

College Campus Virtual Experience Simulator

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Abstract: Virtual Campus will be an important part of the information construction and university digitization in future. The Android based system is established via a case study of the campus of Bapurao Deshmukh College of Engineering, Sewagram. We will adopt Blender software as the scene modelling tool and Unity3D is used as the development tool in the project. 3D virtual campus model based on Android is designed and developed. The virtual campus application of the college enables the users to navigate in the campus in the virtual format, and also to get apposite information about campus the application is useful. There is no other effective tool as Unity3d for the design and development of a virtual reality application. This technology is a new and absolute application of IT. It has the potential to get people the same feeling we experience in the real world. Based on blender models this paper designs and develops a roaming system of a 3D virtual campus. The paper mainly studies essence technology of overall modelling. Then we achieve a virtual campus interactive roaming facility.

Keywords: Virtual world, 3D modelling, Unity 3D, blender, game development.

1. Introduction

The improvements in computer technology have also been matched by rapid campus information construction and virtual campus is the important constituent one of them. Traditionally, the virtual campus established on the base of the 2D plane map and photo map cannot meet the diversified needs for instance, recruiting students and giving publicity to the external, navigating in campus and conducting the information management. 3D virtual campus based on virtual reality and network techniques has much more advantages in immediacy, real scenes and good interactive experience and enables the users to enjoy their immersive experience. 3D virtual campus has become a fundamental column of campus websites and it would play a major role in giving publicity to the external, recruiting students and conducting the information management. The Android based system is established via a case study of the campus of Bapurao Deshmukh College of Engineering, Sewagram. We will adopt Blender software as the scene modelling tool and Unity3D is used to be the development tool in the project. 3D virtual campus model based on Android is designed and developed. The key techniques such as 3D scene modelling, roaming and interacting with each other are discussed further. As a game engine including graphics, sounds and physical function, Unity3D supplies a strong level editor, supports most of the mainstream of 3D software formats,

taking C# and JavaScript as the programming languages to implement the script function and enables the developers to quickly develop the game products with high-performance and high-quality without any ideas of bottomed and complex technologies. As a 3D inter-platform game engine, Unity3D supports the mainstream platforms such as PC, Mac, Linux, Web, IOS, Android, Xbox360 and PS3. There has been development and testing on the PC platform and then the game will be transplanted on the android platform. Android is the most robust and promising platform for today. An Android app will be developed. An .apk file and .obb file will be extracted, bundled and published on Google Playstore.

2. Virtual Campus Roaming System Overview

Android-based virtual reality application involves displaying a 3D virtual space. Many modern third-person Android based video games can be used as an example, using touch controls, reactive character behaviour, and other interactive functions to make app users feel as though they are in a 3d Virtual space. Usually, no sense of peripheral vision is a criticism of this form of immersion, which limits the user's ability to know what is happening around them.

There are two parts composing the main body of the 3D virtual campus roaming system. In this project, two most critical parts respectively are 3D model making and developing an interactive experience.

The development of the virtual campus follows the general principle that includes successively analysing, designing, developing, testing, revising tautologically and completing gradually the program. The process of system development has two prongs. The first part is that three-dimensional model of campus scenes. According to campus architectures and environments the model is constructed and optimized by Blender. Then the second step achieves the interactive experience between the users and environment. The main contents are to script interactive scenes which are applied on connecting the static three-dimensional model to Unity3D and enable the model to have the interactive experience.

A. Creating three-dimensional models

Blender is introduced to create the surface models including scalene triangle flat surface. The building models are created by the information of plans and the buildings. The partially accurate three-dimensional building models are created. The details of the building surface such as terraces, doors and

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windows and fences haven't been modelling alone and the way of texture mapping is used and texture pictures replace the complicated model structures. The environment models include trees, flowers and grasses and plants. There are a lot of trees which haven't been modelling and the mode of billboard is adopted in order to reduce the complexity of the scenes in the campus scene.

B. Interactive design and implementation

The created model of the campus scene is leading to Unity3D and then C# is applied to edit interactive scripts to interact with each other between the users and environment. The interactive design of the system includes navigating in the campus, interactively linking the scenes and interacting among the information.

Roaming function is a main one of the virtual campus. The system supports the users to visit and browse in the first person. The user can move with the assistance of the android controls. Up arrow swipe, down arrow swipe, left key and right key swipe control respectively forward, rearward, left and right movement. The screen is used to change the direction.

