Preliminary Study of 3D Base Navigation Websites Development - Use 3D Virtual Temple Navigate Websites for Example

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Abstract

From now on, website display still uses interface visual effects as the main appeal, its goal aims to attract user's browsing interest, but in actuality, the website display is still in 2D images, text-based presentation. Hence this research will build a full 3D base virtual temple website and move the religious spirit of the actual temple, activities development to the Internet.Whether it is temple festivals or blessing will all build in full 3D Virtualization then brought network interaction, information and even gameplay to "the 3D base virtual temple websites" for development cloud Religion and applied it to smart mobile device platforms, let the busy modern spiritual sustenance at all.

Keyword: Virtualization、Interactive、Smart mobile devices

I. Introduction

Background and purpose of the plan

From now on, website display still use interface visual effects as the main appeal, its goal aims to attract user's browsing interest, but actual hit, the website display is still 2D images, text-based presentation. Thence, this research will build a full 3D base virtual temple websites and moved the religious spirit of the actual temple, activities development to the Internet. Whether it is temple festivals or blessing will all build in full 3D Virtualization then bought network interaction, information and even gameplay to "the 3D base virtual temple websites " for development cloud Religion and applied it to smart mobile device platforms, let the busy modern spiritual sustenance at all.

The general website due to factors of network bandwidth, performance of the user's computer (CPU, graphics card, memory, etc.), affecting Internet website's speed, quality, so in the program and interface design still 2D image-based, but with the speed of network bandwidth and computer hardware & software evolve faster and faster, 3D display interface computing accelerated, more and more online 3D game platform appear, those are to meet the user's visual senses, good visual design is one of the most direct concern to stimulate and attract users to browse and using the website. Therefore, this "3D virtual temple website" planning use the game engine Unity 3D (Hereinafter referred to as U3D) to build 3D website, U3D is a game engine developed by Unity Technologies, its features are well known in with affinity easy to use and much easier to learn the operation interface, it can compatibility with 3ds Max, Maya and other famous 3D production software designed 3D models and 3D animation. In the interactive program control is based on the C language, JavaScript, Boo script as the main programming language, it has relatively high degree of freedom In the development, the compatibility in various platform is also very high, In addition to the Mac, it supported Windows and other platforms, smartphone platform like iOS、Android all can run U3D developed game、interface, may increase the use in variety of hardware facilities, let the busy modern spirit, spiritual sustenance at all.

II literature

The plan will use U3D as the primary development platform, it may increase use in the variety of hardware facilities. However, the common 3D website technology in the general site is the application need to first explore to understand the pros and cons of

building the current 3D website development technology. While we discussing 3D website, "Second Life" the 3D virtual community site developed by Linden Lab can learn about the importance and advantages in the internet era about building 3D website.

1.Unity 3D

U3D can be quickly and easily in prototyping、The multi-platform development is most advantageous function of U3D. But the ease of use of the tool, as well as the power of the API, able to dive into the depths of the program, understanding and application of low-level operation is more important advantages. The U3D official found that about 90% condition can meet customer demand; these old features are built-in, when customer need to go deeper change the bottom of the program, the U3D official will fully support reached.

A cross-platform game development editor

The U3D itself support to production of multi-platform games, it can development games of iPhone, Web, Xbox 360, Android and PlayStation.

Figure1: http://chinese.engadget.com/2006/02/28/what-would-steve-jobs-do-result/.

Deferred Rendering

The U3D provide cutting-edge technology of the lighting system, hundreds of point light sources can be placed in the scene, instead of a huge performance impact. With G-Buffers, U3D provide "deferred rendering technology" this functionality to produce high-quality images, and not lose too much computer performance.

