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USE OF 3D FORMAT RESOURCES IN TEACHING THE DISCIPLINE "INFORMATION SCIENCE AND INFORMATION TECHNOLOGIES"

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Abstract
This article describes the content and forms of using 3D resources in the teaching of "Computer Science and Information Technology" in secondary schools. The effectiveness of the use of 3D electronic manuals for teachers of computer science and information technology in secondary schools is highlighted.

Keywords: 3D format, electronic manual, animation, modeling, 3D content, virtual element, manual modeling, automatic modeling.

The development of Information Technology has also led to tremendous advances in computer three-dimensional (3D) modeling. The result is programs that provide incredible opportunities. Their use has led to a series of educational content, video games, and even several films, such as Avatar, which are entirely or partially set in virtual worlds inhabited by virtual elements and living beings. In some of the latest video games, Google, Inc. it lays the groundwork for creating a digital archive of the entire world in 3D (Google Earth) with extensive possibilities for representing entire virtual cities. In general, the possibilities of simulation technology are endless, and the future is much more interesting. Given the complexity of the real world, it is used to create content from virtual worlds such as video games, movies, and online applications. Creating detailed 3D content using modern modeling technologies is inconvenient and time consuming. This helps in that the production of educational content, games and films requires a huge investment of time and money, as well as the ability to easily create 3D models, as if you were drawing with a pencil. The complex and far-reaching goal we set ourselves is to enable digital content creators, whether they are experienced digital artists or casual hobbyists, to quickly render and synthesize rich virtual worlds like the real world. To this end, much research needs to be done to improve the ability and speed of 3D content synthesis.
We will describe various important and complex 3D modeling tasks and we will be able to solve them. In particular, we apply data graph-based optimization to important modeling problems in terms of computer graphics and computer vision. In terms of graphics, the goal is to develop powerful and intuitive modeling tools to help artists

create 3D content in the digital world. From a rendering standpoint, the goal is to reconstruct realistic 3D models of objects and scenes from image data.

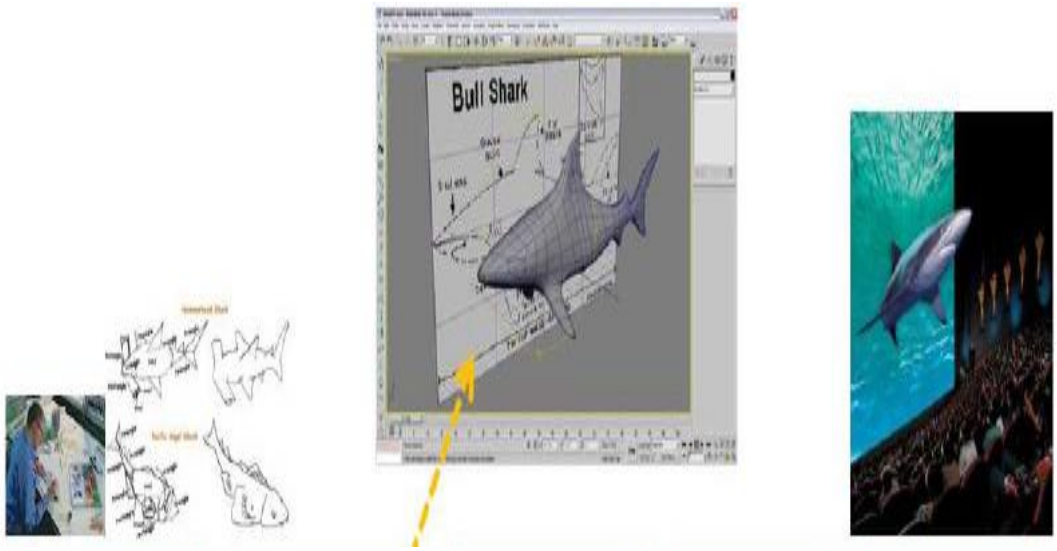

Figure 1. Computer graphics pipeline.

Modeling in computer graphics refers to the process of creating mathematical models to represent 3D objects in a virtual environment. Lap-fai Yu in his work described the place of modeling on the conveyor line of 3D computer graphics (in Fig.1)[1]. Once created, 3D models are usually presented that take into account the interaction of light in the virtual environment and the reflective properties of the 3D model, resulting in a high-quality synthetic image of the virtual scene if, as usual, the goal is to achieve photorealism. Such virtual 3D models can also be animated. For example, the 3D virtual characters used in motion pictures are typically animated in a manner similar to how real human actors act to promote content. In addition, such virtual 3D models can be made to create a 3D real model in the real world - which is a recent trend in 3D printing in computer design. In general, 3D models serve as important prerequisites in various graphic and design applications. Much of the content of modeling research is aimed at introducing innovations into the process of creating a virtual 3D model.

