



Unreal Engine Based College Campus Tour Model

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Abstract: This project provides the students the opportunity to view the campus with the help of a virtual 3D model. It uses the Blueprints provided by Unreal Engine 5 in conjunction with the C++ API.

Keywords: Unreal Engine, C++, Blueprint, 3D model, Graphics

I. INTRODUCTION

The most common problem that appears in front of any person is not having the proper knowledge of any unvisited place, including any country, city, tourist place etc. for this problem, Google came up with a solution of “STREET VIEW” in Google Maps. The Street View can easily explain most of the areas in 3D view that a person is unaware of and the same problem appears for new upcoming students where they are unable to understand their new University Campus structure and its location. In fact, the students are not able to find the desired information on the internet about their University Structure. In this problem, Google Street View is not adequate, but the Unreal Engine can construct the whole Campus Structure to nurture the student, and it will be beneficial for them to understand their campus map.

II. TECHNOLOGY (USED AND REQUIRED)

System Requirement

- **Processor:** Quad-core Intel or AMD 2.5 GHz or Faster
- **Graphic Card:** AMD Radeon R9 or GTX 1650 with DirectX 11 or Higher
- **Memory:** 8 GB RAM DDR4 or Higher
- **Operating System:** Windows 10 64-bit, MacOS Monterey or Linux Ubuntu 22.04

Technology Stack

- **Unreal Engine:** Unreal Engine is the most advanced version of 3D Computer Graphics developed by Epic Games in 1998. In this Engine the user can create 3D Cinematic Graphics, define Libraries and perform most of the actions that can be done in real world by using the concept of both Blueprint and C++.
- **Blueprints:** Blueprint is a visual scripting system and it uses the node-based interface. The nodes are the objects such as function call, variables, scripting etc. Every node contains pins which are used to accept input and generate output and there are mainly two types of pins, one is Execution Pin and the other one is Data Pin.
- **C++ API:** Unreal Engine provides the facility of using C++ language which are used to create software codes, the codes are then further used to create graphics, animation, the structure of a body, movement, physics etc. and the classes of C++ can be used with blueprint to set up fundamental structure that can be iterated by the level designer.

III. OBJECTIVES

The objective of this application is to teach to provide an introduction to 3D Graphics and Rendering along with providing them with a virtual tour of the college campus.

Time and Energy Efficient

Every Student can use the application from their computers and can visit the campus virtually without even going there, they can visit every floor and room of the campus and can visit the labs that are available in the college

Cost Efficient

The application is based on an open source software, anyone can use the application without wasting too much money [1].

Structural Analysis

Through this virtual tour, the students can understand the intricacies of architecture along with understanding how this architecture can be constructed with the help of 3D rendering [2].



Easily Modifiable

Students can easily modify and update the model with the help of unreal engine. This can be accomplished by accessing the executable file with through unreal engine. It will only require some practice.

IV. CONSTRUCTION AND OUTPUT

Now that the objectives are clear we can move on to the construction and the output of this model.

A. Construction

Lets us now understand the construction of the 3D model of the class room using Unreal Engine.

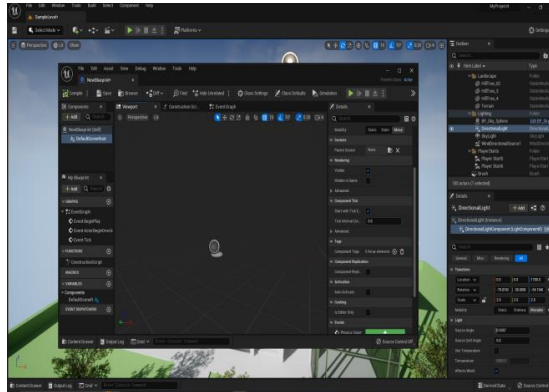


Fig.1

- First for every model a base is always required and for that we use the Unreal Engine application interface.
- To create a landscape base we have to select Level from the selection tool with 3 dots.
- Right click on it to select Levels and then name it as Landscape.
- A Blank world appears in front of the screen and we have to use SHIFT + 2 to create this virtual base.

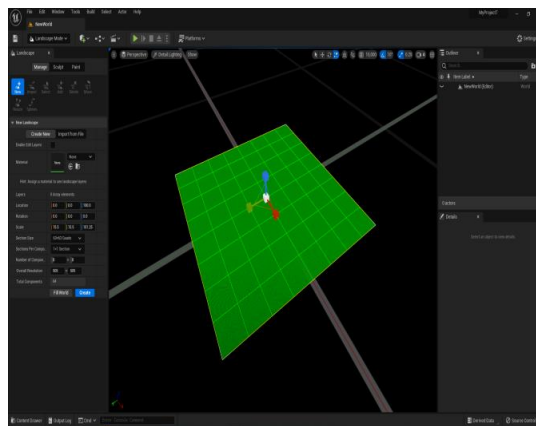


Fig.2

The base will then further use to create Gravity, Animation, Physics etc.

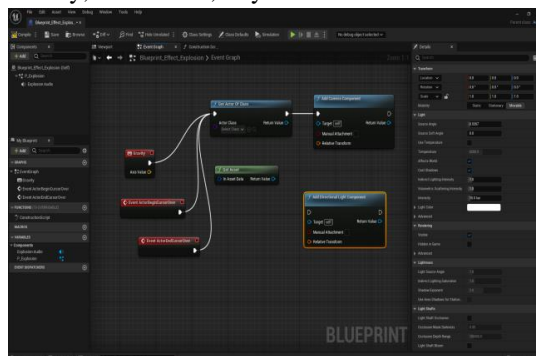


Fig.3



As we can see in the Fig.3 there are some several nodes present in the Blueprint

- The first node is Gravity to create virtual gravity and to prevent the objects from floating or falling inside the base.
- The second node is Get Actor Of Class, this node is used to access the actor model for the class in which it can move around everywhere.
- The third node is Get Asset, this is used to create 3D assets that can be seen in the front end , i.e. the blue print works as backend and the Assets works as frontend.
- The Other nodes are Directional Light Component which is used to generate lighting and shading effect.

B. Output



Fig.4



Fig.5



Fig.6



Fig.7

Fig.4 & Fig.5 are examples of what a fully rendered model looks like. The objects themselves (Monitor, chairs, table etc.) are the assets and these assets constitute the visible parts of any 3D render, while the Blueprint acts as the backend.

V. CONCLUSION

Unreal Engine Based College Campus Tour Model makes the students understand their new University Campus structure and its location. It is beneficial for them to understand their campus map. The students can easily learn how to develop 3D architecture of any building. Future of this project is very bright as the developers can apply their own creativity to enhance the existing work to develop the better 3D models.

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