Beast Lightmapping

U3D provide best light mapping technology "Beast" in the industry, this technology is used in many popular game of the 3A level. Previously, Beast charge per game license of up to $ 90,000, but this now has become a built-in function. Beast light maps are able to have beautiful effect interaction with the real-time dynamic light sources, when the object close to the camera, U3D will switch to instant light, so that you have the most delicate shading details. (Figure II)
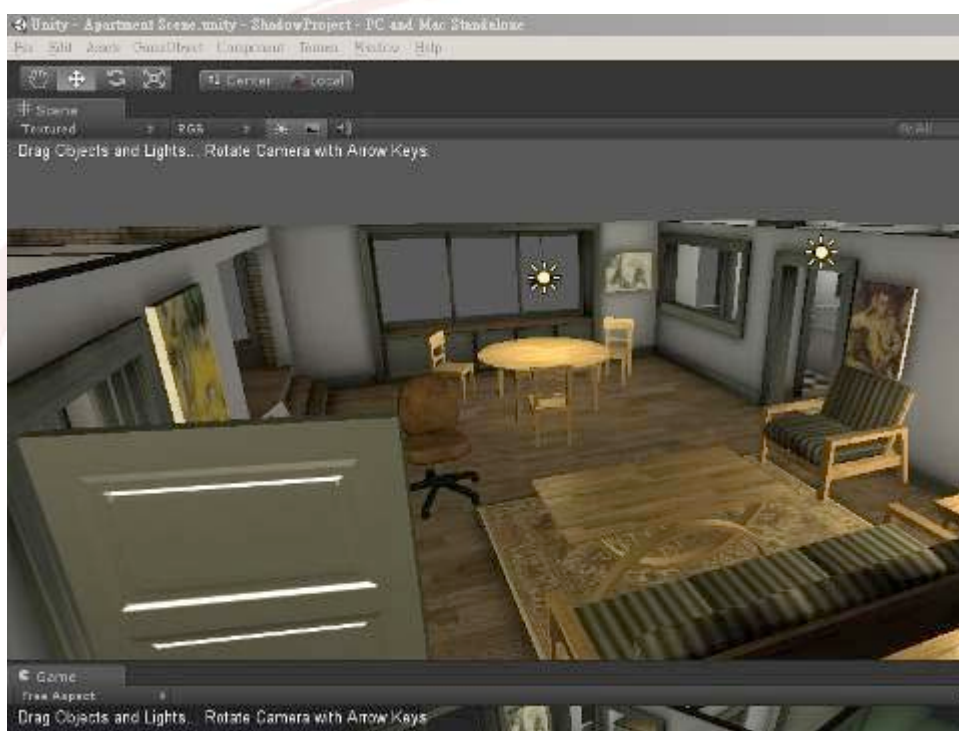

Figure2: Unity offical website.

4. Camera Lens Effects

U3D upgrade the post-effects, the software itself is wrapped in a lot of special effects, such as Kill Zone game special effects inside. There is a light plumes, the depth of field of the high quality, internal lens reflections, stroke, depth of field, color correction (depth-aware color correction) ... and so on, those make the camera function more comprehensive.
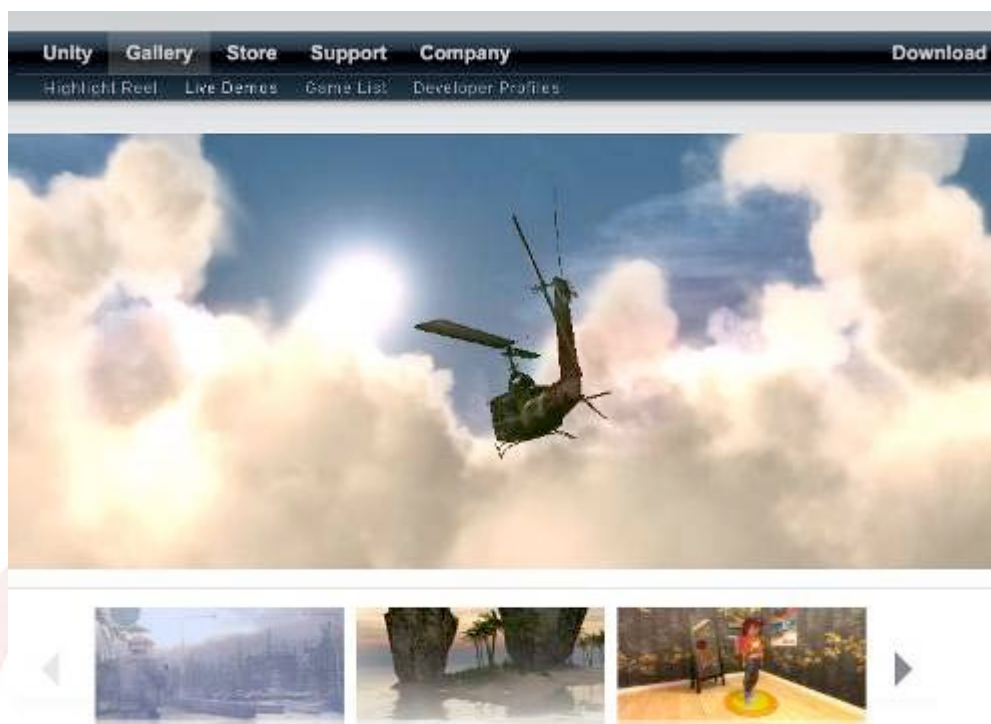
Figure3: Unity offical website.

