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Cyber-Theater as Another Dimension of Communication in Contemporary Performing Arts

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Abstract

The relevance of this study is due to the expansion of various concepts of cyber-theater in the contemporary performing arts. The examples of the stage embodiment of cyber-drama and digital-performances prove that each stage work raises extraordinary artistic issues, and each technological innovation is accompanied by the emergence of the new audience opportunities and competencies. However, due to the fact that communication between the creators of the super-modern stage content and the ordinary viewers currently isn't sufficiently arranged, there are gaps in the perception of the artistic messages, difficulties with the audience's empathy for the events and actors of cyber-drama and digital-performance. The authors aimed to explore the communication barriers associated with cyber-theater performances and to present ways to solve problems in this context. The following methods were used: complex analysis and synthesis, comparative and descriptive methods, technique of communicative approach. Peculiarities of creating cyber-drama and organization of digital-performance are revealed, similarity, difference and interdependence of their means of expression are characterized. The tendencies of further development of cyber-theater and cooperation between its creators and the audience are determined. Various studies in the field of creative industry on the impact of the effectiveness of the audience's perception of cyber-theater performance are analyzed. As the results of the research, the emblematic digital-performances of the 2010s are described, the effectiveness of various artistic proposals at this stage and possible directions for further development of the industry are determined.

Keywords: creative industry, cyber-drama, digital-performance, stage communication, audience competencies, humanization of technologies

1. Introduction

The twentieth century in the performing arts was marked by the use of technological systems. In our opinion, Max Reinhardt's arena-stage, experiments with space and light, artificial living beings and the aero-theater of Italian futurists, constructivist performances of Russian Vsevolod Meyerhold and Ukrainian Les Kurbas, technical and technological innovations of Bauhaus artists are to some extend related to the formation of the aesthetics of digital-performance of cyber-theater. They just marked the process of finding new stage forms and means of expression in the early avant-garde era. As S. Dixon (2007) rightly pointed out in his "Digital Performance: a History of New Media in Theater, Dance, Performance Art, and Installation", *"a look back, especially on the early avant-garde of the 20th century, sharply focuses on the historical landscape, illuminated by an amazing volume of additional work, even if done in different contexts and using pre-digital technologies"* (Dixon, 2007, p. 5).

Without exaggeration, a break in the artistic paradigm of the theater of that time was accompanied by changes in the communication system. Study of this issue by means of European scientists' researches and taking into account the own scientific experience of the authors allowed to identify the following factors that influenced the formation of the aesthetic appearance of the early avant-garde era:

1) Changing of the functionality of the director and reducing the role of the actor;

2) Increasing the artistic weight of the scenography and the predominance of the visual component over the verbal;

3) The exit of the theater beyond the big stage-box to the small cabaret and variety show stage with their non-verbal means of communication;

4) Frequent use by directors of city streets and squares, churches and other ritual buildings, exhibition halls, circus arenas, factory workshops, etc. as a stage location;

5) Destruction in these performances of the ramp and so-called *fourth wall* of the lifelike realistic theater;

6) Direct addressing of the theater to the audience and its encouragement to participate in the show (Styan, 1982; Listengarten, 2017; Berghaus, 2017; Goldberg, 1979; Braun, 1998; Grynyshyna, 2019).

At the end of the 20th century, the above mentioned artistic and technological principles were further developed in the theater of postmodernism with its characteristic eclecticism, innovative openness, modeling of reality and experiments with artificial reality. Its formation coincided in time with the era of new information technologies. In fact, modern theater faced the problem of the existence of traditional cultural forms in the space of high-tech civilization.

Innovative approaches to the organization of a stage show affected its ontological (space and time) coordinates, and this affected the communication dimensions of the performing arts. Computer-controlled video projections on huge screens and scores of lighting effects (the performances of Robert Lepage are illustrative in this sense) transformed and expanded the constant ideas of the theater and its audience about the spatial boundaries of the stage. The use of online broadcasts and video recordings encouraged the audience to the deep rethinking of the temporal coordinates of stage action. Let us also agree with C. Salter (2010), who in *Entangled: Technology and the Transformation of Performance* argued that at the turn of the century mechanical and computational technologies quite actively influenced performance practice, changing artistic priorities and directions of its development.

