



FORMING STUDENTS' UNDERSTANDING OF COMPUTER GRAPHICS IN MODERN EDUCATION

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Abstract:

In this article, we discussed the role of computer graphics science in the educational system, graphic design, graphic editors, how important computer graphics science is in our society, and how this field is a new field that does not stop developing.

Keywords: Computer graphics , design, raster graphics, vector graphics, fractal graphics, Graphic editor, color models.

Introduction

Based on the demand of today's day and age, it is clear that the science of computer graphics is inextricably linked with every field, and the demand for it is growing more and more. The scope of application of computer graphics is very wide, and first of all, the visuality of this field is noteworthy. That is, the image is the main factor in computer graphics. Many graphics tools either require a sense of computer programming (such as Adobe Flash), or scripts and small programs can be combined with graphics to create interactions in movies and games[11]. This article reviews what is currently included in computer graphics classes. Information creation in computer graphics is focused on the human senses of sight and hearing, and simply speaking, images and sounds are widely used to convey information. The main goal is to convert information into images and sounds. Today, there are many computer graphics programs, which differ from each other according to the field of application[10].

Professionals in each field choose a graphic program that is convenient for their activities. The scope of the programs will also be focused on a specific area. So, when choosing a graphic program, it is necessary to take into account its capabilities. In most cases, it is necessary to master other programs or disciplines before using a graphics program. And with that, graphics programs become more complex.

Concept of computer graphics

The concept of computer graphics now includes a wide range of fields, from simple graphic drawing to creating and embellishing various images in real life, and even creating new image-related projects with the help of a software tool . Computer





graphics is a widespread software application, that is, computer graphics relies on existing and newly created software[9]. Working with computer graphics is becoming one of the most popular areas in modern computer technology. Currently, even professional artists and designers are engaged in this direction. It is known that a person receives information through the organs of sight compared to the organs of hearing and sensation . Visual information will be easier to assimilate . This feature of human nature is used in graphic operating systems[8].

All graphic objects of the operating system, as well as all other images, must be created or included in the computer in some way . Special external (peripheral) devices are used to input graphic images to the computer. The most common device is a scanner. Recently, the scope of use of digital cameras is expanding . Their difference from ordinary cameras is that the image is not chemically captured on the film, but is recorded on the microcircuits of the camera's memory . From there, information can be transferred to a computer via a cable. Some digital cameras also have the ability to record data as a file to a floppy disk. You know very well that it is not so difficult to transfer the information on the disk to the computer[7].

You don't necessarily need to scan, photograph, or capture an image to enter it into your computer. The image can be created on the computer itself . For this , a class of special programs called graphic editors has been developed.

Development, presentation, processing of information in graphic form, as well as the establishment of connections between graphic objects and non - graphic objects in files is called computer graphics in informatics.

Special computer programs made it possible to draw pictures on the computer screen with the help of a mouse, that is, to create, correct and move images, just like drawing various pictures with a pencil or pen on a sheet of white paper . These programs are considered drawing programs or graphic editors, with the help of which the elements of the picture are managed.

The very rapid development of computer graphics and the updating of its technical and software tools require constant improvement of the course, constant study of new directions in this field[12].

No modern multimedia program can do without computer graphics . Up to 90% of the working hours of professional programmers who create programs for public use are spent working with graphics. The main labor cost in the publishing house is artistic and decorative work with graphic programs.

has increased significantly , primarily in connection with the WWW service, which combines millions of individual "pages" into a single network[6].





an important role not only for academics, but also for artists, designers of various fields, specialists involved in advertising, creation of Internet pages, teaching process and other fields . Its use , especially in the field of sources, leads to the use of high decorative techniques in the emergence of colorful illustrated literature, textbooks , and artistic works. Creating eye-catching videos and web pages is hard to imagine without computer graphics[5].

unique independent importance in training personnel in the field of economy .
Computer graphics are divided into three types:

- **Raster graphics**
- **Vector graphics**
- **Fractal graphics.**

They differ from each other in that they are depicted on the monitor screen and printed on paper . The difference between the original raster and vector graphics is known in the technology of creating a graphic image, the style of reflection, editing and pagination. Briefly, this difference can be explained as follows: In point graphics, the minimum element of the image is a point, and in vector graphics, it is a curve[13]. In raster devices, it is created from a set of points that make up images. These points are called pixels.

