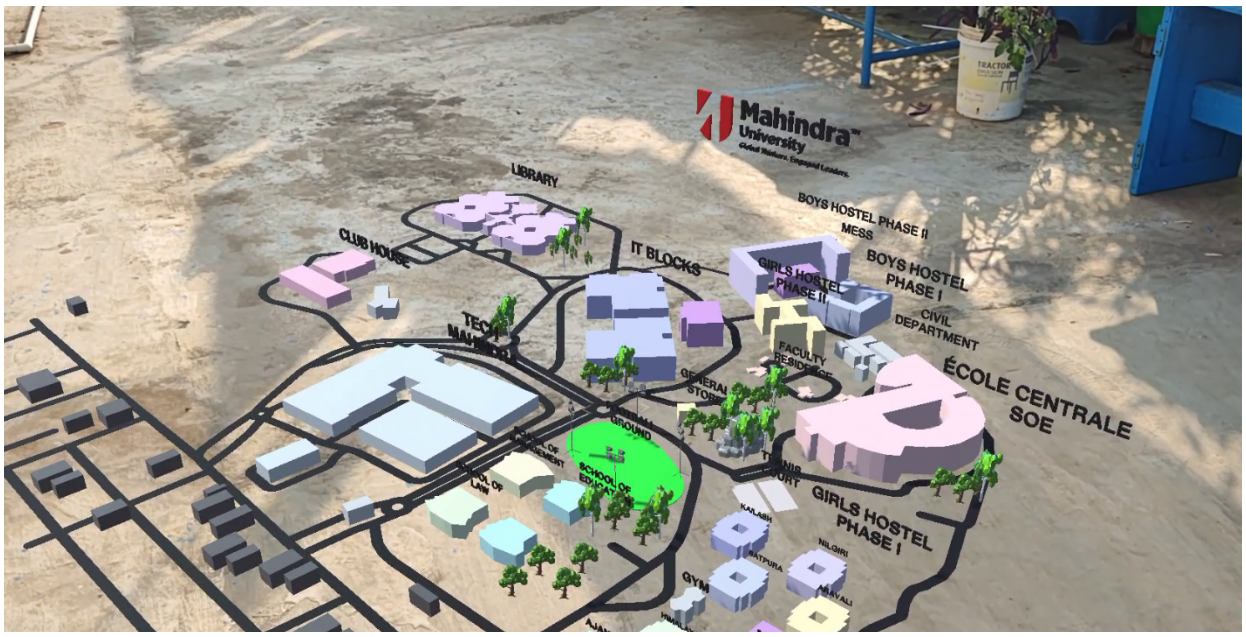
PARAM SHIV ASHISH - SE22MAID002

CRIMSON GAZE (BUILT USING UNITY)

AR INTERACTIVE MAP OF MAHINDRA UNIVERSITY



Introduction

This AR Application generates an interactive map of Mahindra University on a plane surface and you can easily look around the map and the blocks pop up as you gaze across the map. (just by looking with the camera in the direction of the block in the map).

This application can be extremely useful for any person who would like to gaze upon the university in a bird eye view perspective, such as construction workers(Architects), new joiners to make them familiar with blocks and various departments in Mahindra University. Could also be useful as an advertising application which could be sent to the aspirants.

Some other use cases would involve checking out the football match score which is happening in the Mahindra University football ground and could also be used for fun games like treasure hunt hints which could be easily placed on the map using other tools while developing.