With the beginning of the 21st century we have witnessed the intensification of this multi-vector process. Today we are talking, in particular, about cyber-theater which includes stage versions of plays written by AI, and theater, dance and performative productions in which computer technologies (video projections, robots, androids, virtual reality, processed on a computer or controlled by a computer, sensory computer devices or telematics) play a key role in shaping content, aesthetics and form. One of the leading features of the cyber-theater is that each of the technical and technological innovations is invariably accompanied by the emergence of new audience opportunities and competencies. For example, virtual reality and *floating architecture* form a physically and mentally new level of relationship between real and virtual spaces (so-called "match moving" – a technology that combines the movement of footage video with objects created in two-dimensional and three-dimensional space) (Shlykova, 2003). Using of modern motion recognition systems (for example, *Isadora* and *EyeCon* systems allow you to control music, sound, lighting, etc. through the movements of the human body) together with multimedia and sound effects radically renew the sphere of dance movement (recall Mers Cunningham's virtual choreography projects, such as *Biped*, where digital scenery by Paul Kaiser and Shelly Eschar transformed and three-dimensionally reproduced the movements of the human body using *motion capture* technology developed by a choreographer). It expands the perception of viewers of choreographic shows about the possibility of receiving information about the surrounding reality through non-verbal communication (Pimenova, 2015).

Despite the sporadic appearance of new productions and their too wide geography, over the past two decades, cyber-theater nevertheless became a part of contemporary performing arts. Therefore, there was a need for a correct understanding of the problems inherent in it and the nature of the communicative processes taking place in this space. These positions determine the relevance of the study.

The study is novel because it presents an open theatrical initiative with a new artistic view. It also accumulates the empirical experience of the authors of the article and the opinion of the international theater-critical community regarding extraordinary artistic issues, the solution of which prompts the theater to search for new forms of communication with the public and other ways of presenting its own artistic product. The main elements of scientific novelty are proposals of mechanisms to enhance the audience's perception of the artistic product of cyber-theater and ways to overcome the negative effects, such as the effect of *uncanny valley*.

2. Method

The research was carried out using a combination of several methods. Considerable attention was payed to the technologies of creating texts and performances of cyber-theater. Based on the methods of analysis and synthesis, the features of the digital performance as a holistic stage product and the relationship and properties of individual elements of its structure, such as text, space, light, sound, actors, were identified. Techniques of communicative approach were used to take into account the specifics of audience's perception of AI-plays and digital-performances. At the same time, the dramatic material of the cyber-theater was evaluated according to the same criteria (artistic and scenic) as the traditional play, and the social, educational and communicative potential of the cyber-theater was compared with the functional capabilities of the traditional stage. Results of the study were presented using a descriptive method.

3. Results

Currently, the main tools in the field of high-tech art are AI-technology, which achieve a certain level of artistic expression of the product. Let us agree with L. Manovich (2018) that AI has now ceased to be merely *"a means of individual artistic expression, becoming, instead, a mechanism for inspiring a mass audience. Processed data in today's society is a way of modeling an "aesthetic identity" that preempts our artistic taste and potentially guides us in the choices most people make"*(Manovich, 2018, p. 3). One of these recent models, where a large volume of processed data is presented in a dramatic form, is a cyber-drama, which will be discussed in this part of the article.

3.1 Cyber-drama as a Basic Product of Cyber-Theater

The cyber-drama was offered to a potential digital-performance audience in 2021. It can be stated that in connection with its appearance in the space of the cyber-theater, two questions immediately arose: by what criteria should a dramatic product created by AI be evaluated? And can AI set new standards for the creative world?