Creating the virtual person. The person model is introduced and controlled by the Player. A camera is created and put on above the head of the player and set up for a sub-object of the player. The environmental angle which has been switched to the camera happens in the third person.

3. Design and Development

Software required and technology used is discussed thoroughly as follows.

A. Blender – 3D modelling application

Blender is open source and free 3D creation software. It supports the totality of the 3D pipeline consisting of modelling, compositing and motion tracking, animation, rigging, rendering, simulation, even video editing and game creation. Blender is very useful to individuals and small studios who benefit from its unified pipeline and responsive development process. Blender is a free modelling, animation, texturing and rendering app. The FOSS program has been in the field for a long time, and later has a group of experts, teachers and enthusiasts for its continued evolution. It brags a majestic sculpting toolset and highly impressive 3D modelling and is considered a completely feasible alternative to paid modelling schemes.

B. Unity 3D

Unity 3D is widely fashionable among game developers. Moreover, it's being employed enormously by designers, and different inventive artists with an equivalent passion. Unity 3D could be a platform that's capable of providing life to your visions and concepts. Gratuitous to mention, it comes with a strong set of tools. Here are some uses of Unity 3D.

The Unity application could be a complete 3D surroundings, appropriate for birthing out levels, making menus, doing animation, writing scripts, and organizing. The computer program is well organized and also the panels are often

absolutely custom-made by dragging and dropping.

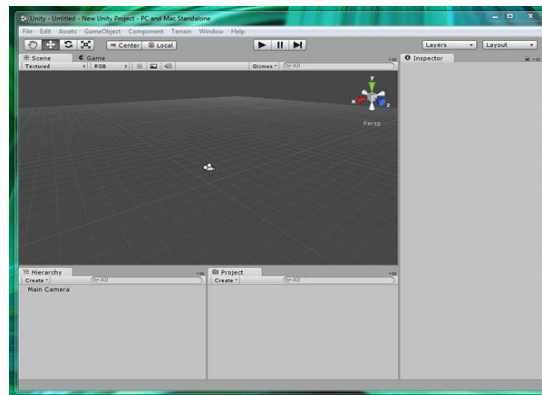


Fig. 1. Unity 3D software user interface

Assets are any resource files our game uses for development and design. These can be anything like 3D models, materials, textures, audio, fonts, and scripts. Unity can't actually create most of these assets except cube and sphere. Instead, other custom assets must be created externally using 3D modelling tools and various other tools and then should be imported into Unity.

Asset importing of Unity3D is robust and smart. Traditionally, 3D game engines have usually been finicky things and are very particular about what files you give them, forcing developers to carefully convert all their files. Not Unity. Unity is compatible with all popular 3D file formats including Maya, 3D Studio Max, and Blender. It also supports all common image file formats, including PNG, JPEG, TIFF and layered PSD files directly from Adobe Photoshop. Unity supports sound effects, WAV and AIF, and MP3 and OGG for music.

We can drag in project assets and arrange them to make levels and game screens in scenes. The contents of the current scene are represented by a tree-like format Hierarchy panel. Scene panel is great for organizing your scene's assets in 3D space, the Hierarchy is where you'll spend most of your time actually organizing your scenes and keeping them arranged with everything in good order.

We are using blender as an external application for asset making and compiling those assets in unity3d software and making an android application.

C. Virtual Roaming

Virtual roaming, an essential branch of virtual reality technology, is a highly interactive, immersive way of experiencing various scenarios. It has become popular in the game, tourism, construction, medical, aerospace, and many other industries. Virtual roaming is widely applied in making big scenarios: We can use them in campus scenarios, street scenarios, attractions scenarios, game scenes scenarios, etc. There are two types of virtual roaming: the first person virtual roaming and the third person virtual roaming. We are using third person roaming.

Virtual roaming in the third person: A Virtual roaming in the third person: It consists of more images than in the first

person, users can clearly observe the protagonist from a better view which increases the interactivity. Camera follows the protagonist and stays tied to the main character. This is commonly used in various game scenes, such as Role - playing Game, Action Game, Adventure Game, Third Person Shooting Game, Fighting Game, Sports Game, Racing Game and so on.

