The Art of 3D: Development and Application of 3D Model in Animation, Games and Films

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Abstract:

The 3D technology is an emerging technology that comes with the development of computer hardware and software technology. It is usually generated by special software such as 3D modeling tools, which exists in a virtual way in a computer or computer file. Three-dimensional technology has been used in a variety of fields, such as engineering, animation, education, fashion, movies among others. The research aims to widen the knowledge of the people by introducing the theory and method of modeling data in three-dimensional technology in the application and development of film, animation and games. Through the introduction of 3D in the paper, we can understand the 3D world more and recognize the influence of 3D models in animation, games, and film. The scientific application of 3D modeling technology can improve the flexibility and production level of animation, produce high quality 3D movies and TV effects, and promote the development of the film, animation and game industries.

Keywords: 3D development, 3D image, 3D models, 3D technology,

I. INTRODUCTION

Three-dimensional technology (3D) is an emerging technology as the result of advancement in both hardware and software technologies. It is usually generated using special software like 3D modeling tools that exist in a virtual way in a computer or computer file. Likewise, three-dimensional technology has been used in a variety of different fields such as in medical industry to make accurate models of organs and film industry for creating active characters, objects, and real-life movies. This 3D technology was also in-demand in the video game industry; the construction industry uses them to present proposed buildings or landscape performance; the engineering community uses them to design new equipment, vehicles, structures, and other applications and in recent decades, the earth sciences have begun to build 3D geological models. The virtual world was first established using the 3D animation software wherein the designer builds the model and the scene based on the shape, as well as the object's size to be represented. After, it will set the movement track of the model including the virtual camera's motion and other parameters of the animation. Next, the materials for the model will be assigned and will be lighted. Finally, after all these processes were done, the software will generate the final output to produce the 3D image.

In today's era, 3D plays an important role in film, games and animation. The application of this technology has greatly improved the richness, advancement and vividness of film and television, animation and game production, thus creating a

more perfect visual effect. The application of three- dimensional modeling technology can enhance the flexibility and productivity levels in animation, produce high-quality 3D film and television effects and uplift the developers in producing film, animation and games. For decades, three-Dimensional (3D) technologies transformed and continually shaping and changing the world and its future.The purpose of the study generally aimed to acknowledged and amplify awareness on the importance and demand of three-dimensional arts and technology in modern era that are used in different industries particularly in animation, games and films.

With the increasing demand for 3D-trained specialists and researchers, different opportunities were seen in different fields such as education, research and businesses mostly on entertainment and multimedia industry that caters animation, movies and games. This shows hundreds of students that 3D is certainly one of the foremost important and useful technical courses in modern industry, whereas giving the students effective new tools, knowledge and experiences on how they can apply these developments in their quest for solutions to worldwide challenges.

Objectives

This study aimed to create 3D models that can be used in film, animation and game industry, to foster awareness about the demand of 3D technology in the modern media and to provide solid technical skills on different methods and methodologies to produce 3D computer-generated visualizations.

II. LITERATURE REVIEW

Three-Dimensional Model Technologies

Based on the studies conducted by Heng Chen (2013), three- dimensional (3D) modeling techniques are commonly used in different areas such as medical image, construction, heritage, special effects in movies, 3D animated games, and

virtual reality. He also mentioned that three-dimensional are widely used in entertainment media such as games, animation effects and on film. He said that because of the fast progress in the computer games' industry, the pursuit of game's exact and stunning screen effects have been the ownership of consensus. Characters' scene created using 3D model in a game depicted fine and outstanding visual effects and produce good impact to the viewers. Thus, the use of special effects and 3D models are particularly used in film productions. Moreover, under the virtual-reality environment, the use of three-dimensional (3D) technologies plays an important role. The environment of virtual reality's biggest difficulty basically lies in the roaming model fidelity and real-time rendering of contradictions. Though the structure of the model will be fine, but they can consume time. One concern that should be considered is the performance of computer and construction of more complex models. If one draws several models, it is more difficult to achieve the effects in real-time. Once the real time result is poor, viewers will be disappointed. Technically speaking, the 3D models lay a good foundation and will promote the entire virtual reality system, thus, developing a 3D virtual environment is extremely significant.

According to Xi-Dao LUAN et al. (2008) study on Research and Development of 3D Modeling, the use of 3D models is particularly seen in different application areas such as animation, education, fashion, movies and multimedia. Likewise, 3D models are used in archaeology, architecture, dentistry, foot wears, museums and textile industry. Other application areas like industrial design, engineering, manufacturing companies, prototyping, the sculpture, web design, mold making, and even toy industries are also using three-dimensional models. A 3D modeling research also promotes the protection of heritage that used laser scanning, and several projects including Stanford Digital Formae Urbis Romae

Project- uses ShapeCam, a structured light system to build a detailed 3D model of the Antonineny Museum at the ancient city of Sagalassos (SW-Turkey). Also, the development of a new field of biomedicine called Computer-Aided Tissue Engineering (CATE), wherein 3D modeling is widely used to model tissues and organs and guide the design of artificial tissues and organs, such as bones, vessel, and perform the tissue- engineering.