In 2021, the first performance based on a play created by AI was staged by the Prague Theater *Schwandia*. The artistic event was timed to the 100th anniversary of the premiere of the famous drama *R.U.R* by science fiction writer Karel Chapek at the *Prague National Theater*. It's in the title of this play and in the list of personages appeared a character, for which Karel's brother and his co-author Jiri Chapek came up with the name *robot*. Aiming to celebrate a significant theatrical event, Czech entrepreneur and innovator Thomas Studenik in 2019 proposed that the dramatic story of the future production be written by a robot: *"I thought, we shall turn the idea upside down, and instead of performing Chapek, who wrote a play about robots, take a robot, who would write a play about humans!"* (Sitnikova, 2021). Studenik turned with a proposal to professor of the Faculty of Mathematics and Physics of Karlov University, Rudolf Rosa, who in the work on the text used the open-source speech module *GPT-2* developed by Elon Musk's research company *Open AI*.

The module is able to generate English texts by reading and processing information obtained on the Internet from news, books and titles of plays and films. Having studied the structure of these texts, AI generates a similar text. According to Arifa Akbar (2021), this time it generated 90% of its *autobiographical* material from *its own depth*, the rest – human touches – was guided by a team of computer scientists and theater people. Rudolf Rosa stated*: "In our case, we submitted the main part of the script, which contained the names of the characters and their remarks, and it created the rest of the text. In fact, we were surprised by the end result – it required only the minor correction"* (Sitnikova, 2021). However, Chad DeChant, an AI expert from Columbia University quoted by S. Moutinho (2021), didn't believe the statements of his Czech counterpart, because in reality the program does not understand the meaning of sentences, but simply arranges words that are likely to be used together, one after the other.

David Koshnyak, who supervised the writing of the screenplay, described it as follows: *"This is a kind of futuristic "Little Prince" by A. de Saint-Exupery. As in the classic French children's book, the one-hour production of "AI – When a Robot Writes a Play" tells a story of a robot who travels to the human world to learn about society, human emotions and even death"* (Moutinho, 2021). He also noted that from the very beginning of the work, the script emphasized the themes of sex and violence, because these are the topics that Internet users discuss most often in social networks (Ibid). Indeed, AI produced a rather messy play about love, loneliness, but primarily about sex. Although it can be assumed that the creative team was hoping for something else – that the story about the robot's travels, written by AI, during the performance would give a reason for a dialogue with the audience about rather annoying topics that concern society.

The premiere of the joint work of the London *Czech Centre* and *Schwandia* took place on February, 26, 2021. The play was staged by Daniel Hrbek. Martin Shimek's scenography consisted of iron bars and a cage-like structure, located on a black floor, painted with glowing circles and triangles. The plot of the performance consisted of several unrelated episodes in which Robot (Jacob Erftemeyer) met various people, mostly women of mature age; they behaved rather strangely in his presence: they dance around or rushed to his feet with a groan. Therefore, the play increasingly resembled the lively sexual fantasy of a middle-aged man. *I would like my binary self to have the same body*, Robot told one of the women. *Your lips are like warm honey*, he said, and promised to love her *all over her body*.

Previously, the writers in their books described creatures, robots and aliens, from Mary Shelley's monster to Michel Fiber's alien from *Under the Skin* and Kazuo Ishiguro's clones from *Never Let Me Go*. But the dramatic portrait created by the robot didn't seem as tender, deep and complex. His romance was rude, straightforward and flat. Robot had a blank face with glazed eyes, wore platform shoes like a classic zombie, and looked like a modernized Frankenstein. The questions of life, camaraderie, mortality, voiced in the play, in the mouth of this character seemed to be devoid of emotions, drama, depth or plot. Robot traveled through the episodes as if in a silly surreal dream.

It turned out, that people were better able to imagine artificial beings in love than AI was able to convey human feelings.

David Kosnyak, sharing his impressions of the rehearsals, admitted that it was difficult for the actors to interpret the text, because AI didn't cope with the transfer of actions and emotions needed to make the play work on stage. One of the actresses told him that her role was the most difficult one in her career (Moutinho, 2021).

