Research on Dynamic Water Surface and Ripple Animation

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ABSTRACT

Dynamic simulation of waters may be a important analysis subject, however the analysis and simulation of the water drops generating ripples is comparatively less. The analysis on the ripples motion is nice significance as a result of the essentialness of it within the special environments. In our analysis, we have a tendency to study the strategy of adding dynamic water ripple effects in 2nd image on website, 3D animation and computer game. By the means that of form simulation, we have a tendency to add animation effects for the net page through making cells of table combined with clear effect files of Flash. we have a tendency to deliver the goods the great reality ripple impact by mistreatment easy dynamics and kinematic principle to make models within the 3D animation. By mistreatment the mix of 3dMax and Realflow package, we have a tendency to deliver the goods a lot of realistic simulation of the impact of dripping ripple. within the computer game system, the suitable algorithmic rule is applied in program to simulate ripples properly. These ways square measure applied to totally different environments and therefore the results square measure realistic.

1. INTRODUCTION

Dynamic water simulation may be a terribly important issue, it's a hot spot of analysis for the surface reflection, refraction and surface wave effects of the dynamic simulation .With 3D games and therefore the quality and indepth of computer game applications, most of the games and computer game package is commonly the assistance of dripping ripple effects to reinforce the game's friendliness and realism. deliver the goods dripping ripple simulation, the principle of particle system principle, the principle of sunshine refraction and reflection wave propagation and attenuation characteristics square measure calculated, and the maximum amount as potential to attain speedy and real show impact. the way to simulate the phenomenon like rain, snow, smogginess and flame is often troublesome and vital for tricks and computer game .The dynamic simulation of water surface may be a analysis subject that it's nice theory worth similarly as sensible significance. The analysis of the reflection and refraction of waves has become a hot topic for researchers everywhere the world[1-5]. The analysis on the ripples motion is of nice significance as a result of the essentialness of it within the special environments. On the calm and tranquil surface, the ripples can seem unless external objects perturb the water. If the perturbance stops, the surface can became calm once more when it slow. The wave moving of 2nd differential equation is collectively with the phenomena, the literature references proposes a simulation technique of ripples on tiny water surface that creates surface modeling by mistreatment the strategy of Johanson 's projection grid, finding equation by the programmable GPU technology associate degreed simulating ripples absolutely by an acceptable algorithm[6-7]. The literature reference simulates the raindrops by finding 2nd shallow water equation that describes flow development through SPH technique, mistreatment the distortion type of Mon-aghan artificial consistency in step with the concrete model[8]. within the paper the drip ripple effects created supported GPU ,Xia Yan used 3 improvement ways ,they are some approximation ways , simulating 3D effects by 2nd bump texture and writing shader programs, he created the delineated ways of ripple effects [9].In this paper we have a tendency to analysis on the strategy of adding dynamic ripples in 2nd image on website, 3D animation and computer game system. the easy dynamics and kinematic principles square measure applied within the 3D animation to simulate the ripples reality. within the 2nd image on {the we have a tendency tob|the online|the net} page and therefore the computer game system we simply used form simulation effects however not complicated physical models for the ripples effects. These ways square measure easy and sensible, the impact is incredibly vivid and realistic. These may be used for a spread of eventualities got to ripples or waves, like rain water, pond or lake with fountains, etc.

Figure 1. raindrop and ripple.

2. RESEARCH OF RIPPLE EFFECTS IN 2D ENVIRONMENT

A. Flash animated raindrop ripples In some wonderful films we often see the effects of the slightest rain which giving a warm and romantic feeling. When a piece of stone is thrown into the pond, water surface ripples are spreading around, the ripples in a circular form will get bigger and bigger and fade away slowly, the water will restore calm soon. According to this natural phenomenon, we simulate raindrops the ripple effects falling from the air into the river with flash software.

B. ADDING RIPPLES IN IMAGE ON WEB PAGE In the web page, some photos and rendering pictures are used frequently to make beautiful picturesque scenes that the green glass looks like a carpet, the bouquets of flowers are a mass of blossom, the lake and the hills add radiance and beauty to each other, the mountains are clear against the sky and the waters is very bright. In most cases, the water is flat.

When we process the picture, a method which can combine the effective ripple file of Flash with the picture is adopted to achieve the good reality ripple effect. First distribute the resource files of Flash, convert .fla format file to .swf format file. Then produce a table within the website, take the .swf format file as background of the table, the table size may be adjusted by the image size, produce cells within the table, insert the ripple special files within the acceptable cell, set the background color of the ripple animation to be clear. The animation file may be utilized in the entire table, we will insert many ripple files in a very table, too.

