論文
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A Study for 3D Game Process Production Using Virtools
(Virtools을 바탕으로 한 3D 게임 제작방법에 관한 연구)

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Abstract

The rapidly expanding field of animation is constantly looking for skilled animators in both 2D and 3D applications. The animation industry, as little as 10 years ago, was limited to the occasional blockbuster release. Today, we find animation everywhere, from medical applications to architecture to feature films and gaming. Especially, 3D games have become a way of life, but it still requires a lot of effort, on the programming side, to get it looking respectable. Programmers take a much more charge of part than designersin the real life game production. In this paper, I would analyze how to easily create 3D game animation using Virtools even if you are a non-programmer.

요약

애니메이션의 분야가 급속히 발달한 요즘 3D 응용 프로그램에 숙련된 애니메이터들을 끊임없이 기대하고 있다. 10년 전만 해도 애니메이션 산업은 블록버스터 영화 분야에서만 가끔 성공을 거두는 것을 볼 수 있었지만 요즘 우리는 애니메이션을 의료용부터 건축용, 영화, 그리고 게임까지 어디서나 볼 수 있다. 3D 게임은 애니메이션 산업의 중심부가 되었지만 제작을 위해서는 프로그래밍 분야를 포함하여 아직 많은 노력이 요구된다. 특히, 3D 게임을 제작하기 위해서는 프로그래머가 그래픽 디자이너보다 더 많은 부분을 담당하는 것이 현실이다. 본 논문에서는 디자이너들이 프로그래밍에 익숙하지 않은 사람이라도 Virtools을 이용하여 손쉽게 3D 게임 애니메이션을 제작하는 과정을 소개하고자 한다.

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1.Introduction

3D computer graphics are different from 2D computer graphics in that a three-dimensional representation of geometric data is stored in the computer for the purposes of performing calculations and rendering 2D images. Such images may be for later display or for real-time viewing. 3D modeling is the process of preparing geometric data for 3D computer graphics, and is akin to sculpting, whereas the art of 2D graphics is analogous to photography.

Animating objects that appear in a three-dimensional space can be rotated and moved like real objects. 3D computer graphics are works of graphic art created with the aid of digital computers and 3D software. The term may also refer to the process of creating such graphics, or the field of study of computer graphic techniques and related technology. [1]

People now spend hours of time looking down corridors, exploring tunnels and viewing intricate extraterrestrial planets. All of this is now possible because of recent developments in computer hardware. Theirlowly PCs can do more than theythought. People were absolutely amazed that PCs could display 3D imagery at interactive frame rates. [2] Virtools, which's been building for over 13 years, enable designers to create whatever game they want on their PC.

The games calculate all of the view data as the program is running. It should be flexible enough that it can be extended and modified in the future, and robust enough to be useful. The Game Creators are dedicated 100% to delivering the best range of affordable and cutting-edge game development tools.

3D animation is at the heart of games and virtual reality, but it may also be used in presentation graphics to add flair to the visuals. In addition, with over 185 universities using and teaching Virtools around globe, Virtools has become the leading interactive 3D development platform in the education field.

Actually, the users need complicated programs, high cost, and time to create 3D animation game. However, more importantly the process of creating their games should be fun, easy and not too heavy on the wallet. The products they need should not break the bank and there will be no more slaving allnight over a hot keyboard just to get a simple 3D object onto the screen. With the products they can complete impressive end results within a fraction of the development time and cost of other languages. [3]

This paper is to explore methods to create 3D game animation with the use of Alias Maya and especially considering Virtools; examine Maya and Virtools; why it would be great use of Virtools for designers; how to use Maya to model objects for export to Virtools and how to process using Virtools. Thus, I'd like to show how easily create 3D game with Virtools even as a graphic designer has no experience programming using my own project as an example.

2.Maya

Alias' award-winning Maya 3D animation and effects software continues to lead the industry in technological innovation and is being adopted by more and more console and computer game developers. The users can see how Maya has been used in popular games.

Maya 8 Unlimited is one of the mai n 3D applications used by many of the top v ideo game design and production companies and most independent producers to create ey e-catching visual effects, cutting edge game s, and unique game design visualizations.

Basic polygon modeling is taught w ith emphasis on proper anatomy, costume, an d game engine standards. Techniques cover ed with Maya will give you an excellent fou ndation for further 3D game and animation.

If you're playing a Sony PlayStatio n®3, Nintendo® GameCubeTM, Microsoft® XboxTM or PC game, many of the 3D imag es you see on the screen are createdusing M aya! [4]

3.Virtools

3.1WhatisVirtools?