As the performance drawer to a close, many in the audience were relieved to realize that the AI is currently incapable of writing an original piece. However, let's not forget that this was not an ordinary performance, but a first-of-its-kind experiment that challenged both the theater and the audience. As David Koshnyak says, in essence, it's similar to conversations between children who overheard what their parents are talking about in private. So, if the picture painted by child's mouth looks too sad, it's our fault, not the machine (Ibid).

3.2 Cyber-drama as a New Standard of Creative Communication Between Man and Machine

Another version of collaboration between human and artificial intelligence was presented on August, 23 2021 at the stage of London *Young Vic*. For three evenings, a seminar on writing called *AI + Young Vic* was held here, during which the invited audience had the opportunity to form their own opinion on whether AI can set new standards for the creative world. Using *GPT-3* in-depth learning system (the next generation post-GPT-2 system that wrote a play for the *Schwandia*) capable of generating human-like dialogues and plots, theater director Jennifer Teng worked with a team of writers and actors over the design and presentation of a new stage work.

GPT-3, recently announced by David Chalmers (2020), a professor of philosophy and neuroscience at New York University, as one of the most interesting and important AI systems ever created, has already demonstrated the ability to write prose and new articles indistinguishable from man-made ones. Unlike previous language models, which often made mistakes, *GPT-3* is suitable for summarizing, although, experts say, there are unfinished sentences and misuse of words in texts, written by it.

In *Young Vic*, GPT-3 based the textual product on hints from the creative team, which actually determined its theme, style and format, as well as any characters that might appear in the process. For example, on the first night of the seminar, the initial hint entered into the system was: *GPT-3, create a list of ideas for a play*. Next, GPT-3 performed various literary tasks, such as a command to write a Shakespearean sonnet in the style of a reality show star (Cellan-Jones, 2021). When the system was asked to provide ideas for the play, it provided a set of answers, of which the creative team singled out two. The first was the cry that the humanity was moving towards complete chaos; the second was the study of *the creation of human personality and memories* and how AI could reflect these concepts.

The system was asked to develop these themes in a number of scenes, and GPT-3 organized a catastrophic event called *The Great Clash*, after which food became scarce, and *beast-like men and women roamed the earth*. One of the machine-generated scenes sounded like this:

1st actor: - We have lived here for many years, we survived like bats, in caves that we dug in the ground, and we filled them with all sorts of unnecessary things to create the illusion of survival. In fact, things are different.

2nd actor: - The world dramatically changed. When we are struck by a great clash, the sky darkened, the earth cracked, and our species was almost destroyed.

AI itself was one of the heroes of this anti-utopia, it dreamed of gaining independence, freeing itself from programming, and considered people the source of its suffering. In fact, J. Khalili (2021) noted, AI has demonstrated the ability to reflect human anxiety and neurosis.

The topics of gender inequality, environmental crisis and racial stereotypes were introduced into the system without specific instructions. It's not clear how, but the system constantly focused on everyday problems. Therefore, even inhuman characters, created by a machine, washed dishes and led a vegetative existence in front of the TV.

According to J. Teng, the main question that the theater answered with this performance was how playwrights can cooperate with AI? The man's collaboration with the machine resulted in 30-minutes scenario. At the end of the first and second evenings, J. Teng summed up what had been done, deciding which fragments of what was written should be carried over to the next evening (Khalili, 2021). Evaluating the contribution of both participants in the process, the director said that it was a joint work of people and machine: *Sometimes it loses the wright pass. But I think it's a creative challenge as we meet AI and its content and get it back on track* (Cellan-Jones, 2021). R. Cellan-Jones also pointed out that J. Teng even attributes AI's human ability to get to the bottom of things: *It speaks beautifully about humanity, in its comments we recognize our characters and the dramatic conventions that it created seemed very lively on the stage. I now wonder if the role of the machine in the creative process may have been to awaken new ideas in us* (Ibid). However, according to the author of the blog, most of the dialogues generated by AI seemed banal and unoriginal. The director and her team looked much more creative, giving others a reason to think about the possibilities of the machine (Ibid).