TOOLS USED FOR DEVELOPMENT

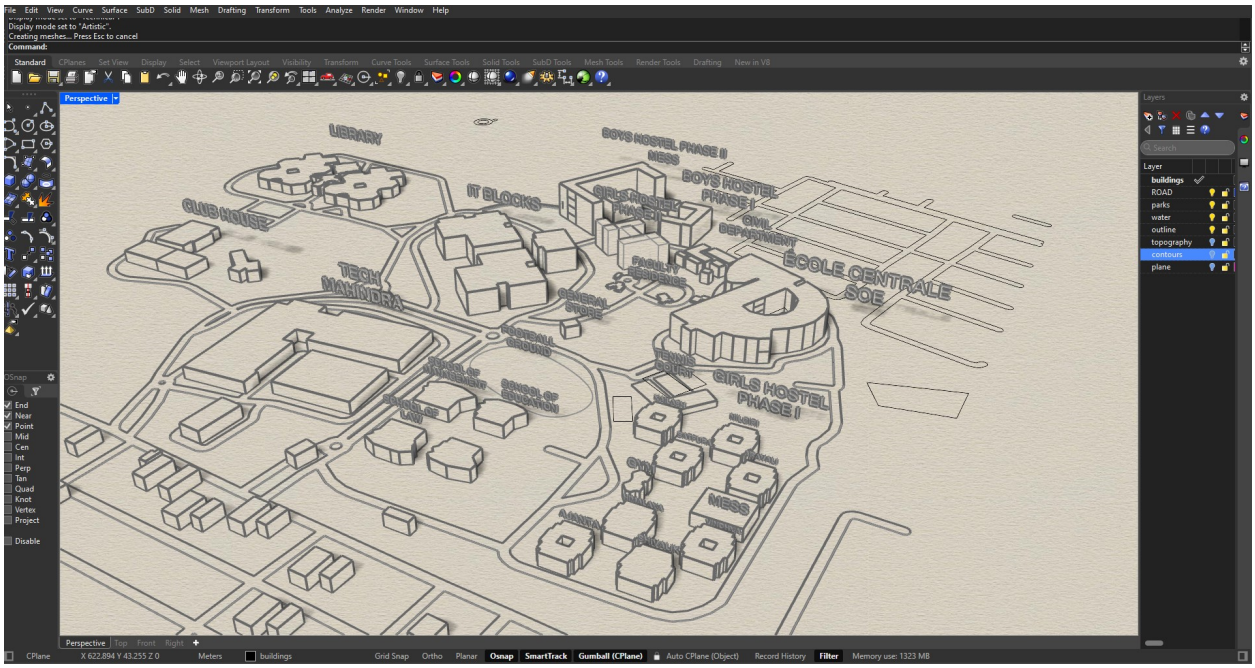
- **RHINO - RHINOCEROS 3D**
- **UNITY**
- **AR CORE**
- **VUFORIA PLUGIN (AR CAMERA AND GROUND PLANE DETECTION)**
- **BLENDER (FOR FEW 3D MODELS)**

RHINO - RHINOCEROS 3D WORKFLOW

Rhino is a modeling software which is used for commercial 3D computer graphics and computer aided design application

Overall, Rhino 3D's versatility and performance make it a go-to tool in various domains such as architectural design, industrial design, shipbuilding, jewelry design, optics, and more.

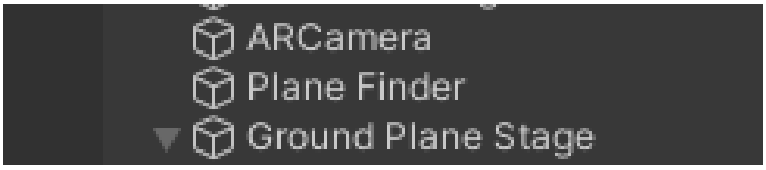
Complete mapping and 3D model of the base Mahindra University map is made in Rhino 8 using references from google earth for the scaling of our 3d assets