Virtools has pioneered cutting edge solutions for real-time 3D interactivity since 1993. Virtools built the company's initial sof tware solution, Virtools Dev. It specializes i n providing comprehensive software develop ment environments for creating highly intera ctive 3D content. Virtools is an integration t ool and an "Interactive 3D doftware" editor a s well. Acquired by Dassault Syst®mes in mid-2005, Virtools is the leading provider of comprehensive software solutions for building highly interactive 3D life-like applications.

Customers include industry leaders such as France Telecom, L'Or®al, Matsushit a, Procter & Gamble, PSA, Renault.Virtools game clients include major game studios suc h as Electronic Arts, Remedy, Nickelodeon, S ony Computer Entertainment Worldwide Stud ios, Microsoft, Dreamcatcher, Warner Bros O nline and Ubisoft, etc. Virtools is a licensee of Sony Computer Entertainment Inc's Tools and Middleware Licensing program.

In addition, Dassault Syst®mes (D S) (Nasdaq: DASTY; Euronext Paris: #13065, DSY.PA), a world leader in 3D and Product Lifecycle Management (PLM) solutions, anno unced today that Virtools' technology is appr oved to be part of the "PLAYSTATION®3" ("PS3TM") Tools and Middleware Program. ®We are proud to be part of the "PS3TM". Tools and Middleware Program with the obj ective of providing our clients with even stro nger middleware for the next generation platf orms®, says Virgile Delporte, VP Electronic Entertainment for Virtools, Dassault Syst®m es.

With Virtools technology, it was ab le to create the entire application at a low co st and concentrate on creativity. Also, it is the high level of interactivity associated to a n improved navigation system allowed by Vi rtools powerful solutions. [5]

Itis designed to run in real time Vi rtools Creation and Virtools Developer are hi gh-level, object-oriented tools for developing 3D virtual reality worlds populated with acti ve objects. Virtools 3D real-time technologie s and solutions have been used in a wide va riety of applications such as simulation of pr oduct usage, ergonomic testing, creating the shopping experience, training scenarios, right through to branding, advertising and web ma rketing applications.

3.2AdvantagesofVirtoolsforgame

Called Virtoolsset to rapidly speed up the time it takes to get designers' ideas f rom paper play to proper play. It generates

3D environments so that developers can eval uate game concepts and ideas, presumably so that game developers can concentrate more h eavily upon game play and interactivity. Virt ools gives game studios the technology they need to develop complex, high-quality 3D ga mes in record time. 100% of the games pro duced with Virtools have followed the full de velopment cycle up through public release, to generate revenue and acquire a committed au dience of gamers. [6]

Virtools is a 3D application/simulati on development environment that bundles tog ether models and code into files that can be played by the Virtools Web Player. Dssigne rscan generate a compact file containing all of the pieces. They then add code to theirw eb-page that loads up the Virtools Web Play er browser plug-in. The plug in then loads up the game-file and plays it, resulting in a playable 3D browser-game with a reasonably seamless user-experience. Thus, with the be st real-time 3D rendering and interactivity a vailable anywhere, Virtools Web Player lets you play, learn and discover breathtaking int eractive experiences on the web. [7]

Also, Virtools announced the availa bility of the Virtools®Physics Pack for Dev 2.0, with integrated rigid body physics power ed by Havok. Building on Virtools Dev 2.0 with Havok's real-time physics engine, this i ntegrated solution brings the latest developm ents in games physics to the web, and make s them accessible to designers with no C++ knowledge. Before Virtools, to make 3D ga mes, game creators needed to be an expert i n assembler, in C, in C++, in Java, in Visual Basic, in Photoshop, etc. However, as a non -programmer suchas graphic designer, it's p ossible to produce a 3D animation game with a beautiful scene.

For example, a non-technical game designer had managed to get hold of an eval uation copy of Virtools and convinced manag ement to give him a month to play with it. In that month with no prior programming ex perience he was able to basically create an e ntire level for a character action game on hi s own including making his own graphics. Virtools is a quick and easy to use applicatio n/game development tool, in which designers can use their modeled objects. It takes a m ajor leap toward making what has been an e soteric technical art accessible to a wider ran ge of non-technical content designers.