5. Source-level Debugging

For program designers, U3D provide the convenient script debugging features through MonoDevelop can be used on both Windows and Mac platforms. Those features can suspend the game, for each line of code editing, set breakpoints, view variables, different from the early print-based debugging and greatly enhance the work efficiency of the program staff.
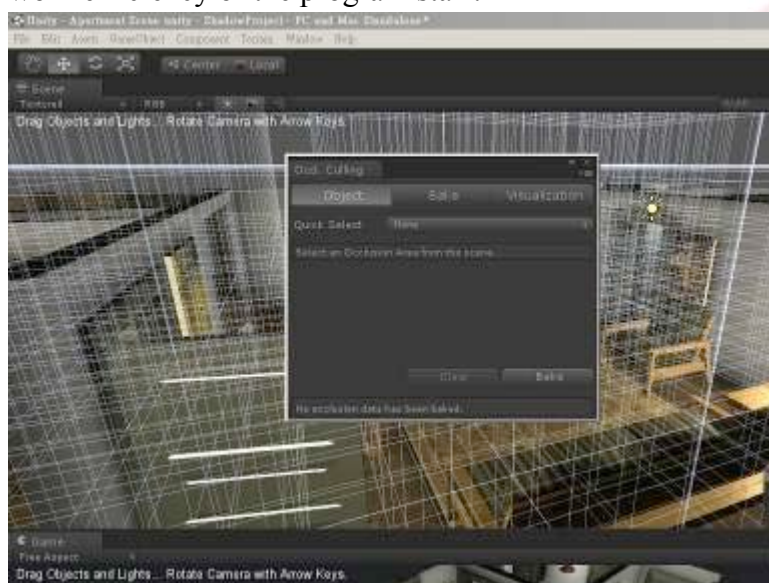

Figure4: Unity offical website.

6. Asset Management function

When conduct a large-scale project, this feature can help the project to quickly find the material assets, U3D now add a "the content browser, it has the ability to preview the material assets of the scene that contains the label with the search function, you can quickly find the desired material.
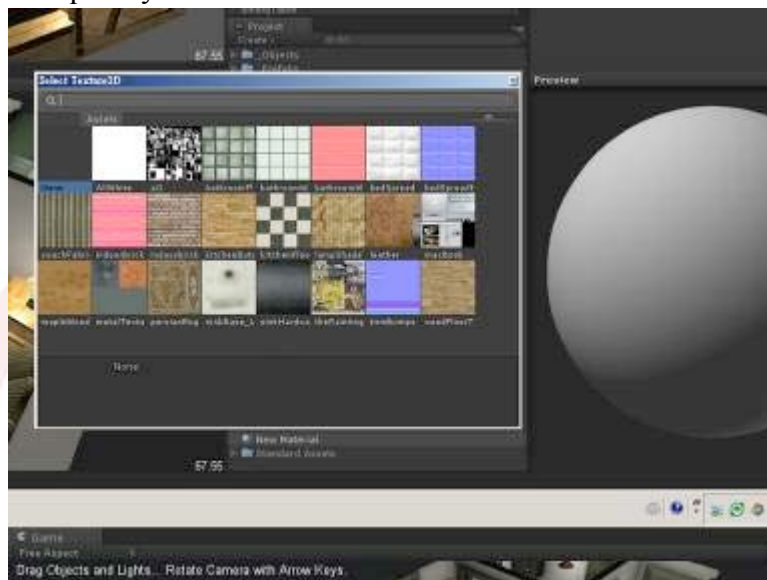

Figure5: Unity offical website.

7. Sound effect function

U3D added Reverb Zones, filters, tracker file support management tools and provide falloff curves for all major audio editing, and that is why it can completely control the environment sound.

8.Occlusion Culling

About game performance problems on the phone, even with fast hardware, costumer will be still asked to get better performance, that's why U3D provide "occlusion culling" system. This system can be used in mobile devices, web pages, and game consoles. It does not need to increase any budget; the system is come with U3D, so that company cost savings.

圖六：奇銳科技官網。

Game developers often use scripts editor to add some features to strengthen the integrity of the process and file contains output material or change default model import options, of course, they will write other things, one of which is a version of the game build script. Game companies often have to create different versions of the game for different publishers that have different hardware limitations, in the Unity editor they write extensions for different games, Unity editor such as level editor, use customized assets, so that it can be able to integrate the current scene without requiring Excuse programmers.

2. Flash 3D Plug-in category：Papervision3D

The more mature production technology in 3D website making history was FLASH 3D, early, Flash relative lack of application in the 3D field, most of time it only rely 3D software to output continuous sequence drawings or use their own mathematical formulas to calculate the simulated 3D effect, the continuous picture only can one-way play and cannot be generated in real time interaction. Up to Web2.0 era applications emphasis on user interaction, the development of 3D technology can play in Flash Player, with small size, excellent interaction with the user and the effect of realistic 3D simulation; 3D web applications will undoubtedly bring users all new visual experience. (Green milk tea, 2009). The development of this technology let 3D effect is not only just in a single transmission on the animation but also more interactive operation to increase website interesting and immersive visual experience.

