

MODERN TECHNOLOGIES IN DIGITAL ART

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Annotation. This thesis demonstrates the main features of innovative IT techniques in creation of digital images and their impact on the development of digital art.

Keywords. Digital picture, graphics tablet, stylus, raster, pixel, vector, function, paintbrushes.

This thesis illustrates the process of digital art development and the main reasons of its popularisation. Many innovative technologies come into different areas of our life and art is not an exception. The creation of a graphics tablet has made a great impact on the development of digital arts. Images created with the help of computer are fantastic. That's the reason why more and more digital techniques are constantly appearing. Also, thanks to graphics tablets, digital art has become quite popular among not only specialists, but also common users.

The process of IT techniques development provides us with new gadgets and software. Particularly great impact it has made on the digital technologies of creating pictures. And nowadays traditional technologies become less popular among youngsters being displaced by digital. Why? There is a reason for it. There are some advantages of digital technologies over traditional ones:

- no need for buying expensive materials such as eraser, colored pencils, charcoal pencils. All that you need is to have a PC, art editor, mouse or graphics tablet and you are ready for creating new pictures. You can use even a smartphone for these purposes;

- functionality of art software is very convenient for users. When something goes wrong, for example a previous line is needless, you can just use a special tool "Step over" and the line disappears. It is impossible to do this with traditional techniques;

- usage of digital pictures is wider than traditionally-made ones. The illustration of this fact could be the wide range of digital pictures in advertisements, websites' design or in animation sphere.

So, that's why digital art now is fast and perspective developing direction.

There are different tools in IT that can help us to create new images. Professional artists implement this work with graphics tablets.

A graphics tablet is a computer input device that enables a user to hand-draw images, animations and graphics, with a special pen-like stylus, similar to drawing images with commonly used pencil and paper. The device consists of a flat surface upon which the user may "draw" or trace an image using the attached stylus and the image we can see only on a computer's monitor. But there are some models of graphics tablets that display the images on their surfaces instead of monitors, making the process of drawing more similar to drawing on paper.

There are different types of tablets. They can be divided in some groups according to the peculiarities of their function: passive, active, optical, acoustic or capacitive tablets. The characteristic feature for all these types that they have in common is that a tablet can use the received signal to determine the distance of the stylus from the surface of the tablet, then the tilt (angle from vertical) of the stylus, and get other information in addition to the horizontal and vertical positions, such as clicking buttons of the stylus or its rotation. Compared with touchscreen, a graphics tablet generally offers much higher precision, the ability to track an object without touching the tablet, it can gather much more information about the stylus, but usually it is much more expensive [1].

Computers store information in digits. And obviously images are also stored in a binary code. In order to work with digits and to modify the whole image computers use two different technologies: raster and vector graphics (figure 1).

Raster images are comprised of individual pixels of color. Each color pixel contributes to the overall image. Raster images might be compared to pointillist paintings, which are composed with a series of individually-colored dots of paint. Each paint dot in a pointillist painting might represent a single pixel in a raster image. When viewed as an individual dot, it's just a color; but when viewed as a whole, the colored dots make up a vivid and detailed painting. The pixels in a raster image work in the same manner, which provides for rich details and pixel-by-pixel editing.

Raster images are capable of rendering complex, multi-colored visuals, including soft color gradients. Digital cameras create raster images, and all the photographs you see in print and online are raster images. They are ideal for photo editing and creating digital paintings in programs such as Photoshop or Procreate.

Anything less raster images cannot be scaled to larger sizes. When they are scaled, quality is lost and they become blurry, as each pixel becomes larger or photo editing software attempts to compromise by adding in colored pixels.

Unlike raster graphics, which are comprised of colored pixels arranged to display an image, vector graphics are made up of paths, each with a mathematical formula (vector) that tells the path how it is shaped and what color it is bordered with or filled by. Since mathematical formulas dictate how the image is rendered, vector images retain their appearance regardless of size. They can be scaled infinitely.

Though vectors can be used to imitate photographs, they're best-suited for designs that use simple, solid colors. Vector images are comprised of shapes, and each shape has its own color; thus, vectors cannot achieve the color gradients, shadows, and shading that raster images can (it is possible to mimic them, but it requires rasterizing part of the image – which means it would not be a true vector). True vector graphics are comprised of line art, sometimes called wireframes, that are filled with color [2].