With the Virtools Physics Pack, De v 2.0 users will now be able to add physics to their interactive applications as easily as t hey add other behaviors to objects - with a simple drag-and-drop. Based on the Havok game technology available for the PC, PS2 a nd Xbox, this real-time physics behavior pac k features rigid body collision detection and state-of-the-art constraints. [8,9]

With a versatile behavioral engine a nd an industry-quality rendering engine, Virt ools powers multiple game markets and genr es: adventure, shoot 'em up, simulation, mas sive multiplayer and more. Virtools seamles sly merges all aspects of the production proc ess for efficient teamwork between developer s, game designers and graphics artists. With several thousands of users worldwide, Virtool s provides the tools that will help game deve lopers process out their prototyping and strea mline full game production. [6]

Virtools can be an easy to use plat form for quickly creating games or prototype games. To summarize, there are many reaso ns for using Virtools: 1) It can be combined

and integrated for maximal visual results in my interactive 3D scenes. 2) Different degrees of interactivity can be applied. 3) The user has complete control over the game camera. 4) Original and instinctive interface design 5) Rich, complex interactivity 6) Stunning 3D graphics with the best rendering available 7) Optimized creative process 8) Accessibility to non-programmers 9) Reusable development components

4.Howtoprocessusing Virtools

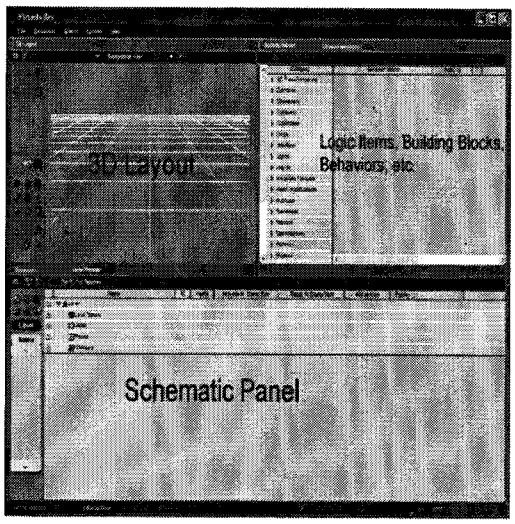
4.1Maya&Virtools

As the world's leading innovator of 3D graphics technology, Maya and Virtools softwareapply for the film and video, games, interactive media, industrial design, and visualization markets. "Virtools is pleased to provide Maya users with our groundbreaking interactive 3D development solutions, making it easier than ever to create amazing interactive 3D applications with Maya's 3D models and animations," said Bertrand DUPLAT, Virtools Founder and President. [10]

I'll introduce how to combine Maya's powerful 3D modeling and animation software with Virtools® Dev.'behavioral features and bring life-like interactivity to 3D content. The Virtools Exporter for Maya applies to export 3D models, lights, cameras, materials, textures and animations into Virtools's Dev 2.0. Maya's bones, skin, and vertex colors features are also supported. Virtools Dev makes it possible to edit on the fly in the "real life" gaming context, for optimal tuning and final results. Thus, Virtools has created a customized tool which streamlines the Maya pipeline for creating interactive 3D content with Maya and Virtools Dev 2.0.

4.2Interface

Virtools has resource folders similar to Maya's scene folders. To begin explaining how Virtools can be used to create a game, let's look at the interface. [Fig.1]This is how Virtools looks once users start it. As with most 3D programs, Virtools has a panel and tabbed interface to provide ease of use.



[Fig.1]The Virtools Interface
[그림 1] 버툴 인터페이스

The Virtools framework brings together graphical user interfaces, graphical and text scripting, debug application programming interfaces - such as the behavior and render engines - as well as asset integration.

The remarkable efficiency of 'building blocks' makes interactive authoring accessible to artists, yet the scripting environment is full featured and well suited to supporting game programming instruction. Virtools has what they call "Building Blocks" or BBs for

short. These generally represent small functi ons or systems that you can insert in your s cene. That's, to save time, Virtools allows t he user access to building blocks, which are pre-made scripts for performing a series of a ctions. Using building blocks, you can make a character walk and display other animation s in perhaps 15 minutes. [9]

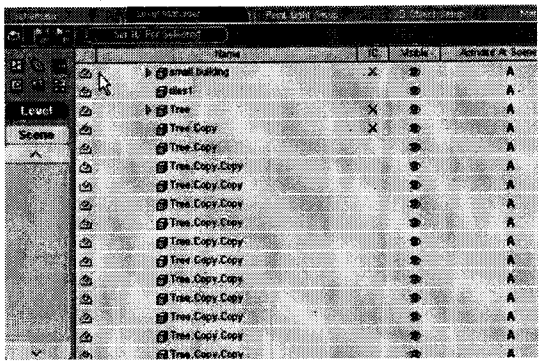
4.3Process

I'll show a simple/basic game using Maya and Virtools. As an example, I create d a 3D animation game including basic game elements.

