Problems of Using Cyberdramaturgy in Modern Foreign Cinematography

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Summary
The article is devoted to the actual problem of the use of digital technologies in modern cinema in developed countries. The purpose of the study is to identify the essence of the term "cyberdramaturgy" and the problems of its use in modern film production. The research methodology is based on a systematic approach and includes the methods of the general scientific group (analysis, synthesis, deduction, induction), as well as a number of special methods: the method of content analysis of scientific literature on the research topic; sociological survey method; as well as the method of statistical analysis. The results of the survey were analyzed using the Neural Designer program (a tool for advanced statistical analytics) and translated into a graphical diagram format for clarity of perception. Answers in 75 questionnaires were evaluated by the average score for six analysis criteria, which made it possible to bring all the calculations to a 10-point scale. As a result of the study, the author of the article concluded the following: directors believe that the use of cyber analogues of actors and backgrounds leads to the blurring of genres, the hybridization of cinema and animation; directors are also concerned about the problem of replacing the director himself with a special program. The writers are completely concerned with the problem of machine scripting with almost infinite variability beyond the human imagination. Directors-producers believe that the cyberdramaturgy development will lead to completely new standards of cinematic quality, sharply different from the traditional assessment of acting and scene setting, to the appreciation of 3D animation as the highest category in the art. Such innovations actually devalue all international cinematography awards, as cyberdrama reduces the value of cyberactors to zero. It is impossible to bail out an "Oscar" or a "Golden Globe" award for a digital double or a separate cyber model that is used in the film instead of the actors.

Keywords:
cyberdramaturgy, digital model, digital double, computer graphics, 3D animation.

1. Introduction

Digitalization has affected all spheres of human life, and such mass art as cinema has undergone especially noticeable progress. The process of digitalization also gives rise to the emergence of new scientific terminology, which is designed to denote new phenomena for its scientific analysis.

In 2001, the full-length animated film "Final Fantasy: Spirits" was released. Of the massive145 million dollars budget, about a third was spent on acquiring servers, workstations and software. And the filmmakers paid special attention to the realism of modeling live characters. At that time, this was a real breakthrough in the field of creating digital actors' models. Of course, it was still impossible to confuse them with real people, but the difference was already small. And many of the flesh-and-blood actors had a bad feeling, which Tom Hanks voiced shortly after the film's premiere: "It worries me a lot, a lot. This threat is coming and we, the actors, must rally in the face of it and do something" [1, p. 34]. Then, 13 years have passed, technology has come a long way. Three years later, ironically, Tom Hanks himself became the "source" for the character in the animated feature film "Polar Express".

In the mid-2000s, it seemed that filmmakers would never be able to achieve such realism of artificial people in order to finally get rid of the effect of the "Uncanny valley". However, in 2008 the wonderful film "The Curious Case of Benjamin Button" was released. Through the efforts of the animators, Brad Pitt throughout the film received the appearance of both an old man and a teenager, while remaining recognizable by the old Brad [2, p. 37].

The example of this film showed that in episodes it is already becoming possible to get rid of the realistic effect, since the cost and labor intensity do not yet allow making a full-fledged double. For example, in some scenes of the film "Iron Man 3", a digital copy of the actor Guy Pearce was involved, because he managed to grow a beard for shooting in another film [3, p. 140].

For someone, even very high-quality modeling of monkeys in "Planet of the Apes: Revolution" (2014) causes not only surprise, but also some inexplicable wariness. Although this can be explained by the unusual humanization of monkey faces [4, p. 68].The disadvantage effect for the film industry is that instead of surprise and joy, the viewer can experience negative emotions. And this is a direct path to the commercial failure of the film, and for what then was the time, effort and huge money spent on creating special effects? And in modern blockbusters, this is the main item of expenditure for all resources, not only financial ones [5, p. 131].

How many resources are required today for a realistic simulation of a person? Of course, this very much depends on a number of conditions, but on average in a hospital, each

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frame requires about 30 hours of work on a large number of very powerful servers [6, p. 411]. And in five minutes of the film there are 7200 frames at a frequency of 24 frames / sec. At one time, a real breakthrough was the use of motion capture technology, without which it is impossible to achieve full realism of the 3D models'movements [7, p. 28]. In 2012, Nvidia released a demo video of "Digital Ira" face rendering technology [8, p. 138]. Here is a very realistic depiction of an early balding man in his thirties, speaking slightly through his nose. If we look from afar or catch a glimpse, then we can't distinguish it from a real person.
Surprisingly, until now, the eyes of digital actors do not "give in" to animators in any way, they cannot be made completely indistinguishable. Here we will inevitably think about the meaning of the phrase "the eyes are the mirror of the soul". Each feature of digital model requires serious calculations: skin folds and irregularities, blood vessels, movements of facial muscles [3, p. 141].

