# 3d max 2014 tutorial pdf

View original X products and covered versions 3ds Max 2014Download through the tutorials to practice some typical workflows. At the end you will have a greater understanding of some of the techniques you can use to test your own projects. HTML Tutorials Tutorial Scene Files Download the 3ds Max 2014 ZIP Supplemental Files. We recommend that you download the files to the Documents folder to emulate the recommended workflow. You will need to navigate to the download location when prompted to set the project folder in the lessons. Tutorial Scene Files (zip - 173472Kb) Get quick answers from Autodesk support staff and product experts on the forums. International Conference on Applied Internet and Information Technologies, 2016 3ds Max Application for 3D Modeling and Rendering Igor Stojanov1, Blagoj Ristevski2, Zoran Kotevski3 and Snezana Savoska4Faculty of Information and Communication Technologies, St. Kliment Ohridski University – Bitola Partizanska bb, 7000 Bitola, Macedonia 1istojanov91@yahoo.com, 2, 3, 4-blagoj.ristevski, zoran.kotevski, snezhana.savoska}@fikt.edu.mk Abstract. This article describes the 3ds Max application for 3D modeling and rendering of a car model. It explains the process of creating a 3D car model, as well as setting up references, working with editable poly, details inside the car, using turbosmooth and symmetry modifier. How materials are applied to the model, as well as scene lighting and rendering settings. It also describes rendering methods and techniques. The final rendering results of various rendering plugins, such as V-ray, Mental Ray, Iray, Scanline, Maxwell, Corona, Octane, and LuxRender, are presented and compared. Keywords: Computer Graphics, 3ds Max, 3D Modeling, Rendering Techniques. 1. Introduction We live in time when visualization and visual effects are widely used. There is no film that does not use special visual effects and there is no tv that does not broadcast ads made with special visual effects. 3ds Max started the revolution in 3D computer graphics and is the longest on the market, compared to the other 3D graphics software packages. This long existence makes 3ds Max to still be on top of the most popular software for 3D graphics.3ds Max is a professional 3D computer graphics program to make 3D animations, models, games and images. It is developed and produced by Autodesk Media and Entertainment. It contains many features specifically designed to help artists, architects, engineers and designers in various disciplines in the realization of their projects. In this article, 3ds Max is used to model, texture, and render the 3D model of a Mercedes S coupe class 2014. The rendering methods of V-Ray, Mental Ray, Iray, Scanline, Maxwell, Corona, Octane, and Luxrender are also explained and compared. The rest of the document is structured as follows. In the second section creating a 3D 3D model, describes the basic techniques for creating an exterior and interior of the car model. The following section explains the rendering, as well as how the materials and lighting of the scene are applied. Section 4 explains real-time and non-real-time representations. The following section shows and compares the renderings of different rendering plugins. The last section gives the concluding observations. 2. Creating a 3D car modelPresing the 3ds Max car model is a complex process in which you need to have basic knowledge of polygon modeling. Polygon modeling is an approach to modeling objects by rendering or approx approximation of surfaces using polygons. This type of modeling is the basis of the development of the car model. To create polygons as the initial shape, 3ds Max offers dozens of shape classes such as cube, sphere, plane, cylinder, pyramids, etc. By converting these shapes to polygons, then moving, adding, or splitting vertices and polygons, and using some modifiers, you can create arbitrary objects [1]. 2.1 Setting the reference image To make a complex 3D model like a car, it is necessary to have a technical drawing of at least two views. It is also very important that these drawings are drawn accurately and professionally and are on the same scale from all views. They are the basis for making the 3D model accurate. Creating a simple material with a Mercedes S coupe-class reference image on a fuzzy map is the first step in creating a 3D car model. This material is aligned on a plane and moved to align with the view. This process must be repeated for all views. In addition, a cube with dimensions equal to the width of the car must be created, and all drawings with technical drawing are incremented or decreased to match the size of the cube. This process makes the car on the real scale. 2.2. Modeling a car The first step in modeling a car is to make a rough plan where the mesh will be [4]. The next step is to create a box or sheet from a particular view and make it editable poly. A polygon is created by holding down shift from the keyboard and moving a border. Other polygons that follow all reference images are created by using and repeating this technique. It is very important not to forget to check the mesh of all views all the time, because if the polygons match one view does not mean that they match other views. The mesh created is not a smooth surface. Turbo smooth is a modifier that automatically creates polygons and makes the surface smoother. This is a very important modifier and without it, it is impossible to create a correct smooth surface. Also the mirror modifier is very important because it reduces modeling time. Only half of the car's shell should using this symmetry modifier, because the other half is created symmetrically. The particular thickness of the object is performed by applying the shell modifier. It is used to a thickness in the car casing. Similar techniques and modifiers are used for the remaining parts of the car such as headlights, taillights, logo and Mercedes rims. It is very important to have several 3ds Max applications for 3D modeling and rendering of reference images of each element to make a more accurate model. The mesh of the car model is shown in Fig. 1. 1. Car model mesh. 2.3. Modeling the interior of the car The interior of the car consists of many objects and details modeled as separate elements. There are many buttons with different details and signs on them and all of them should be modeled. This modeling stage highlights the details of the interior of the car. Most objects inside the car are modeled with the same techniques as objects on the outside of the car. 2. Inside the car. A primitive converted to editable poly and with moving and cutting polygons to match the desired object. After that, symmetry and shell modifiers are mostly used. The interior of the car contains small details such as stitches that make rendering more realistic. First, a small cylinder is modeled, and then an animation is performed on the spline or path constraints. Figure 2 shows