Scientists around the world have explored two approaches to modeling: manual modeling and automatic modeling.

While automatic model generation, the 3D models you are interested in can be generated automatically if they contain a lot of repetitive elements.

Hand Modeling The most common way to create 3D models is with hand tools. Generic modeling and digital sculpting are popular hand modeling techniques, and the choice between them depends on the type of 3D model being created. For modeling man-made objects, such as furniture and buildings, polygon modeling is preferred, as the polygon-type image usually matches the shapes of man-made

objects. For modeling organic objects such as virtual human characters, digital sculpting is preferred due to the added flexibility in the braid modeling process. Manual 3D modeling is usually done with interactive modeling programs. For example, 3Ds Max, Maya, ZBrush. Its interfaces, which provide a wide range of 3D modeling, allow you to create very realistic and detailed 3D models. However, the complexity of the controls creates a very stressful situation, which is why 3D modeling has become the achievement of professional digital artists. But even for professionally trained professionals, creating powerful 3D models still requires a lot of time and effort. Tutorials that usually require a lot of high-quality 3D models require a lot of investment to create the latest games and movies. This severely limits the speed of production and the number of annual releases. Unlike the situation where in the 1980s video games usually contained simple 2D graphics and all production could be done by a small team, there is now some problem for the video game production and film industry due to the use of 3D technologies. A manual approach to creating 3D models will probably not be a problem for an artist[2]. However, one can easily succeed in developing powerful and intelligent modeling tools and interfaces. Indeed, in computer graphics research, constant work is underway to improve the methods of interactive modeling.

As part of the study on the topic “Methods for creating and using an electronic manual in a 3D format on the subject “Computer Science and Information Technology” for general education schools, “an electronic manual on the subject “Computer Science and Information Technology” was developed. The appearance of the electronic manual 3D demonstration of the lesson is as follows (Fig.2).

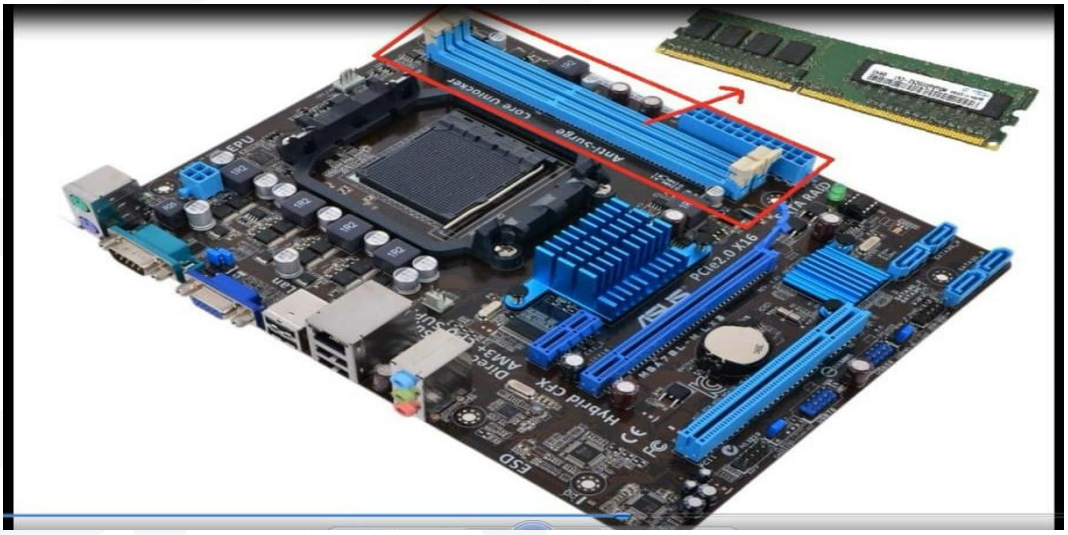

Figure 2. 3D demonstration of the lesson type of electronic manual.

It is not always possible to show readers the internal components of a computer by unpacking them. Especially in modern candy bar computers, which are now becoming more and more popular in society, opening its internal parts is considered quite a difficult task [3]. And the computers on which this is possible have by now gone out of circulation due to moral obsolescence. At the same time, a sharp update of the content of curricula also does not allow this. On the other hand, the connection of the internal parts of the computer with each other, the explanation by specifying the sequence is also a fundamental feature of the simulation. Another advantage of modeling is the ability to view and capture a 3D model at an arbitrary position using a render method. It is today that the use of these modeling capabilities in teaching computer science and information technology can be seen as an educational tool that gives a good effect.

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