Therefore, in this context, generating a Flash3D category-Papervision3D (Referred to PV3D), PV3D is not software either new programming languages, which is a Flash Action Script open source-based technology, it aimed at achieving the more dazzling、with higher interactive powerful Flash 3D Web applications. The earliest PV3D test version is published in the July 7, 2007, which continuous development and maintenance by a group of core members. And development the PV3D web applications only need to use Flash Action Script 3.0 with PV3D class file (similar plug-in), the client (user) can watch only need to install the Adobe Flash Player 9 or more version.

The PV3D produce 3D effects are out by the mathematical formula, but have been packed into the off-the-shelf category of plug and very convenient in use. Although Flash Player10 now add the small 3D functionality, all visible objects (Display Object) have x, y, z, rotationX, rotationY, rotationZ, such as property, but its performance still not good as PV3D and the development team has developed Flash10 version of PV3D, Therefore, the role of PV3D is still irreplaceable.

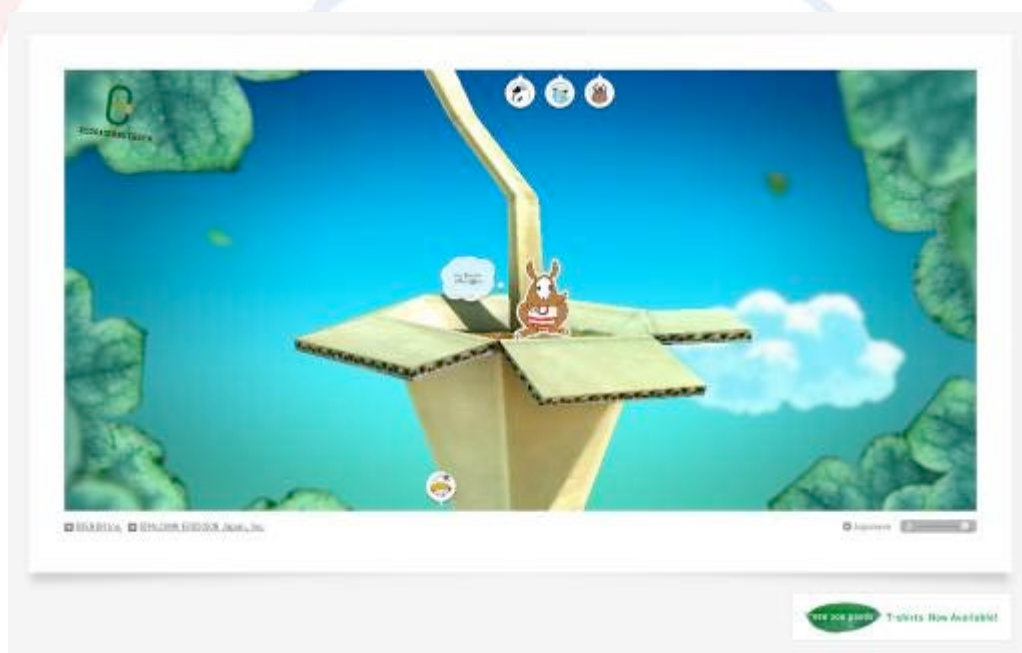Figure7: Use PV3D technology to produce virtual underwater world website

Figure8: Use PV3D technology to produce 3D website. http://ecodazoo.com/

The PV3D provide many useful objects and methods to help us deal with the complex mathematical operations let us can easily simulate 3D world in Flash. Relative, if computing of PV3D experience too complicated models or large number of 3D objects, it will consume a lot of CPU usage, so the number nodes of model (constituting the number of faces) and the number control of objects are very important. The bitmap processing of Flash itself, there are many fly in the ointment, such as bitmap scaling or rotating effect when there are jagged, even use PV3D there is no exception, so you can open a picture smoothing function to alleviate this problem. Use PV3D can toward interactive and interesting direction to apply, as for

the texture on flaws can be considered to strengthen them to some art techniques that are use of 3D map drawing skills to complement the model number of faces problem. Figure 3 describes car's 3D website is use of maps drawn techniques to produce realistic cars entities effect. In figure4, 3D website using mapping techniques to create a unique visual style and increases its interactive view fun.