Modern digital model of the actor can express pleasure, bewilderment, irritation, surprise, boredom, pleasure and anxiety, and almost at the same speed as a living person. This is a very important factor, as our brain instantly registers too low or high speed of facial expression change, as a result of which we have a feeling of falsehood. How this technology works: first, the head of a human model is scanned, and the movements of facial musclesand eyes are digitized.

In addition to mechanics, the reflection of sources is calculated light, shadow map with a particular facial expression, during a conversation.So far, two versions of "Digital Ira" have been demonstrated: from Nvidia in March 2013 at a conference dedicated to GPU technologies, and from Activision in July 2013 at Siggraph [9, p. 56]. Nvidia ran it on one of their graphics cards, doing 4.9 trillion operations per second.

While it is technically possible to create an almost completely realistic digital actor model, the cost and labor are such that it is cheaper to hire a highly paid Hollywood star. The main reason is the need to use very large computing power, which is constantly getting cheaper. And when the cost of creating an ideal, perfect "digital actor" will be comparable or lower than hiring a good actor, then we are in for a tumultuous change.

There will be no need to divide digital actors into dramatic, comedic, etc. They can play any role, any character. Almost all films with digital actors use three-dimensional models of living people, as in the same "The Curious Case of Benjamin Button". However, the main goal of digital effects specialists is to create arbitrary characters that are indistinguishable from people. Arbitrary age, appearance, gender, height, fullness, etc.

Although digital copies will also be in demand: imagine how many wonderful, great actors could be immortalized in forever young "digital" ones, using them for many decades. While we are all aging, and the same actors with age can no longer perform many roles [10, p. 72].

The term cyberdramaturgy is actively used in modern works of foreign authors [2, p. 38], and refers to the process of creating a hybrid (partly real and partly animated) and fully digital animated film.

In the broadest sense of the term, cyberdramaturgy is now present in almost all genres and branches of film production: from background and scenery replacement and stage and location shooting to the combination of animation and acting (for example, Ari Folman's "Futurological Congress", 2013) to combining acting appearance with digital picture instead of many hours of make-up and removal. The ability to shoot mass scenes with an infinite number of mirror doubles (for example, battle scenes in epic trilogy "The Lord of the Rings", 2001-2003).
The problem of completely replacing the actor as an integral part in the film production with a digital analogue, based on digital algorithms and controlled by the director with a program, was very wittily raised for the first time in the film "Simone" (2002) by Andrew Niccol.

Over the past 20 years, some moments of the film have become a daily reality in the US film industry. Hollywood, as a mega-production of modern mass films (as Americans say, "pop-corn" movies), produces up to 30 blockbusters a year, based on cyberdramaturgy [5, p. 131].
European cinema tries to stick to traditional filming and scripts are written for real actors, and not for computer virtual counterparts. This indirectly explains why the United States is the world film market leader: the use of computer graphics can significantly reduce the cost of location and studio filming, the cyber analogues using instead of actors significantly reduces the cost of royalties and stuntmen, and also dramatically reduces the time for the film production itself.

At the same time, thecomputer programs for film creation requires a special, principle new film dramaturgy, in which the screenwriter and director must take into account the presence of cyber characters and find solutions for optimal synchronization of the actions of real actors and cyber models. Stage modeling in digital format allows to think through almost all the nuances of such a "cyber movie".
However, directors, screenwriters and film directors highlight a number of problems that arise in film production with digital tools. In particular, professionals say that one of the most acute problems of cyberdramaturgy is the shortage of personnel: it is rather difficult to find a director of cyberscenes, and this profession differs from simple computer graphics, since it also requires an understanding of the general intention of the director in his "final version", so to speak [2, p. 56].

They also note the problems that arise in certain genres of cinema when using cyber scenes: for example, in the genres of horror, action and fantasy, cyberspace almost

completely replaces location shooting. So, these genres are overloaded with cyber effects.