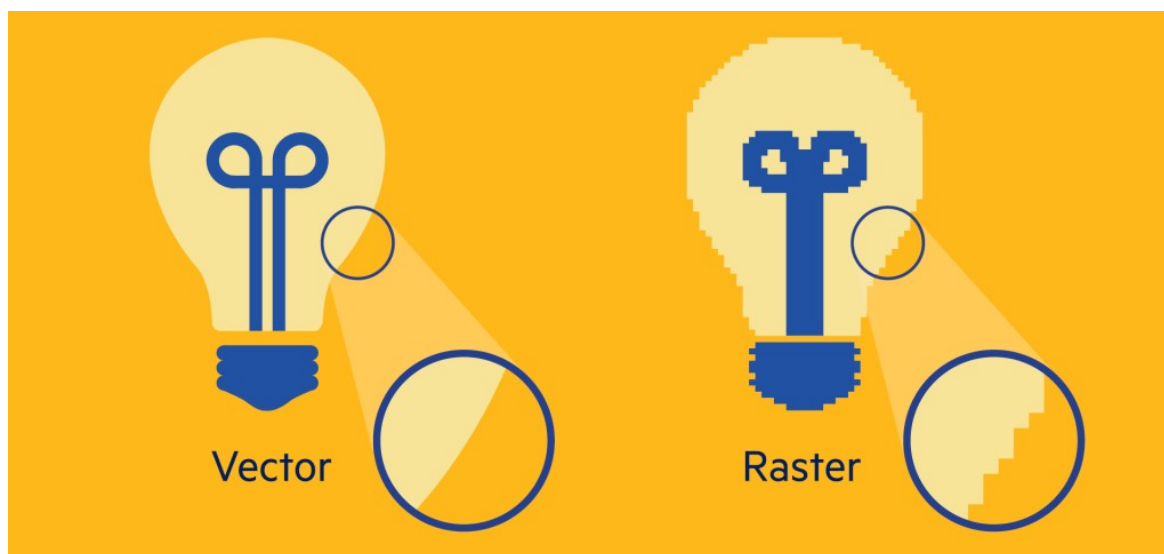


Figure 1 – The difference between vector and raster graphics. The first picture is an example of vector graphic, the second is an example of raster graphic.

Both of them have their own advantages and disadvantages. And according to the needed result you can choose between raster and vector graphic and choose software you are going to work with.

There is a great number of computer software that works with images. It can be varying from professional Adobe Photoshop to useful for beginners Paint Tool SAI. The software used for this purposes on smartphones - IbisPaint X (for Android and iOS users) or Procreate (PC port for iOS). The main difference between them is in providing additional functionality. Let's list the most popular of them.

Paint Tool SAI can be installed in graphics tablets, has a user-friendly interface, a good optimization, high working speed without consuming storage resources. Using this program you can create your own brushes, share them via Internet and, of course, upload them for further work. Paint Tool SAI supports all popular files format, such as JPG, PNG, PSD, and has its own format where you can store all positions of your layers and save vector layers as vectors. That's why it's a popular program for beginners. It occupies a niche with a strong potential growth for different styles of digital art such as anime style or cartoon style.

Adobe Photoshop provides a wide spectrum of functions, contains not only functions of Paint Tool SAI but also a lot of other advanced features, can improve quality of image, restore damaged or old images, add colours to black-white pictures. Adobe Photoshop functions regardless of whether it is used to work either with text elements or photos. And that is not the whole range of helpful functionalities of this program. That's why it's very popular for editing photographs and for creating arts in realism style [4,5]. But there are some disadvantages: it is very expensive and consumes a lot of computer storage resources and hardware.

X IbisPaint is a software for smartphone users that gives you a possibility to create images on your phone! It has almost the same functionality as PC software and is similar to Paint Tool SAI to some extent. But the main difference is in the additional options. This program provides a huge amount of paintbrushes to create picture of any kind. It is great to generate something new on your phone. But of course X IbisPaint isn't usable for professional work, only for common users.

Concluding what has been said above, I want to stress that the domination of traditional drawing technologies era is gradually declining. Digital art now is an essential part of our lives and it strives for

replacing traditional techniques. But to my mind these types of technologies will coexist and complement each other.

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