My idea is a personality test game in 3D animation with poetic scene: I need tw o paths and symbol objects to build a world. The players choose one path and pick up obj ects. After that, they can get their personali ty type. For a part of game elements, I use camera working, controlling for the objects, keyboard controller, etc. Let's start!

4.3.1.Environment

There're two ways to create a worl d: One is that I can load a pre-made one if I don't want to take a while to make one. To load a pre-made world, go to the resourc es tab on the top right and then under 3D e ntities/world select a world and just drag it i nto the 3D scene on the top left. Now, I ha ve loaded a world. The other one is that I make my own world where I export objects from Maya to Virtools. I chose to the secon d one to build environment elements to add a World in Maya. For example, in the case of forest, I made one tree in Maya, export to Virtools, and then 'copy and paste' the tree object in 'level manager.' [Fig.2]It doesn't af fect size such as short cuts. It's very usefu l way because it's important to consider 'siz e' in 3D animation. The good thing is that there is no rendering time, just export to Vir tools. Below is how to create forest in Virt ools.



(a) 'Copy and paste' the tree object in 'level manager'

(b) Forest scene

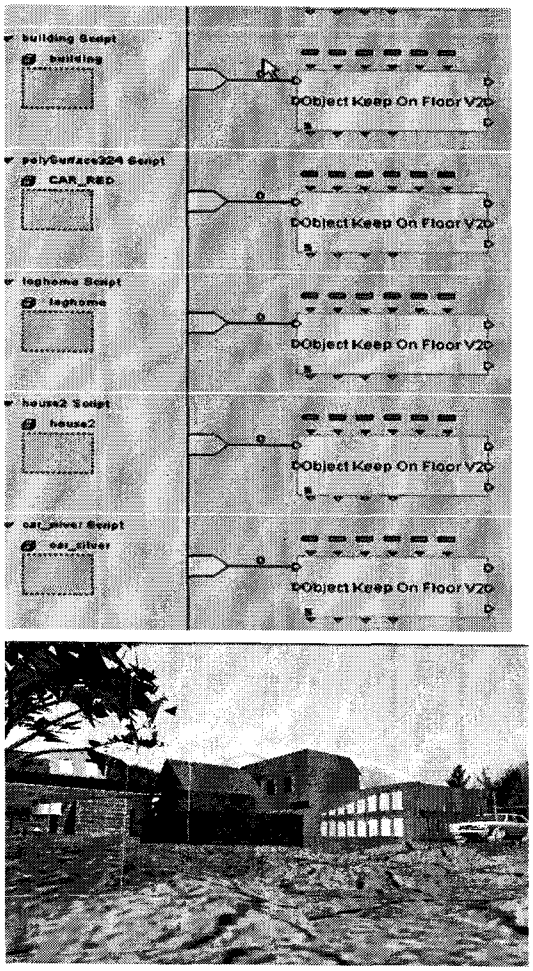
[Fig.2] Create forest in Virtools

[그림 2] 마야에서 만든 하나의 나무로 버툴에서 간단하게 숲을 이룬 모습

4.3.2.Location

To locate on the ground, I need 'ob

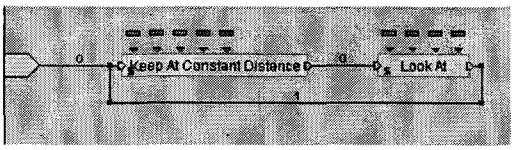
ject keep on floor' script. [Fig.3] I just drag objects onto the scene wherever I want and apply this script on the each object.



[Fig.2] Build location on the ground
[그림 2] 각 오브젝트의 위치 구축

4.3.3.Camera

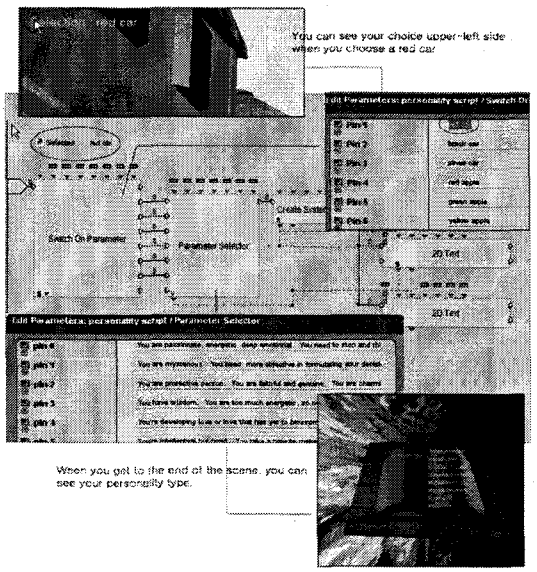
I need a chase camera that follows behind the player's movement: The camera j ust moves the player's viewpoint through th e space, and the space reacts to his/her pres ence.