In melodramas and classic detective stories, on the contrary, there are practically no cyber scenes, which reduces the value of these genres for modern viewers. Therefore, as a result, such hybrid genres as: fantastic action movie, mystical thriller, fantasy drama are actively developing.

In the adventure genre, it became possible to replace complex special effects on location with digital pictures. In this context, it is logical that professionals note such a problem as the erasure of genre boundaries under the influence of the cybertechnologies implementation in cinema.

Thus, the study of the problems associated with the use of digital technologies in modern cinematography will make it possible to identify current and potential trends in the development of modern cinematography in US and EU countries.

2. Materials and Methods

The research materials were the answers to the questionnaire of film industry experts from the countries of Eastern and Western Europe and the United States. The study involved 75 experts, working in the film industry in the following professions: director, screenwriter and stage director.

The total representative sample was 75 respondents: three groups by professional segment (director, screenwriter, stage-director).

Table 1. Distribution of respondents by profession in the film industry on the survey

The profession of the respondents	Number of respondents
Director	25
Screenwriter	20
Stage-director	30

The questionnaire consisted of 12 questions, two questions for each analysis criterion:

1. How ethical is the using digital analogues instead of real actors?
2. How important is digital actor'smodel replacement in hybrid film genres?
3. How big is the impact of cyber technology on the modern film-staging development?
4. To what extent is it possible to realize the director's ideas through the synthesis of real and digital backgrounds?
5. How strong is the dependence of modern cinema on real actors?
6. To what extent does cyber-modeling of the scenario reduce the cost per screenwriter?
7. How useful is cyberdramaturgy for the cinema development?
8. How much does the synthesis of genres lead to a change in the modern cinema format?
9. To what extent is the director's idea easier to realize with the help of computer graphics?
10. To what extent is the cinema development moving towards the hybridization and digitalization of "mass films"?
11. Estimate how much labor costs decrease when real actors are replaced by a cyber model?
12. To what extent does the film industry development require the formation of a new "cyber screenwriter" profession?

The survey was conducted on the social network Twitter. The material was collected in several stages, determined by the logic and objectives of the study.

The empirical study was carried out in three stages.

Table 2. Stages and timing of empirical research

Empiricalresearchstages	Survey schedule
Collecting material	1-17. 01. 2022
Sampling	18-20. 01. 2022
Analysis of examples	21-30. 01. 2022

The research methodology is based on a systematic approach and includes the methods of the general scientific group (analysis, synthesis, deduction, induction), as well as a number of special methods: content analysis of scientific literature on the research topic; sociological survey method; as well as the method of statistical analysis, and scientific synthesis of the received information.

Table 3. Methods and objectives of the study

Methodgroup	Research objectives
General scientificmethods	Analysis of scientific literature on the research topic Scientific synthesis of the information received
Special methods	Content analysis of advertising texts Sociological survey Statistical generalization of the obtained results

The survey results were analyzed using the Neural Designer program (a tool for advanced statistical analytics) and translated into a graphical diagram format for perception clarity. Answers in 75 questionnaires were evaluated by the average score for each analysis criterion, which made it possible to bring all the calculations to a 10-point scale.

Table 4. Methodology for evaluating respondents' answers according to the analysis criteria

Criterion	Rating scale
Ethics of using cyber analogs of actors	

The level of costs when using the cyber model of filming	1-3 low level 4-6 average level 7-10 high level
Cost level of traditional real cinema	
The influence of cyberscripting on the development of hybrid genres	
The frequency of use of cyber analogs in the US film industry	
Frequency of use of cyber analogues in the film industry of the European Union countries	

Each criterion was evaluated, based on the translation of qualitative data into quantitative ones: 1-3 points low level, 4-6 average level, 7-10 high level of a particular criterion in advertising texts. This method of analysis made it possible to generalize the data obtained in the course of a survey of experts in the field of the film industry. The empirical study was conducted in three phases in January 1-30, 2022.

3. Results

According to the results of the survey conducted in the first group of respondents in the professional segment "director", the following results were obtained (Fig. 1).