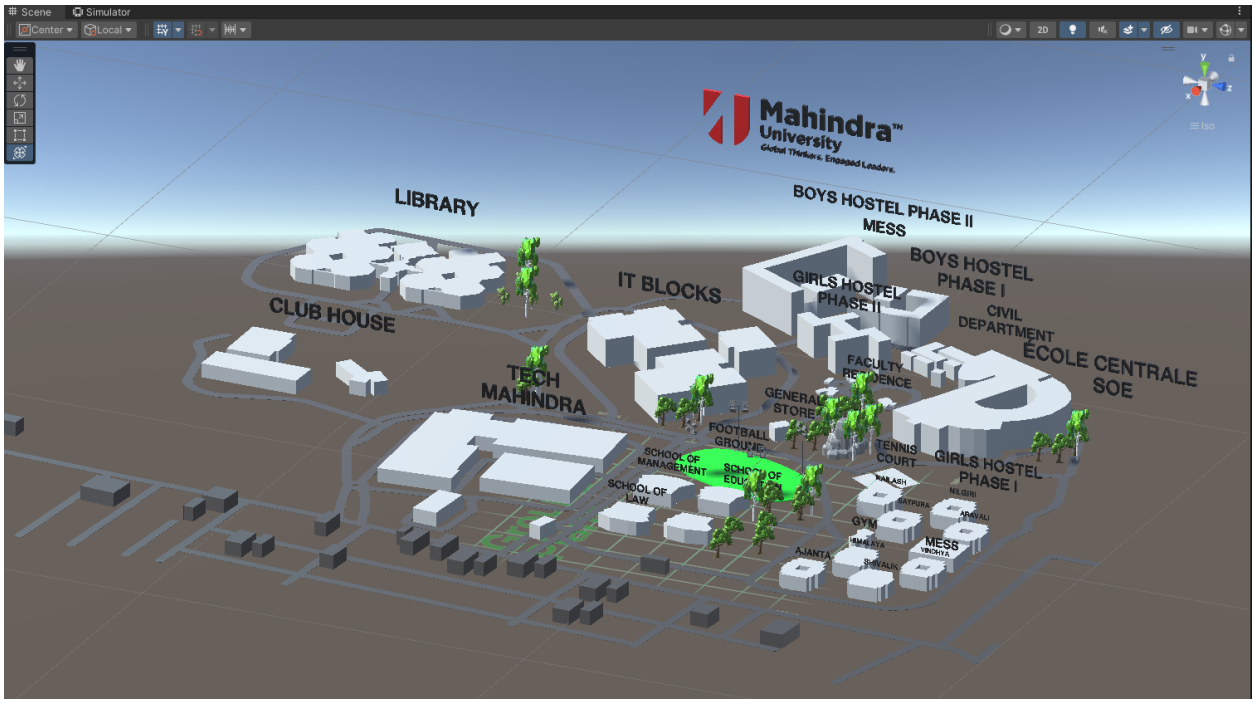
UNITY GAME ENGINE

We start with a simple ARCORE template in unity and start building further from base template, which includes the AR Foundation and other AR Session Plugins (3D template could also be used and switched to android platform later from project settings)

To get the AR Camera Module, we used a plugin called Vuforia which also provides us the AR Camera and Ground Plane Stage to place our Map which was designed using RHINO 8 earlier, Vuforia also provides us with the required module to detect our ground plane IRL, this module is called as Plane Finder. Vuforia can easily be downloaded and installed.