Figure9: http://www.playsmart.jp/

Figure10: http://www.cleoag.ru/labs/flex/parkseasons/

3 Principle of PV3D

Model and texture:

Three points connected into a triangle and a lot of triangles to form a

model. The texture is the model at each point (x, y, z) of corresponding plane (u, v), u, v is bitmap plane x, y, merely point has been used x y, and to be avoid duplication. The map inside Flash3D is calculated according to different slope of each triangle and each point corresponds to the UV calculated beginBitmapFill second matrix parameter (matrix) to use bitmaps filled triangle. (Figure 5)
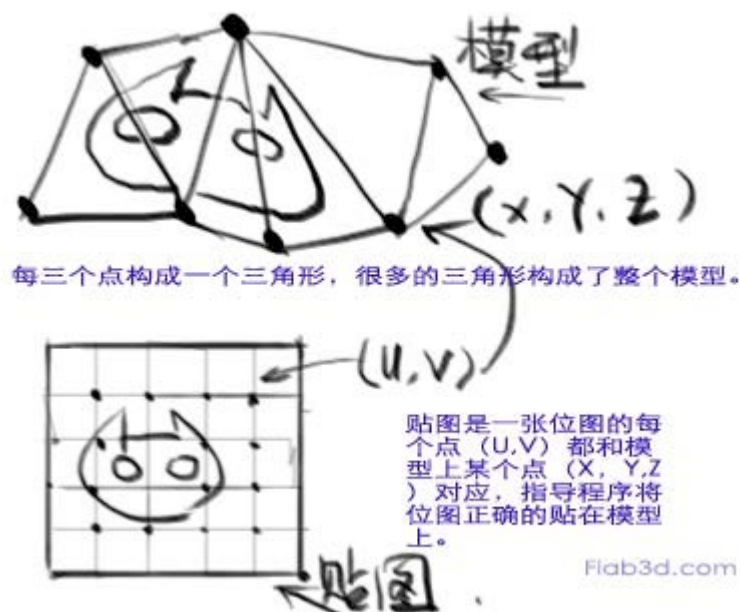

Figure 11: http://www.5uflash.com/flashjiaocheng/flash-3d/5450.html

The movement principle of Flash3D is major change of coordinates and generates a dynamic sense of move feeling, thus in our visual what we thought moving point and the model is actually not moving at this movement what might move just coordinate system. And what we thought point move, rotate, zoom and perspective is all the same principle, but is on the move, rotate, zoom, perspective these points and the model coordinate system where only.So, Camera movement is the model coordinate system around the axial rotation. All the points have any change is a point (x, y, z) multiplied by a matrix obtained. The categories have been defined in the PV3D and all the expressions like plug-in are convenience for we apply.
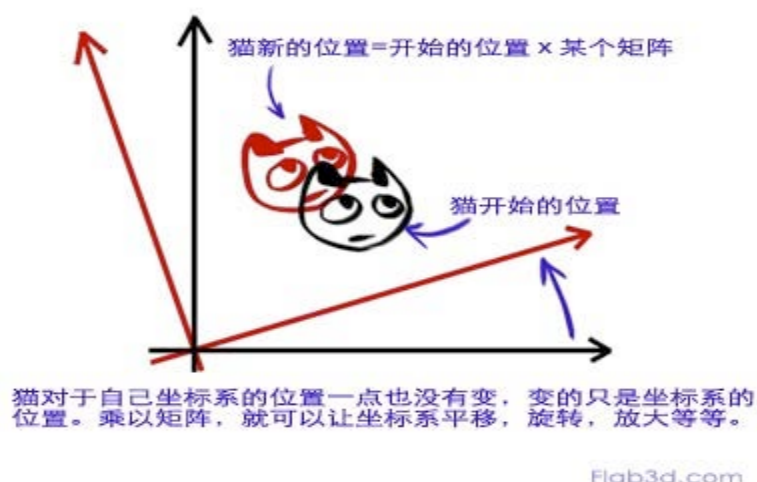
Figure12: http://www.5uflash.com/flashjiaocheng/flash-3d/5450.html

Projected on the screen:

Although it is "3D" but in fact it still viewed on a flat 2D screen. It must take the 3D point (x, y, z), becomes only the (x, y) of the points that are displayed on the plane of the screen. Specifically, 3D point is the projection of the point in the plane of the canvas. If you remove the z values directly from x, y, z, while an (x, y) of the point can be obtained, but such projection graphics would be no changes in the near and far, and therefore produced a "perspective projection", the algorithm is used x, y divided by a value w and Z to obtain the perspective view of a distance of (x, y), this is what we usual see a 3D image of most normal distance. (Figure7).