D. Application in Field

Unity Video game engines are capable of handling huge amounts of complex geometry and rendering realistic looking lighting. To explore virtual buildings for engineering and architectural purposes using a game engine like Unity is a very good practise. Unity is compatible with all popular 3D file formats including Maya, 3D Studio Max, and Blender. Unity's high end graphical capabilities. Instead of just using renders and blueprints, architects can use a game engine to create 3D models that can be shown to the client's android phone, desktop or web.

Video games are not just for entertainment anymore. Video games can have significant uses for training in the medical and military industries. Clinispace Virtual Sim Center. An awesome game developed with Unity, used by medical professionals to practice patient care and clinical management in a virtual environment. Essence to deal with various scenarios before the real experience happens improves overall efficiency. Unity's extensibility, realistic graphical capability, and ease of use make it ideal for making industrial simulators.

E. Procedural

Before starting this project, we first did the work of collecting and processing data. First, the project team searched the information through the college and field shooting scene photos, etc., to collect more detailed image information for the later work of three-dimensional modelling.

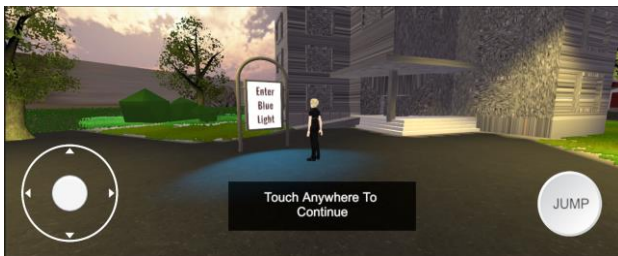


Fig. 2. Interaction - Exchange of information on college 1



Fig. 3. College Front gate in 3d asset form

In the three-dimensional modelling, we use the most common method of polygon modelling, by analysing the topic structure of the building, to simplify and produce roughly the

shape of a building model, according to the "big - small - big" Modelling concept, firstly build the basic model, then fill in the details, and then put them together, and finally realize three-dimensional modelling of each building.

Post-processing models typically include modelling after textures and materials handling, processing and rendering baking lighting effects. After building the basic model, we should add texture or material to the model to make the scene look more realistic. If you want the picture errors or loss to not occur when you import the editor, you can use the object map jpg, bmp, tga, png, dds format. In addition, the composition of a scene puts together a good model, you need to add lighting effects. In the virtual campus roaming, the most used function is the Skylight, and modifies the model, depending on the location of the appropriate lighting parameters.

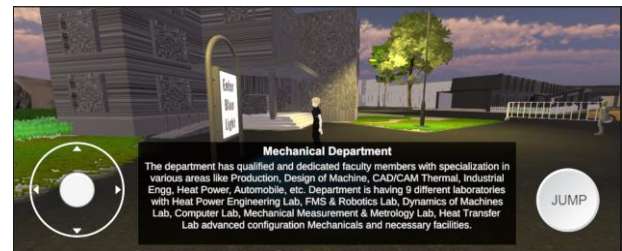


Fig. 4. Interaction - Exchange of information on college 2

The physical information (visual information, sound, taste, smell, etc.) that is not easy to experience in the real world in a certain time and space is simulated and superimposed by using computing technology. Virtual information is applied to the real world and perceived by human beings. So the experience surpassing reality is achieved. Real environments and virtual objects are superimposed on the same screen or space in real time.

To import the model to the Assets folder, drag and drop the Blender file to the Assets panel in the mid-lower section. Alternatively, move and save the Blender file to the Assets folder in the Unity scene project. To place the model in the Unity scene, simply drag and drop the model from the Assets panel to the scene. After making the coding and unity work the app bundle is created with apk and obb file.

4. Conclusion

With the development of science and technology in people's life with coming time greatly affect the virtual reality technology. This technology will become more stable and mature with development in computer technology. We can expect that the humans in the future will not just live in reality, but will also live in the virtual world. The full development and use of virtual reality technology to improve the living standard of people has become the goal of our struggle. This system is made with Blender and Unity3D platform, and finally realizes the virtual roaming of Bapurao Deshmukh College of Engineering buildings. And the practice of the project, make us learn more about this new and advanced technology, and will be a stepping stone for our study and promotion of virtual reality technology.

Unity 3D is not limited to the development of the game. Although at present the applications of Unity3D are more focused on the 2D and 3D game producing, along with the software continuously upgrading, function gradually strengthening, its application in other aspects will gradually in-depth. Unity3D marked a new epoch in game development, broad prospects, its impact will be profound.

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