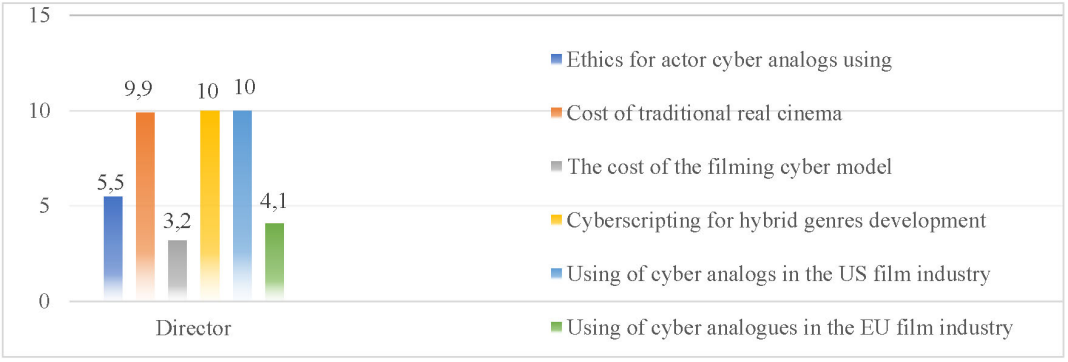

Fig. 1. The cyberdramaturgy importance estimation by respondents in the "director" profession in modern cinema in the EU and the USA (compiled by the author using the Neural Designer program)

As far as can be seen from the data presented in Fig. 1, the directors noted the low level of film production costs using cyberdramaturgy. At the same time, the degree of influence of this industry on the development of modern cinema was noted as very high in the United States, and as average in the EU countries. At the same time, the directors assessed the ethics of using actor's cybermodels in film production at an average level, that is, they consider it quite acceptable for the acting profession. However, in free comments to the questionnaire, the directors noted the danger of replacing the director profession with a cyber analogue or a digital modeling program.

Based on surveythe results of the second respondents' group in the segment of the "screenwriter" profession, the following results were obtained (Fig. 2).

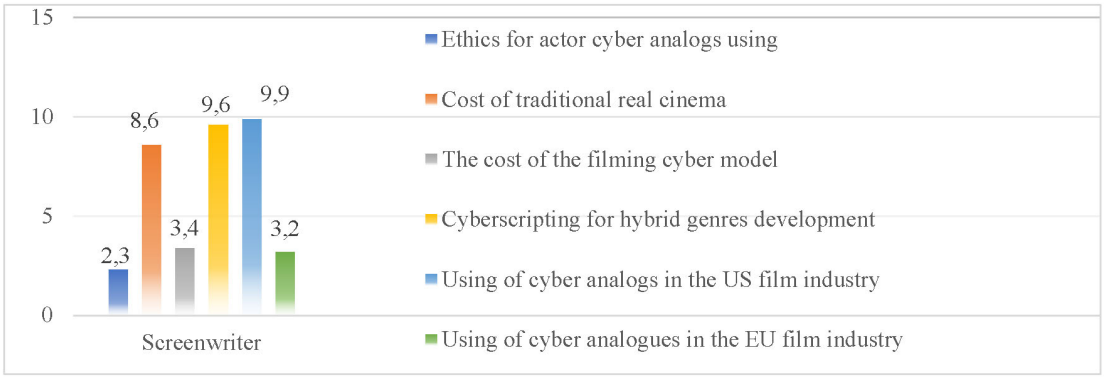

Fig. 2. The cyberdramaturgy importance estimation by respondents in the "screenwriter" profession in modern cinema in the EU and the USA (compiled by the author using the Neural Designer program)

As can be seen in Fig. 2, the second respondents' group rated the ethics of using cyber-analogues for actors in the film industry at a low level.That is, after all, the real acting is valued more.

Otherwise, as the screenwriters noted in free comments to the questionnaire, the very essence of competition and the acting profession will be "reduced to zero", as well as the value of world cinema awards (American Oscar, British Golden Globe, etc.). Screenwriters have also expressed concerns about the replacement of the screenwriting profession: perhaps in the future, a computer program will be able to generate thousands of scripts per minute, as well as create thousands of feature films from these scripts. The scriptwriters also noted the high degree of cyberdramaturgy influence on the development of the film industry in the United States, and the average level of influence in the European countries.

A similar picture was revealed as a survey result of respondents in the "stage-director" profession segment (Fig. 3).