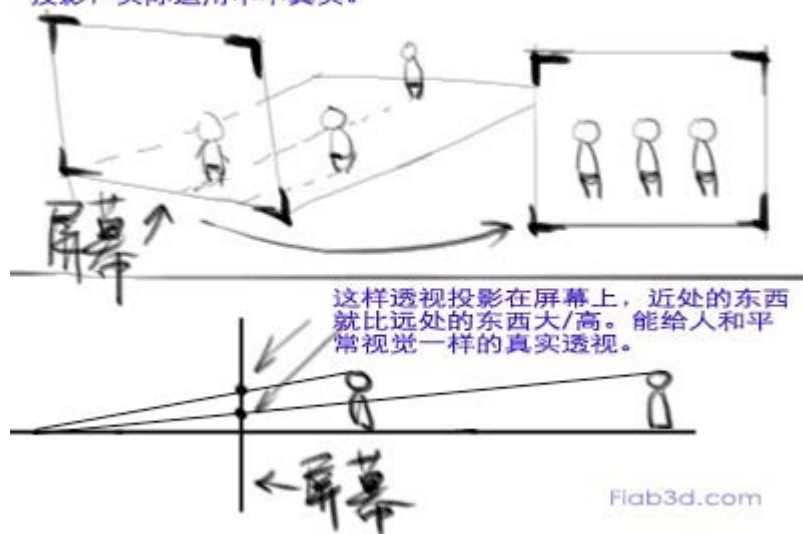Figure 13: http://www.5uflash.com/flashjiaocheng/flash-3d/5450.html

Thus, 3D graphics theory is the basis of the main principle which forming Flash3D, also mathematical formula formed the Action Script code, but it need to have more mature concept of mathematical logic, use Flash authoring 3D website also needs to have certain program basis, to test construct 3D website often takes more time to develop the program and understand the way of use PV3D plug-in. This project attempts to use Unity 3D game engine to develop 3D websites, mainly that it is in very high compatibility with 3D production software, users familiar with 3D software (such as 3ds Max, Maya) is quite convenient used to it. Users into the Unity 3D to create interactive interface control, there are number of functions that can be applied.

Flash is a very strange software, because it is not designed for develop games in the beginning, it can only develop the game through the plug-in; the U3D is a game engine specifically for game development and capable of making the latest game. If you want to change the future of games on the network, you will expect to see the next level of game on pages, the Flash may not be able to achieve this level. (Mirax technology Corp Official Website) Compared to Flash itself is a 2D vector-based authoring software, although there are the PV3D quite mature 3D technology, but it still relative lack of the degree of compatibility with other 3D authoring software, for example, the restrictions of the maps, there are many restrictions of dynamic skeleton support, but U3D its compatibility is very large, convenient, simple and is quite suitable tool to build 3D websites.

360 degree VR Panorama 3D websites:
Such 3D website technology is place the digital camera in a space in the middle position take 360 degrees panorama shooting the actual scene into a continuous digital images, then it synthetic series with software, the continuous drawing concatenated into site similar to the three-dimensional virtual 3D space, such as 3D Space 720 degree video surround system, it is a system developed by the three-dimensional network technology companies, with static surround Videos of the digital camera, through computer software technology and applications, make video on internet can up and down around it or left and right surround like dynamic video, image file size is only like a normal plane JPG compressed image file and small file size suitable for use in the internet. (Three-dimensional official website, 2008) Such sites are dioramas reconstruction, belonging to the picture type of browser, not really pure 3D models built website, but suitable for website cases of actual field conditions to be faithful.

Figure14: Artistic creation 3D online exhibition,
http://www.3dspace.com.tw/sample/fhsh/show/

Figure15: Campus Tour of the Affiliated Senior High School of National Taiwan Normal University,
http://www.3dspace.com.tw/sample/hsnu/

3D websites and Panorama 3D website are very different in the actual implementation techniques and browse operation mode also have many differences ,the comparison of two types websites may simple be seen from the following table:

Table1: The differences between virtual scene and panoramic photography

Comparison differences between virtual scene and panoramic photography		
Items of comparison	3D 虛擬場景 3D virtual scene	Panoramic photography
1. Production methods	Numerous three-dimensional model of simulation constructed	Ttake few photos connected together to position, rotation and surround
2 Visual effects	meticulous 3-dimensional detail, but inevitably the actual gap	Real photo panorama presented, but only 2D plane effect
3 Range of presents	From any angle of any object or any object in any corner of the scene can do a virtual extension	360-degree photographs from the inside and out, and scene is limited to reality
4. Scenes interaction	Sneak into the virtual space, walk and interact with the virtual objects	first-person orbital rotation on Left and right or up and down the designated to zoom in or out of a photo
5. Production costs	Production process is difficult and time-consuming long	Production process is easy and fast
6. Use threshold	Higher requirements of hardware and network bandwidth	Lower requirements of hardware and network bandwidth
7. Extending the application	Unlimited	Web links