Three-Dimensional Game

An article published by UK Essays, (2016) refers 3D platformer terminology as a featured gameplay in three-dimension area and polygonal 3D graphics. The games in 3D gameplay but with 2D graphics came under Isometric Games. In three-dimensional, the depth to an object can be implemented to make it more realistic. In most games developed using 3D technology, the characters are like the real characters, which exist in the real world, and one will be able to see the facial expressions in the face of the characters. Also, there are some missions in 3D games wherein the players complete one mission, then proceed to next level and mission

tougher than the previous missions. However, a multi-player 3D games are mostly preferred by many since they want to beat one another in a form of group.

Three-Dimensional Film

According to the research of Patrick Gallagher et al. (2011), there is a decrease in demand in the motion picture industry in North America from year 2001 to 2010. This is mainly because there are improvements in the quality and accessibility of interconnected market in home entertainment. Due to the introduction of 3D technology, there is an increasing demand in cinemas and this is accompanied by increase of the average tickets' prices. As a result, there is excess in profit that has motivated and boost the numbers of 3D films available in the market, and the number of theaters

that offers 3D movies to moviegoers. On the contrary, this technology denotes higher cost and longer production time, thus resulting to reduction of total supply of available films in the market. In the future, 3D films are expected to be a common technology and improvements on interconnected markets will somehow reduce the demands from the viewers or consumers. In order to sustain the profitability in the long run, motion picture industries need to implement new options and experiences in the entertainment categories.

Moreover, based on the research by Ann-Kristin Knapp et al. (2014), there are arguments offered by researchers about why digital 3D help increase the financial success of motion pictures. Researchers concluded the particularities of hedonic consumption, namely sensation seeking, satiation effects, and low price sensitivity, and propose that a movie's genre, the temporal "trend" or point in time of its release, and whether it is an early or late sequel determine the amount of additional value of digital 3D for consumers, serving as moderators of the link between 3D and theatrical movie success. In line with movie industry economics, the study mentioned the dependent variables: (a) box office revenues, (b) attendance numbers (which account for the higher ticket prices of 3D movies), and (c) return on investment (which accounts for the additional production costs incurred due to the 3D element).

III. RESULTS AND DISCUSSIONS

The authors used the sculpting process and how to get started with basic ZBrush Face sculpting. Sculpting is the process of working a material such as stone or wood to change its shape. Sculpting a model in ZBrush is very similar to working with a ball of clay in the real world- one can mould it into different shapes, add or take away material and a surface a fine detail.
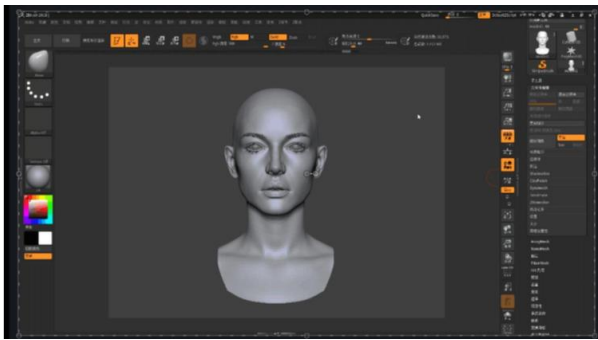
Fig.1. Head model opened in ZBrush

Fig. 1 showed the head model / character that will serve as the base model for sculpting. This image was imported in ZBrush. Once imported, the picture of the reference model (Fig. 2) should be made available and aligned according to the perspective of the model (as shown in Fig. 3). The sculpting process started in the base mesh using different tools available in ZBrush. The processed image as shown in Figure 3, is the result of sculpting and rendering through the use of different software like Maya and ZBrush.
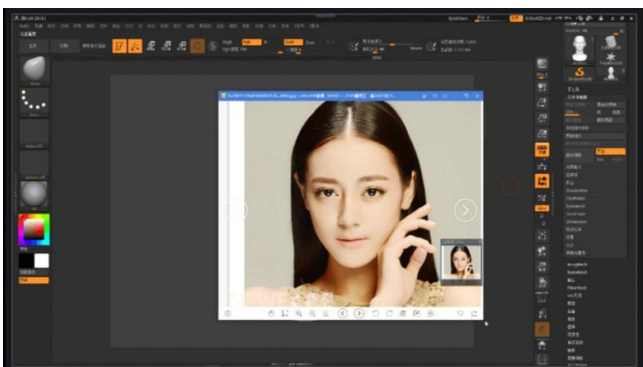

Fig. 2. Reference model

Fig. 3. The processed image (3D model)

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