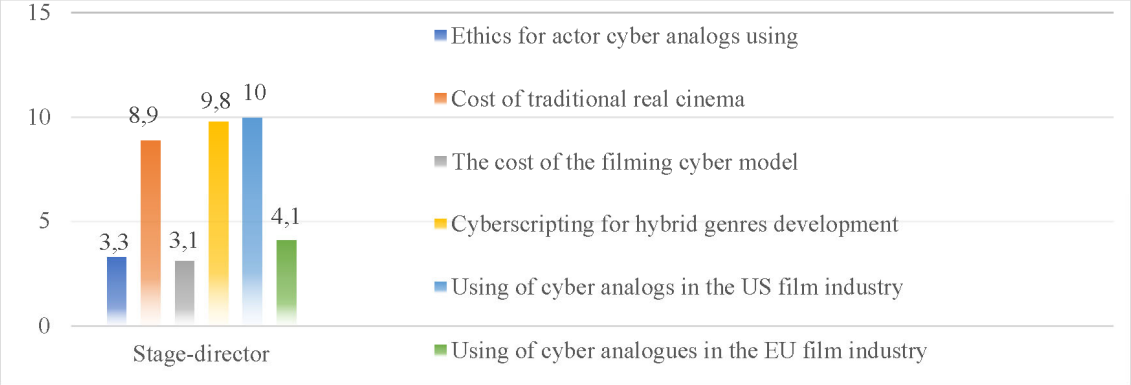

Fig. 3. The cyberdramaturgy importance estimation by respondents in the "stage-director" profession in modern cinema in the EU and the USA (compiled by the author using the Neural Designer program)

As shown in Fig. 3, the opinion of stage directors largely coincides with other respondents' groups. At the same time, the costs of the cyber model and the ethics of using it instead of a real actor were assessed at a low level. As the respondents noted in free comments to the questionnaire, the copyright issue also arises, since the cyber model does not have authorship as a subject of business relations, and several monopoly firms can be developers of programs for cyber cinema. That is, in the foreseeable future, we can talk about the monopolization of the film industry by software corporations, created programs for creating films without directors, actors and screenwriters, but with a huge coefficient of entertainment and mega-profits.

4. Discussion

Our research results are partially approved in the works by such authors as J. Belton [11], S. Cubitt [12], R. Dettmer [13], N. Didkovskaya and S. Bertova [14], E.V. Dukov and V. Evallie [15], R. Garcia [16].

In their works, T. Harris [17], B. Hussein [18], Y. Jeong, B. Kim, B. Yoon, D. Nam [1], A. Kolodkina [19], O. Lavrenova [20] confirm the theses on a significant reduction in the costs of paying actors and on location and pavilion shooting.

The studies by A. Martin [21], B. Michel, A. Hébert [4], V. Nepiipov [5], M. Ogura, K. Ogawa [22], Ya. Parkhomenko and A. Lugovtsev [23], V. Poznin [6], S. Prince [24] show the proportions of the use of animation and real acting in modern hybrid film genres in European countries.

The works by P. Quigley [7], E. Rusinova [3], M. Stepanov [8], C. Strathearn [2] are devoted to the ethical problem of using a cyber model instead of a real actor in the modern film industry in the USA.

The results of our study are also confirmed in the researches by Yu. Vorontsova [9], S. Wilke [25], A. Zaprudin, M. Shcherbinin [10].

Nevertheless, the study of cyberdramatology needs to be developed in the areas of cinematography, screenwriting and film production.

5. Conclusion

As a research result, we concluded the following: the directors believe that the use of cyber analogues of actors leads to the blurring of genres, the hybridization of cinema and the animation predominance. Modern directors are also concerned about the problem of replacing the director himself with a special program capable of generating scripts, dramaturgy and staging without human intervention. The writers are completely concerned with the "machine" scripting problem with almost infinite variability beyond the human imagination.

Directors also believe that the cyberdramadevelopment will lead to completely new standards of cinematic quality, sharply different from the traditional assessment of acting and scene setting, to the appreciation of 3D animation as the

highest category in the art. This, in turn, will lead to a monopoly on film production by a few major software companies. Such innovations actually devalue all international cinematography awards, as cyberdramaturgy reduces the value of cyberactors to zero. It is impossible to award an Oscar or a Golden Globe to a digital double or a separate cyber model that is used in the film instead of the actor. It is also impossible to adequately evaluate the contribution of a screenwriter, director and stage-director to a film that was created using a single computer program.

Based on the empirical study results, we can assume that cyberdramaturgy is a field for many interdisciplinary studies that should help assess current trends in cinematography in developed countries.

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