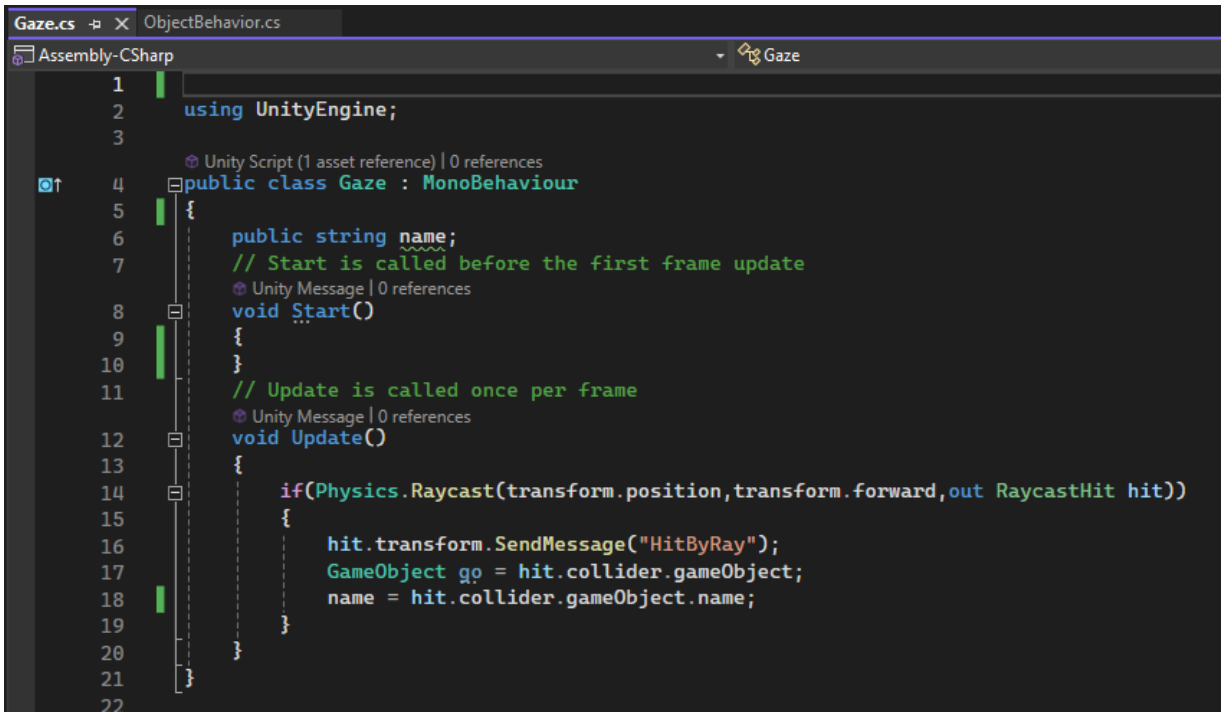


Now that we have basic modules set up we can proceed and place our map on the ground plane which is derived using the Ground Plane Stage in unity viewport



Each Block in this 3D map is now an individual block as our prefab is completely unpacked and we can manipulate each of them individually to have a gaze interaction on each block

For this we have written a scripts that continuously releases a ray cast from the center of our AR camera in in forward direction, here's the c# script and this script is imposed on our AR Camera which is also our main camera in the scene



When the ray hits any of the block we are trying to make the block pop up such that it gives an effect of blocks being more focussed as we gaze over the map using our devices (Demo in the video which I have attached with the documentation, or you can also download and install our apk file on an android device)

The script on the object detects if its being hit by a ray then transforms its scale and position which make it looks like a pop up 3 model

(script for this can me found on my github named ObjectBehavior, as this script is too long to be attached as an image here)

Now we can finally build our application using unity for android device

Our app is supported on device which run android 8 API Level 26 or above

Our general builds for testing purposes

CrimsonGaze.sln	10-12-2023 15:31	Visual Studio Solu...	2 KB
CrimsonGaze-0.1	09-12-2023 15:17	APK File	62,698 KB
CrimsonGaze-0.2	09-12-2023 17:02	APK File	62,737 KB
CrimsonGaze-0.3	09-12-2023 17:24	APK File	62,715 KB
CrimsonGaze-0.4	09-12-2023 23:53	APK File	62,719 KB
CrimsonGaze-0.5	10-12-2023 14:34	APK File	69,779 KB
CrimsonGaze-0.6	10-12-2023 15:29	APK File	71,743 KB

The which you will be using for project evaluation will be crimsonGaze-1.0

HOW TO USE CRIMSON GAZE

- Download APK (from my github or zip)
- Install APK (will likely ask for extra permissions as it is not from store)
- Open the app (You will be greeted with your camera scanning for planes which will take a few seconds)
- As a rectangle reticle appears tap on the screen which will spawn the Mahindra University map on the plane which is detected
- Now you can gaze around the map which interacts as you focus on each block.

PROJECT DEMO