the inside of the car with no materials applied. 3. RenderingThe final process of converting the 3D scene into a two-dimensional image is called rendering. It is a process that converts the 3D model, complete scene into 2D image simulating the rays of light. The data contained in the scene file transmitted to the rendering program is processed for a digital image or raster graphic image. The representation is one of the main subtopics of computer 3D graphics. In graphical preparation, it is the last step, which gives the final appearance of the models and animation. The theoretical concept of rendering is presented by Eq. 1, which serves for a more formal expression of the non-perceptive aspect of representation [6]. where the output light lo is a set of light emitted Le and reflected light. Reflected light is a set of incoming Li light from all directions multiplied by surface reflectance and incoming angles, x is the location of space, w is the direction of light, and fr is the bidirectional reflectance distribution function. Complete algorithms can be seen as a solution to formulations specific to this equation. Figure 3 shows the vectors defined in the Eq. 1. 3. The rendering process. The car model is represented by the V-Ray rendering plugin, which is one of the most used rendering plugins in 3D visualization. Rendering settings are a very important part of finalizing the image. The first and most important step is to enable global lighting. Without global lighting, the image will only have light and shadow without surface reflected light from other areas. As the primary engine in global lighting, the irradiation map is used while for the secondary engine light cache it is used. 3ds Max application for 3D 3D modeling and rendering preset for the irradiation map is used and 1200 subdivision for light cash. You also choose an outdoor preset in V-Ray saving invaluable time to set up rendering. Obtaining a desired rendering requires a lot of testing, so it is recommended to minimize the resolution and image quality to quickly see changes made to the configuration. 3.1 Materials Materials describe how an object reflects or transmits light. These are data that is applied to the surface of an object and displayed in a particular way when the scene is rendered. Creating materials can take a long time and for faster results, plugin called V-Ray Material Presets Pro is used to apply materials to car elements. This plugin contains many types of materials and with a little editing of these materials, you get the desired results. Depending on the desired results, you can often encounter material that needs to reduce reflection, reflection brightness, strokes and opacity. All these settings and many others can be changed in the Material Editor window. Most of the materials contained in the car do not contain texture and only apply to objects. While materials that contain a texture, when applied on very small or large objects do not look realistic. To resolve this issue, the UVW Map modifier is used. It's a mathematical technique for coordinating textures. Includes the ability to adjust the texture size in three dimensions to give additional flexibility to get the desired results. The Multi/Subobject option is used on objects that need more than one material. For materials such as a screen on the car screen, VRayLightMtl is used to illuminate light, while for particular textures that cannot be found online Unwrap UVW modifier is used [2] [3]. 3.2. Scene lighting and camera light settings are objects that simulate real light sources, such as lamps, table lamps, sun, etc. Different types of object lighting are illuminated in different ways to simulate different types of real light sources. The lights allow you to adjust the distribution, intensity, color temperature and other characteristics of the lights in the real-world reference. One of the easiest and fastest ways to illuminate scenes is using High Dynamic Range Imaging (HDRI). This technique makes the scene look like an image in the same place in real life. Because HDRI is displayed in 360 degrees, it is easy to adjust the desired angle by rotating the HDRI in the material editor. The V-Ray sun is used to get stronger shadows in the scene. For the interior of the car a lot of V-Ray Plane lights are used with the blue color located at each angle illuminating the light inside the Real. To clarify the scene, the properties of the camera are also very important. Cameras are objects set up where the image will be. The physical V-ray camera is used with a certain f-number, focal length, white balance, shutter speed and ISO. These properties are to get a proper rinsing rendering. Fig.4 shows the final rendering from inside the car, while the final rendering from the outside of the car with motion blur effect is shown in Fig. 5. 4. Final render from inside the car. 5. Final rendering from the outside of the car with motion blur effect. 4. Rendering MethodsReal rendering in time is a representation of interactive media, such as games and measurements by calculations and real-time visualization, with speeds of around 20-120 frames per second. The purpose of the real-time rendering process is to display as much information as possible that the human eye can process in a part of a second. The main purpose is to achieve as much photo realism as possible with a minimum acceptable speed for rendering, usually 24 frames per second. This speed is the minimum that the human eye can see to successfully create the illusion of movement. 