Research into Unity and 3D model generation, there are multiple ways we can create 3D Scenes that will let us output 3D models based on a given input.

The first is to use Meshes in the "UnityEngine" API. For that, we need to assign vertices and then triangles, as every shape and its mesh can be made using these two things. By creating a MeshFilter and then outputting it, we can get 3D models. So, the challenge in this method is to generate appropriate mesh filters for our input.

EG CODE (Technologies, *Mesh*):

```
using UnityEngine;
public class Example : MonoBehaviour
{
    Vector3[] newVertices;
    Vector2[] newUV;
    int[] newTriangles;
   void Start()
    {
        Mesh mesh = new Mesh();
        GetComponent<MeshFilter>().mesh = mesh;
        mesh.vertices = newVertices;
        mesh.uv = newUV;
        mesh.triangles = newTriangles;
    }
}
```

Another method is to use the Apose.3D for .NET API and generate a scene to create our 3D model in. The input that we need to feed into the API is done by creating a Vector3 component that maps out the colours/the dimensions into the scene in the form of various child nodes. We can control how these nodes behave which can be used to finally get our desired output. The challenge in this method is getting the correct Children Nodes that combine to give the desired 3D Model.

The final method that could be used to implement floor plan generation using 3D models is to let the user use predefined/existing classes in a sandbox environment, and then from assign how these classes behave. This would let the user form the room and simplify the problem of having to parse the input as we control what can be inputted. The challenge in this method is the sandbox environment that needs to be created for this method to work as well as the problem of one-off uniqueness in specific floor plans that we might not be able to account for.

CITATION

Khan, M. (2022, August 2). *Create 3D scene in C#*. Aspose Blog. https://blog.aspose.com/3d/create-3d-scene-using-csharp/

Technologies, U. (n.d.). *Mesh*. https://docs.unity3d.com/ScriptReference/Mesh.html

YouTube. (2022). *Unity3D API Request - Get & display data from the internet*. *YouTube*. Retrieved October 8, 2023, from https://www.youtube.com/watch?v=cU4UaqrPb84.