A raster is a matrix of pixels that covers the entire area of the screen. So, the main element of a raster graphic is a point.

A bitmap consists of a set of points with coordinates and color

An understanding of the graphic editor

Graphical editor - it represents the picture by drawing a series of points. A file consisting of a simple bitmap image contains a sequence of dots and their colors that make up the image one after another . Paintings that have been created for thousands of years can be called the first appearance of dot graphics. In the world around us, we can only see dotted images. Photographs, pictures, traces, images are reflected in our eyes in dotted character[4].

The main element of vector graphics is a line.

Vector images refer to a set of geometric objects that are more complex in structure and have a different appearance[18]. Examples of such objects are rectangles, circles, ellipses, polygons, sections, and lines. One of the characteristic features of vector graphics is that each object in it has control parameters that allow you to change their appearance. Unlike bitmaps, vector images can have arbitrary internal structure.



The conversion of vector images to point images is performed by the application without user intervention. But converting point images to vector images requires a lot of skill from the user[14].

Vector graphics are based on a mathematical idea of the properties of geometric figures. The mathematical foundations of vector graphics are points, straight lines, cross sections, second and third order curves. A point is defined by two numbers (x,y) in the plane. A straight line is defined by the equation $y=ax+b$, which has two parameters. If this straight line is bounded by two coordinates x_1 and x_2 on the x-axis, it defines the section. Examples of second order curves are parabola, hyperbola, ellipse and circle. The general equation of this second-order curve is:

$$x^2+a_1y^2+a_2xy+a_3x+a_4y+a_5=0.$$

Working with vector images on a computer is much easier than working with point images. Currently, vector graphics applications form the basis of machine graphics[3].

Fractal graphics is not drawing or equipping an image, but building it based on programs based on mathematical calculations, that is, images are viewed using formulas. And in fractal graphics, beautiful scenes are created by automatically changing and multiplying images with the help of mathematical calculations[19]. Creating a fractal composition is based on programming, not drawing or shaping. It is used in the artistic decoration of TV shows and advertisements[15].

Fractal graphics are generally used more in creating game programs.

Fractal graphics are used to automatically create images based on mathematical calculations. That is why the programming method of creating a picture, shape, image was chosen as its basis.

This graphic is usually widely used in modeling and analysis of various processes, creating various interesting programs[2].

The following categories of computer graphics can be distinguished:

- commercial
- regarding demonstrations;
- engineering;
- scientific;
- demonstrative;
- animated;

Commercial graphics serve to display information in spreadsheets or databases. This information can be displayed on the personal computer monitor screen in graphs, histograms, diagrams and other views. In this case, the graphs are provided with text annotations and conditional annotations in important places[1].



The commercial graphics application package is aimed at quick and easy representation of the image on the screen, because the goal of the business person is to quickly discuss the changes in the information processing process and make appropriate decisions. To further enhance the imagination, these packages include the ability to depict the image in various graphic forms[16].

Computer Graphics

Role of enhancing the impression and enriching the image with information. The reflected light from the illuminated object that we see passes through the pupil to our eye and excites the nerve cells inside the eye . Due to the fact that these cells are connected to the brain through nerve fibers, the light of the eye is transmitted to the brain and the sensation of seeing an object appears in our mind. We see the item. This ability to see the environment is called vision , and the organ of vision is called the eye[17].

lot of information about our environment through our senses. We receive 90% of this information by sight. The stream of light is the carrier of this information.

Our eyes are connected to the brain through the body's nervous system . If we compare the structure of the eye with the structure of modern optical devices such as a photo camera, film camera and television camera, we can notice that there is a similarity between them.

cannot be obtained from a mixture of colors are called primary colors. Red, green and blue are the primary colors. If we mix them together, it will be white.

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