[Fig.3] A camera to chase
[그림 3] 따라다니는 카메라

4.3.4.Controlsfortheobjects

I need a way of controlling which t he object is shown and processed. I applied scripts for each object as below.

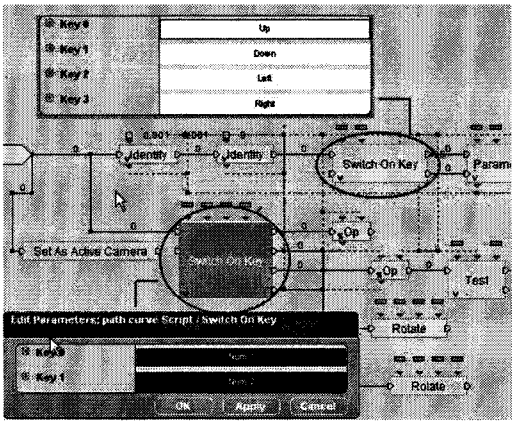


[Fig.4] Create controlling objects
[그림 4] 각각의 오브젝트에 적용되는 제어 장치

4.3.5.KeyboardController

For a part of game element, I used keyboard as a controller. Select the building block called keyboard controller, which can b e found under controllers/keyboard. I used c

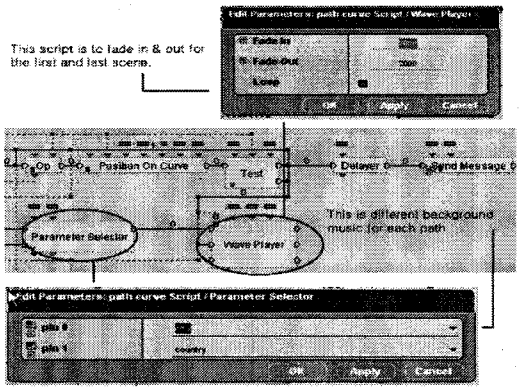
ontrollers for three parts; arrows for camera working; numbers for choice of ways; mouse controller for 'picking objects.'



[Fig.5] Create Keyboard controllers
[그림 5] 키보드 제어장치

4.3.6.Sound

I concerned about 'sound' part I pu t only two background music for each path. [Fig.6].



[Fig.6] Different background music for the t wo paths with fade in & out
[그림 6] 두 길에 음향효과와 함께 각기 다른 배경음악을 적용

In addition, if you have a character with animations you can drag it from your r esources and drop it in your scene. Then y ou can go over to thebuilding blocks and fin d the Character Controller BB, drag and drop it on your character. Walking, walking back ward, running, and standing animations will be placed. You select them and click OK. T hen drag a Keyboard Controller BB on your character. Press play and you can now walk your character around using the numeric key pad keys. If you know the interface and yo u already have your assets you can have a character walking around a level in approxim ately 30 seconds.

There are many different ways for someone to get help using Virtools. One ver y good resource is the documentation folder that is installed with Virtools.

5.Conclusion

It's important to build games create d with a 3D game engine allowing full move ment in the game: The 3D Platform style in volves jumping across platforms in a 3D wor ld rather than moving from left to right as e xhibited in many 2D Platform games. There is usually an "over world" that connects all of these different levels together.

The real benefit of Virtools is rapid prototyping. It's speedy, speedy, and speedy! Virtools is an amazing product and is in so me ways a view into the crystal ball of gam e development: It delivers complete real-time, that's, there is no compiling. So users can see their changes immediately. Crazy high-l evel from a programmatically standpoint mak es importing content a non-issue, and has a great engine and physics suite (Havok) behin d it. That means both that it's easier to un

derstand for non programmer types and, insa nely fast to develop with.

Virtools' revolutionary interactive 3 D technology makes learning complex game or multimedia production easier than ever bef ore. More and more universities are taking a dvantage of this opportunity by introducing Virtools platform to their arsenal of teaching tools. Virtools's user-friendly graphic interfa ce is the perfect introduction to interactive 3 D media, whether users have a foundation in programming or not. I believe that it's reall y an effective tool for learning how games a nd design simulations are created.

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