3. THE KEY TECHNIQUES OF DEVELOPMENT OF RIPPLES IN 3D ANIMATION

The realistic water impact may be a bit sophisticated in 3D animation. in a very giant water surface like ocean ,ocean , lake or broad stream within the scene, the Dreamscape of 3D scoop landscape plug-in may be used and might generate the fact impact as well as the dynamic development like foam and wavy etc. and therefore the rendering speed is quicker. once some objects drop to water surface, if you wish to indicate the collision between the objects and therefore the water, the reactor dynamic system in 3D scoop may be used . to indicate rain or fountain impact we will use the super spray particle that the direction of injection is down underneath the action of gravity house warps and add some motion blur. If you wish to indicate the small print, the fluid dynamics simulation package RealFlow may be used. It can accomplish the projects which include the objects arousing waves, fluctuating with water, splashing, generating some ripples after the particles falling into the water, and producing wake by the rapid movement objects, spray and waves. It is used to simulate the sailing ships usually. The paper studies the general ripples, we can show the effect directly by the material, modifying the reflection and refraction coefficient, adding noise bump map to response the slight wave on surface, binding water into ripple space warp and modifying the correlative parameters in order to generate ripples animation effects[10-11].

A. Relative model
The surface is the plane divided into many small segments. There are more detailed segments; there is more realistic ripple effect. However, there are more surfaces, the rendering is slower. Therefore, we should consider the actual situation roundly to determine a reasonable value of segments. We Create a ripple space warp for generating ripples, the parameters of wavelength,.

Droplet model can be considered from two cases. First if the sense of reality is emphasized, the method which make a simple sphere bound to a FFD space warp can be used to simulate water droplets precisely by modifying the control point. Second, if the droplets model is too complex, it can affect the speed of animation rendering in the droplets too many cases, so we can use the multi-faceted sphere to simplify the droplet model, the noise space wrap can be added to the sphere ,then we change the shape by modifying the ratio , intensity and phase parameters to avoid the same shape of sphere in a large number of water droplets .

B. Lighting and Materials Water is a transparent liquid basically, but water color of the rivers and lakes is affected by many factors, such as the intensity and color of external light, the depth of the water and the impurities of the water. All of the external factors affected the effect of the reflection and refraction of the water directly. And the reflection and refraction of the water is the key to describe the real surface. In the 3D software, we can set the surface material to adjust the reflection channel to add the falloff image, set the glossiness, set the subdivs, set the refractivity, and set the fog color to adjust the color of the water to change the parameters such as the fog multiplier. So lighting and material setting are the key factors to the realistic dripping and ripple animation, VRay is a small plug-in launched by the famous 3D max plug-in provider Chaos group, but it is a extremely powerful rendering plug-in. VRay lighting type is very rich, it provides the sun lighting, the sky lighting and VRay lighting, the user can use the standard lighting and photometric lighting in 3D Max, too. In the indirect lighting, you can set the parameters such as global optical caustics, global Light color, Quasi-Monte Carlo Global Light and light rebound etc to control scene lighting effects. VRay renderer provides a special VRayMtl material. Using the material in the scene can get a more accurate physical lighting, a faster rendering speed, a more convenient parameter adjustment of reflection and refraction.

4. RESEARCH OF RIPPLES ANIMATION IN VIRTUAL REALITY SYSTEM

Virtual reality technology is a human-computer interacting technology which can simulate the human behaviors such as the visual, auditory, tactile and motor etc. Immersion, interaction and imagination are the main features of it. The ripple effects simulated in is off-line and non-real-time. In the first two application environments, virtual reality environment is different, it emphasizes the interactive and real-time. When a person goes into the virtual system, it seems that he involves in real environment. If there is a fountain in the lake, the user should be able to control the switch of the fountain. To experience some special effects in the virtual environment, users may add rain, snow and other natural phenomena to change the weather. In the paper we studied the effects of droplets and ripples in virtual reality system based on Virtools.

A. Implement of water surface,droplets and ripple We can simulate the surface and generate more accurate reflections and refractions through adjusting light intensity and colorimchy by lighting and perturbing 2D texture mapping with normal mapping. A shader program in Virtools had been written and applied in virtual reality project. In the actual operation the effect is real and the rendering speed had greatly increased. Droplets generation is achieved by particle systems. According to the totally different condition of the launching Virtools offer United States with 9 particle system. within the paper we have a tendency to use a plane particle system to induce the drippings within the natural setting by adjusting the particle rotation angle ,the particle speed, the particle life cycle, the particle emission, and therefore the particle size parameters.

5. CONCLUSION

In the paper we have a tendency to use the strategy which may mix the effective ripple go into Flash with the table cell in website. In 3D animation setting, we have a tendency to produce models by mistreatment easy dynamics and kinematic principle, mistreatment VRay lighting and VrayMtl. Water droplets model is generated by a particle system. The water surface may be a plane with several tiny segments, it's sure a ripple house wrap, we have a tendency to regulate section and wavelength of ripple on totally different key frame. In computer game system, we have a tendency to show the reflection and refraction of water by writing shader program, apply the form simulation technique to comprehend the impact. the strategy is easy and therefore the impact is true. But its weakness is that the ripples size should not be too big and the number of water droplets should not be too much. These measures could offer a reference for the users who want to realize ripple animation in different environments.

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