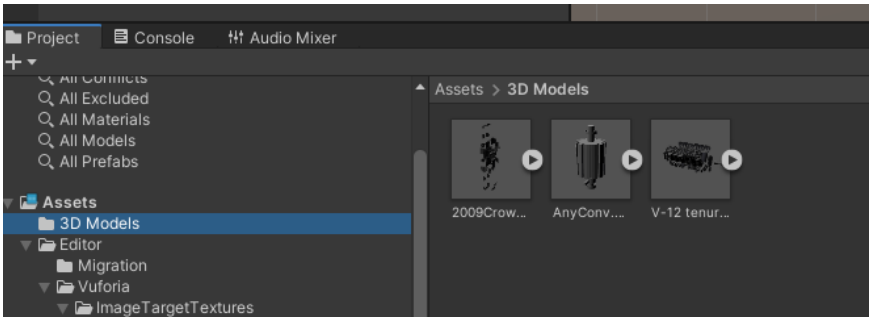
3. In the Hierarchy window, add an AR camera and Image Target



4. For the image target, in the image target behavior, Set the Type to Database, select your database and target image. Your target image is set. Repeat the process if you want to use multiple targets.



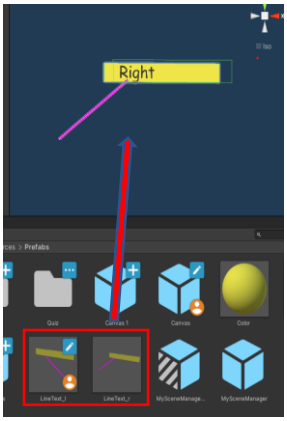
5. Drag and drop your 3D models to Assets folder (For accepted 3D model formats: https://docs.unity3d.com/Manual/3D-formats.html)

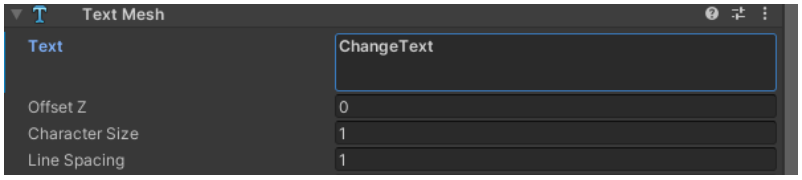


6. From the assets, drag your 3d model and place it inside the Image target created earlier. This will make the model appear on the target image when AR app camera is used.
7. Move, rotate, scale model as necessary.
8. Add more models to the same target if needed. Make sure you place them properly so each of them is properly viewed using the AR app camera.

Add text to the 3D models

1. In the prefabs folder, there are already two prefabs for Linetext, one pointing left and another to right, select the one you need to point to the part of your model
2. Drag and place the LineText inside the same image target as your 3D model.
3. Move, rotate, scale the model to point it properly your part of the model
4. Change the text to appropriate name.



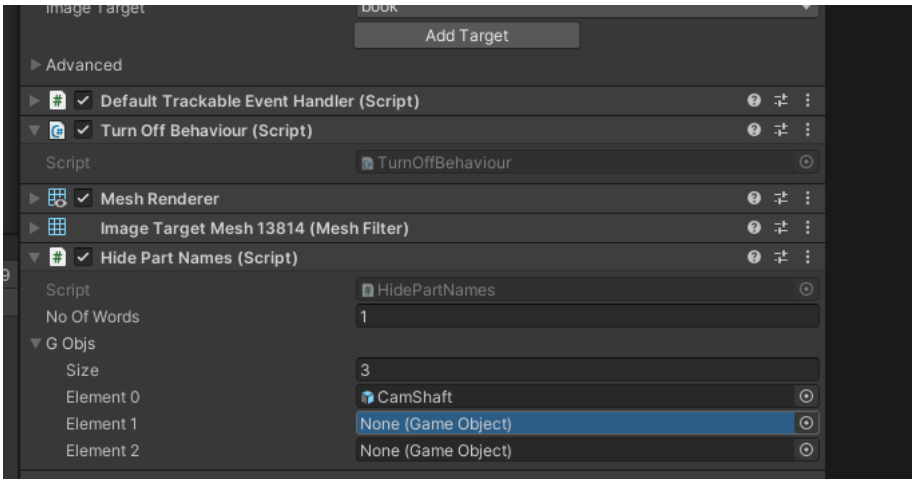


Make the models rotate, move and zoom

1. For best results, add an empty game object and make it the parent of the 3d model and all its related LineTexts.
2. For the gameobject, add Rigidbody property.
3. For the gameobject, add RotateScaleMobile.cs Script

