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EVOLUTION OF ANIMATION FILMS FROM 1995 TO 2021

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Keywords: animation films, Pixar, Disney, 3D animation, photorealistic picture.

The image are mainly related to the improvement of the rendering (the process of obtaining the image).

A contemporary person has long been accustomed to photorealistic pictures and cartoons created in the process of development and improvement of graphic editors. Technology is gradually improving, and dramatic changes are extremely rare. Usually new technologies are tested by large companies not on the feature movies, but on short cartoons. The changes to s direction has practically stopped: rendering has already become quite photorealistic, specialists have learned to visualize fabric, water, hair, shadows and other effects well [1]. Now it is more important to make a film that will not only attract the audience with technical innovations, but also captivate them with the plot.

The purpose of this work is to analyze and highlight the main stages in the development of animation in the late 20th – early 21st centuries.

Material and methods. The source of material for this study was cartoons of 1995–2021. The main research methods are comparative and descriptive.

Findings and their discussion. A real breakthrough in the art of 3D animation was the Toy Story cartoon released by Pixar. It was the first full-length animated 3D film that showed the progress of rendering, material settings, animation. The graphics at that time seemed very realistic, the materials on the models were well developed, characters with hair appeared. The multitude of locations and additions made Toy Story very much like a regular movie.

Then Pixar developed a new format for storing shadow depth maps – deep shadow maps. As a result, in the final rendering of the image, it was possible to obtain high-quality shadows for hair, smoke and glass.

Later, the level of rendering and animation of digital characters increased. For example, Square Pictures' Final Fantasy came out in 2001. For that time, this film was at a surprisingly high level in terms of the quality of the graphics, the elaboration of the characters.

Hair rendering has been a tricky issue in 3D animation for a long time. It was necessary to correctly show their physical characteristics and dynamics. Up to a certain point, an attempt to visualize hair led to disastrous results. The cartoon creators also faced the problem of the believability of hair lighting. Pixar came up with a kind of simulation: the hair was automatically transformed into a geometric mesh (called an isosurface) according to the shape of the hairstyle, and then it was used to calculate the final lighting of the hairstyle.

In 2013, the film "Frozen" was released. This is the case when technological breakthrough in animation is combined with captivating drama. When Disney released the cartoon, it was shown many videos of how the project simulates snow and solves complex geometric problems.

Animation studios have been using depth maps for a long time. Only Disney's *City of Heroes* and Pixar's *Finding Dory* (2016) made the definitive transition to the new path-tracking technology. Path tracing is now used by all studios including Sony, Blue Sky and Illumination. Interestingly, Pixar and Disney are developing this technology independently of each other, despite the fact that Pixar is a division of Disney.

There are many technologies in computer graphics, such as fluid creation, tissue and hair movement, which require serious computation. Previously, it was quite difficult to do this due to the lack of powerful technology. One frame can be considered a day, and in one second of screen time there are 24 such frames. For example, in *The Secret of Coco* (2017), Disney animators faced such a problem: how to put clothes on skeletons so that their bones would not be pinched. To do this, they had to use fabric smoothing techniques.

Today, 3D animation in general has managed to achieve a realistic image, so artists began to return to experimenting with the style that was in 2D animation. It all started with experimenting with contours. Back in 2002, the Jot program appeared, which created the outlines of objects, imitating the hand of an artist. Then for a long time in this style nothing came out, and in 2012 Disney released a short film "Paper Novel", in which the artists tried to recreate the outlines and fills in 3D-animation, similar to those obtained when drawing by hand. Today, making 3D animation is cheaper and faster than drawing traditional 2D, because specialists in this area appeared and powerful technical capabilities appeared. But the desire to shoot more feature films close to art remained. For example, there was Sony's project "Snoopy and the Big-Bellied Little Thing in the Movies" (2015), in which 3D was stylized as 2D.

In the cartoon "Spider-Man", both the manual labor of animators and artificial intelligence technologies were used to stylize 3D animation for hand-drawn graphics.

Today, animation has become photorealistic. But in this way it approached the usual cinema with actors, and therefore its novelty and originality are gradually lost. To prevent this from happening, artists today often deliberately move away from photorealism. Limited LEGO Movie animation from Warner Bros.

2014, when less than 24 frames are drawn for one second of the film. In this case, the movement becomes not entirely smooth, but this allowed imitating the stop-motion technology (this is how traditional puppet cartoons were filmed), as if the animators were really moving real people from Lego and filming it on camera.

Conclusion. Technologies for creating animation change and are tested every year. The development of 3D animation from 1995 to 2021 has almost reached its peak. But the viewer perceives an animated film not only as a combination of technical capabilities, he begins to follow the plot from the very first seconds. Thus, the synthesis of high technical performance as well as the director's intention is important. In the last years of the present time, a person is more interested in films in which there is a combination of 3D and 2D graphics, and not just a photorealistic picture.

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**ANIMATION OF VIRTUAL DIGITAL SUPREMACIC SCULPTURES
IN THE FRAMEWORK OF ANNUAL PROJECT PRACTICE
OF STUDENTS STUDYING AT THE DESIGN DEPARTMENT
VSU NAMED AFTER P.M. MASHEROV**

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Keywords: Digital sculpture, animation of sculpture, Unovis, Vitebsk Art School, Suprematism, art and graphic faculty of VSU named after P.M. Masherov.

Introduction. The chronicle of the Vitebsk Art School begins at the turn of 1918, when the Vitebsk People's Art School was opened in the city. The name of the educational institution has changed several times – Vitebsk Free State Art Workshops; Artistic and Practical Institute; Vitebsk Art College, which was transformed into Vitebsk Art College in the mid-1930s. Since 1949 it has been the Vitebsk art-graphic pedagogical school.

On September 1, 1959, on the basis of the Vitebsk art-graphic pedagogical school, by order No. 115 of July 18, 1959, the Ministry of Education of the BSSR organized the Art-graphic faculty [1]. Almost 100 years have passed since the organization of the first art classes, when the organizers of the educational process at the KhGF again turned to the systems and ideas proposed by the first teachers of the VNHU. In 2006, the new major "Design (subject-spatial environment)" was opened at the faculty. Just 4 years after the emergence of the major, the new department "Department of Design" is being formed under the direction of V.V. Kulenenko [2].