Data source: http://blogs.villamood.com/james/2010/10/21/1482/

From table above can find out that 3D virtual website application on larger elasticity, the relative production processes is long and technically need higher threshold, but its interactivity, better gameplay and increase of cases in a variety of products marketing design flexibility, "user innovation" will be the key to success. The rapid development of the internet, it not only for information, published works, marketing, advertising and commercial transactions, and further, there are thousands of people online on the formation of another society, has the exclusive currency in circulation, commercial

activities, society organizations, media coverage, influence increasingly expanding, the truth is not only entities stationed virtual, virtual entity can counterattack. (Commonwealth Magazine)

Era of Web 2.0 emphasized the features and user interaction; therefore, build 3D website should be able to truly meet the spirit of its innovative interactive features.

Second Life 3D Community Website:

Now, most prevalent 3D website should be the Second Left of virtual community website, Second Life (http://secondlife.com) is an online game created by Linden Lab in 2003, but it is not an ordinary online game you can fight with monsters. Wikipedia: Second Life (Second Life, abbreviation SL) is an Internet-based virtual world, in late 2006 and early 2007 due to the mainstream news media coverage it has been widespread concern. Through a downloadable client program developed by Linden Lab, the user called "residents" in this game, they can communicate with each other through the movement avatars. This set of programs is based on a common Meta universe that provides a high-level social networking service. Residents can getting around and encounter other residents, socialize, participate in individual or group activities, manufacturing and trading of virtual property and services.

「Second Life」 as one of the virtual world, no doubt inspired by the computer punk literary movement, especially Neal Stephenson's novel 「Snow Crash」. Linden Lab said their goal is precisely to create a meta-universe kind of world like Stephenson described. In this world, people can own their unique way to definition how to interact with others, play, do business or exchange. Second Life's virtual currency called Linden Dollar (Linden, or L $). You can exchange Linden Dollar by the residents in the form of specialized markets, Linden Labs and some entities to be converted into U.S. dollars.

「Second Life」 is sometimes considered to be a game, but it does not have integral, plot points, winners, losers, levels, an end-strategy or like other games have some kind of features. Until Now, it has total about 500 million users registered, but many users are not very active, and some residents have multiple accounts.

SL through the virtual reality to simulate virtual reality world, all the way of life in the real world can be realized in SL, because it is a Virtual world so adds some magic function, for example: people can fly for movement. Commercial behavior in the SL also rows for many years, Linden Lab has previously estimated, second Life has about 60 million U.S. dollars' worth of products in the Second Life transactions in 2006, Seven thousand companies have officially stationed profitability. Monthly economic growth of 10 to 15% in second life, similar to the increase in the population with the game, the daily virtual goods transactions is amounting to $ 650,000 (about NT $ 21 million).

The official units also stationed in this piece of technology wonderland. The Swedish Foreign Ministry's Institute of Sweden opened the Embassy of Sweden in "Second Life" that is "Second Life" diplomatic official units. It guides the users how to apply for a visa in the real world and provide information about Sweden. SL it's not just a 3D virtual reality game, but also formed millions of households in Community have the economies of scale, with the business community, advertisers, politicians have stationed. (Commonwealth Magazine, 2007) Therefore, 3D virtual website in Internet applications has a certain appeal, and use U3D game engine to build it, in addition to its convenience, compatibility, and hope to use the elasticity of its interactive program developed to increase "3D virtual temple website" more interactive games.

Research methods and steps

This project will use U3D game engine to build 3D virtual temple website ", the initial model will simulation the Kuan Temple in Changhua City, establish full 3D temple website, after the completion there will run CB (Close Beta closed test) for network transmission、browse smoothness、browser compatibility testing and interactive operability test. After CB, then goes OB (Open Beta test public) open for all Internet users to use for testing, one for the training of the elderly population is corporate questionnaire to easy use understanding of this website, also use test for a variety of hardware platforms. Completed the test from the questionnaire were analyzed to understand the "3D virtual temple website" development future.

Step Description:

1.Temples, statues referenced drawing shooting records: as to build basis of 3D models, textures, and advance to the Emperor Guan Temple main hall space and the Lord God. It will take time about one month.

2.The website architecture set: that is theme website content set will be the function of the actual temple, event planning site content, such as virtual visits to the Yasukuni, virtual temple fairs, virtual hexagram, and virtual puja and put the actual action of the temple onto the cloud. It will take time about one month.