3ds Max application for 3D modeling and rendering This is the basic method used for rendering games and interactive worlds. The rapid growth of computer power provides a greater degree of realism even for real-time rendering, including techniques such as HDR rendering. Real-time rendering enables limited processing power expansion for higher image quality. Animations for non-interactive media, movies, and video are rendered more slowly. This is the basic method used in digital media and art. More techniques have been developed to simulate other environmental effects such as light interactions with various forms of matter. Examples of these techniques are: particle systems (which can simulate rain, smoke or fire), volumetric sampling (which can simulate fog, dust, and other spatial atmospheric effects), caustic systems (simulates light that focuses on breaking uneven light surfaces, such as light that can be seen from the bottom of the pool), and subsurface scattering systems that simulate light that is reflected within solid objects such as human skin). 4.1 Rendering techniques Ray casting uses ray surface intersection tests to solve various problems in computer graphics and computational geometry. The scene viewed from a given perspective calculates the observed image based solely on geometry and basic optical laws of reflection, and possibly by using Monte Carlo techniques to reduce artifacts [5]. Ray conversion is above all a basis for many computer graphics rendering algorithms. Ray tracing is a technique for generating an image by tracing the path of light through pixels in an image plane, simulating the effects of encounters with virtual objects. This technique is capable of producing a very high degree of visual realism, generally greater than that of typical methods of rendering scanning lines, with higher computational costs. This makes ray tracing more suitable for applications where the image can be rendered slowly over time, such as still images, movies, and TV visual effects. It is more uns suitable for like video games, where speed is critical and very important. Radiosity is a rendering method based on detailed analysis of light reflections from diffuse surfaces. Images obtained from the radiosity representation are characterized by soft gradual shadows. Radiosity is typically used to render images of the interior of buildings and can achieve extremely photorealistic results for scenes that are composed of diffuse reflective surfaces. The calculation of lighting over the radio is different from many traditional computer graphics lighting calculations because it is view-independent. The intensity of the surfaces in the model is calculated before any view calculation is performed. This difference can be seen as the difference between demand-based and data-driven lighting calculation. 5. Render plugins Final renderings are performed using the V-ray, Mental Ray, Iray, Scanline, Maxwell, Corona, Octane and LuxRender rendering plugins. Figure 6 represents the final rendering of V-Ray, while the final Mental Ray render is presented in Fig. 7. Fig. 8 shows the final rendering of Iray, while scanline's final renders are shown in Fig. 9. The final render of Maxwell, Corona, Octane and LuxRender is shown in Fig. 10, Fig. 11, Fig. 12 and Fig. 13, respectively. 6. Final rendering obtained by V-Ray. 7. Final rendering obtained by Mental Ray. 3ds Max application for 3D modeling and Fig. 8 rendering. Final rendering obtained by Iray. 9. Final rendering obtained by Scanline. 10. Final rendering obtained by Maxwell. 11. Final rendering obtained by Crown. 3ds Max application for 3D modeling and Fig. 12 rendering. Final rendering obtained by Octane. 13. Final rendering obtained by LuxRender. 6. Conclusion 3ds Max is a powerful computer program that is specially designed to help 3D artists, architects, engineers and designers in various disciplines in the implementation of their projects. Modeling a car with 3ds Max is a complex task and for this reason, the most important step is to set up reference images from at least two views. The modeling process cannot be imagined without knowledge of working with polygons or editable poly and understanding how the turbosmooth modifier works. Adding more details to the interior of the car makes the final image more realistic. Obtaining the desired rendering requires a lot of testing, and to do this it is recommended to minimize the resolution and image quality to notice the changes made to the configuration. A good starting point for materials is V-Ray Material Presets Pro. This plugin contains many types of materials, and the desired results can be obtained with a simple editing of these materials. One of the easiest and fastest ways to illuminate scenes is by using shortened high dynamic range images. This technique makes the scene appear to be photographed in the same place in real life. Camera settings are important for correct rinsing rendering. There are two types of rendering methods: real-time rendering and representation time. The first is a representation of interactive media, such as games and simulations, and the second is used for animations for non-interactive media, movies, and video. In this article, in 3ds Max application, the following rendering plugins: V-ray, Mental Ray, Iray, Scanline, Maxwell, Corona, Octane and LuxRender are used to model and render the car model. You may notice that the final rendering result was best when using V-ray and Corona rendering plugins, while weaker results were achieved when the Scanline, Iray, and LuxRender render plugins were applied. References [1] Kelly L. Murdock, Autodesk 3ds Max 2014 Bible, 2014. [2] Hu, Jia Ying., The Application of Computer Software—3D Studio Max, Lightscape and V-Ray in the Environmental Artistic Expression, Advanced Materials Research 631 (2013): 1379-1384. [3] Lin, T. H., Lan, C.C., Wang, C. H., & Chen, C. H., Realistic Texture Mapping Study for 3D Models, International Conference on Information Sciences, Electronics and Electrical Engineering (ISEEE), Vol. 3, pp. 1567-1571, 2014. [4] Chandler, M., Podwojewski, P., Amin, J., & Herrera, F, 3ds Max Projects: A Detailed Guide to Modeling, Texturing, Rigging, Animation and Lighting, 2014. [5] Woop, Sven; Schmittler, Jorg; Slusallek, Philipp (2005), RPU: A Programmable Ray Processing Unit for Realtime Ray Tracing, Siggraph 2005. [6] Kajiya, James T: The Representation Equation, 1986. 1986.