Make the part names show/hide (Show/Hide LineText Game Objects)

1. The HidePartNames.cs script is added to Show/Hide Text button in IMG_CANVAS
2. In size, input the number of LineText objects
3. Drag and drop each of the LineText that you want to hide/show in the Scene to the elements (Element 0, Element 1 …)



Add simple quiz

1. Open Scene SimpleQuiz to view or modify Quiz UI interface
2. In the assets, Go to Assets -> Resources -> Data -> QuizInfo and open SimpleQuizData object
3. Enter the number of questions in Size
4. For each question, enter
    a. the Question Info to describe the quiz question,
    b. Question Type Text or Image
        i. If Image, also insert Image to Question Img, otherwise leave it empty
    c. Element 0 to 3 the answer options
    d. Correct Ans: The right answer
5. The script performs string match to check correct answer so make sure that the right answer text is exactly the same as the option (Copy and paste for convenience)
6. Make sure to update review solutions in Scene ReviewScene

Add interactive quiz

1. Open Scene InteractiveQuiz to view or modify Quiz UI interface
2. Add the Game Object with 3D model and text
3. In the GameManager game object, enter the number of quiz questions in size
    a. For each quiz element, add the LineText Game object to ask quiz question about
4. In the assets, Go to Assets -> Resources -> Data -> QuizInfo and open SimpleQuizData object
    a. Enter the number of questions in Size
    b. For each question, enter
        i. the Question Info to describe the quiz question,
        ii. Question Type Text or Image
            1. If Image, also insert Image to Question Img, otherwise leave it empty
        iii. Element 0 to 3 the answer options

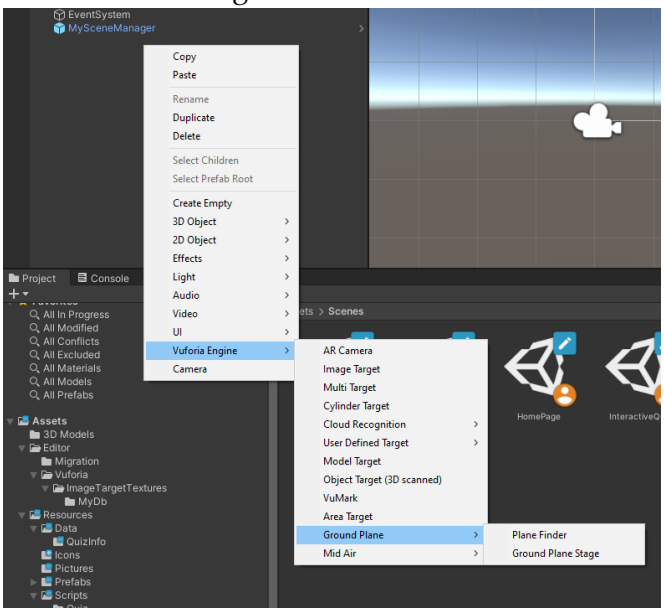
iv. Correct Ans: The right answer

c. The script performs string match to check correct answer so make sure that the right answer text is exactly the same as the option (Copy and paste for convenience)

5. Make sure that the Question order in Step 3 and Step 4 are the same
    a. Element 0 in Step 3 will be shown for Question 0 in Step 4
6. Make sure to update review solutions in Scene ReviewScene

Create model in AR app on ground surface (marker less)

1. In the inspector, go to Vuforia Engine - > Ground Plane and add both Plane Finder and Ground Plane Stage.



2. Add 3D model and text same as shown in Create model in AR app with target image (marker based). You can save the 3d model with LineText as prefabs and reuse it.