3.Build vvirtual reality scenes: the appearance of the temple construction, internal main hall, the Lord God to build complete, and the first-person navigation test. It will take time about two month.

4.Establish interactive operating system: the overall website operating mode settings, interactive programming and development, and development of a simple game content increase interactive games. It will take time about two month.

5.Test surveys data analysis and modifications: The completion of the site for users to test and do surveys, the use of the test in a variety of platforms, for survey questions conduct website modify, re-test and analysis statistics necessary the pros and cons of this plan website built. It will take time about five month.

Software used in this project is Unity 3D game engine development software, currently widely used by major domestic game companies; mainly its software compatibility is very large, two heavy weight Autodesk's 3D production software Maya, 3ds Max its file produced content can be directly input to the setting of the Unity 3D interactive program, online game development is quite mature, the release of the files encountered the successful implementation of various browsers. Unity 3D contains the most powerful engine can be fully integrated professional technical and achieve true cross-platform game development environment, using this set of game engine can create up to $ 1 million more than the surrounding effective. Unity 3.0 is the latest version, there is a marked improvement in the functionality of the editor and Light mapping, resource management, program debugging, physical performance and art operating section becomes more intuitive, in addition, it increase support for X360, PS3, iPhone, iPod Android and other platforms, also authoring tools for web games. U3D can be quickly and easily prototyping, so the development team can focus more on the level of game design, reduce the cost of error trying.

Therefore, this project to build the "3D virtual temple website" is an important milestone in combination of digital media design and the cultural and creative

industries, by build of this website, it not only computer can browsed on the internet but also operation in variety of hardware platforms and smartphone platform, through this site users can real spiritual exchange in the air anytime and anywhere, and design a simple interface operation to promote the development of the elderly network use ethnic groups, thus narrow the communication distance between family generations.

Star wooden images company build website, development of digital content case of considerable size, by the company's rich industrial strength, experience, so that the industry-university programs will be more practical problem solving ability, and through this project build 3D temple demonstration website, for which the company has developed the possibility of customers that belonging to traditional industry categories, open up the door to information technology for the spirit of the traditional industries in Taiwan, we also found that the actual situation of traditional industries that use digital media technology development applications as demonstration project for improved.

IV. Expected results

This project will be industry-university cooperative research and development, the required manpower by both sides participate, by the execution of this plan both industrial design technology capability and personnel training effect can achieve at the same time. Through this research and development, both sides can be found many key technologies which will vary beneficial to the future research and development.

1.With game industry's most popular game development engine Unity3, applied to the development of website to build a full 3D virtual temple website and open digital media design application of precedent in the temple culture.

2.By building full 3D mode interactive website, open religious and cultural use of digital media design to carry forward the human spirit, to change the general public in the mode of traditional religious and cultural beliefs habits and help the groups that inconvenient actual religion to the temple but need of sustenance, such as: the disabled, busy office workers.

3.To creative cultural and creative product marketing channels with website, combined with religious cultural spirit of the cultural and creative products to development cultural and creative new market.

4.Will combined School education and religious culture through industry-university cooperation, injection humanistic and moral spirit for the internet media to construct positive health network society.

5.The finished website will continue to permanently open and recommended to the

various religious institutions in order to develop more mature website products.

Build "3D virtual temple website "entities website model, and actually on line open access, build of this site, get traditional religious spirit through digitization techniques, technologies and features to do alternative promotional. Through the Internet far-reaching, Taiwan's religious propaganda to the world also let the medium of digital media to increase the cultural connotation, Technology always comes in humanity (Nokia) make the cold digital website humanity has a new digital life. It will be line with needs of the general public with gameplay and educational works of cultural and creative industries.

While this project is completed, the website will be permanently open and plan to be extended to others units which interested in developing online temple websites. Taiwan temple culture through build the full 3D virtual website and bring into rich educational games design, develop Taiwan human spirit so that digital media design emphasis on the spirit of innovation and development industry, make the essence of traditional religious culture has more innovative, interesting and high acceptance, let the busy modern spiritual exchange at any time and adjust physical, mental and spirit.

1. Will Continued to construct the network of religious and cultural world, play the Internet far and wide the spirit of spread.

2. It can be a reference for the game industry to develop a new game category and development more positive educational games.

3. Estimated the innovative design of this website will attract cultural and creative industries through the development possibilities of the online channel, this website is also kind of game website, the game industry is booming which bring business opportunities are infinite, with this project through this innovative the religious propaganda tactics, author believe that some other cultural and creative career can be created on this platform.

In addition, recommended this website as project templates to the county and city Department of Cultural Affairs, apply for build the local famous monuments temples and also for cultural digital archives extension, monuments promotion, digital archives, protection of its tangible benefits.

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