Despite of the fact that the main focus of all three evenings was on the interaction of human intelligence with artificial we still have the right to talk about the performance, as all its components were available. The theme, place and time of the event were determined, as well as the performers and the audience that watched them.

As the spectators sat down, a large prism appeared in the center of the ceiling on a round stand. It projected the views of the creative team on AI as a writer and the process of collaboration with it. Mimi Monteith (2021) noted in a review that the audience was, firstly, difficult to listen to and, secondly, didn't understand how to listen carefully to what was being said; but at the same time she noted a possibility of instant entry to the creative space and atmosphere of relaxation formed by the theater. Half of the seats in the hall were occupied by a creative team that worked on the text on open access. During the process, they intervene in different moments of the action, experimenting with sound and video and giving the opportunity to see how the performance is created in stages.

When AI was writing the text, J. Teng was communicating with the audience. From the very beginning, she warned the audiences that they wouldn't see a regular performance. That is, it wasn't an ordinary theatrical show, when the audience watched the unfolding of a story or a perfect spectacle. This, says M. Monteith (2021), was a creative evening of research and understanding of where the digital world can take us.

It's symptomatic that during the action director also reminded the audience that AI doesn't have its own opinion, but only forms something like an opinion based on what the Internet gives, and behaves the way we teach it to behave. So, we have to forgive the system, so to speak, the *student level* of the texts and situation developed by it. Yes, the line-by-line transitions sometimes seemed awkward, and the dialogues sluggish and ordinary. It seemed as if we were looking in a crooked mirror, or the system had mimicked us in this way. In addition, unlike the traditional play, where the scenes are strongly interconnected in the whole plot, AI has developed a series of almost individual episodes, each time as if starting anew and forgetting about past achievements. Each scene was much brighter than the whole play, which was more like a meaningless collage. This highlighted the boundaries of modern language system, arguing that long plays and novels were still a long way off (Khalili, 2021).

Prof. Michael Wooldridge, a leading AI expert at Oxford University said that we shouldn't worry about systems like GPT-3 being able to make human creativity unnecessary*: "A good playwright has an idea of human emotions and relationships and can express it in a play. And GPT-3 doesn't have this, and the ideas that come to it are inspired by us, we just attribute them to the machine"* (R. Cellan-Jones, 2021). The authors of the essay *Artificial intelligence in the creative industries* hold a similar opinion. It's clear to them that *"current AI methods do not mimic the human brain, or even parts of it, particularly closely. The data driven learning approach with error backpropagation is not apparent in human learning. Humans learn in complex ways that combine genetics, experience and prediction-failure reinforcement"*(Anantrasirichai & Bull, 2021, p. 638).

So, it seems that for now, the field of cyber-drama lacks not only creative achievements, but also prospects. From a technological point of view, it is so. But from the point of view of the process of creative communication the conclusions are not so unambiguous. We saw that professional theater is capable of turning even today's far from perfect cyber-drama into the performance and that the creative teams that undertake its stage productions understand the peculiarities of cyber-drama and, most importantly, are ready to look for ways to facilitate the audience's perception of this non-traditional, therefore, unusual and not too comprehensible dramatic material.

3.3 Robotic Theater as a Forerunner of Cyber-Theater

The emergence of cyber-theater as a separate form of the performing arts in the 2000s began with performances in which the robots acted as actors. For example, on November, 25 2008, the 20-minute play *I am a Worker* based on the play by Japanese playwright Oriza Hirata premiered at Osaka University in Japan. Along with the live actors, two human-like *Wakamaru* robots made by *Mitsubishi Heavy Industries* took part in it. The play was about the relationship between a couple (famous Japanese actress Minako Inoye played a Wife) and two robot-assistants. According to the plot, one of the robots suddenly lost the motivation to work, said he was bored, complained about humiliating work and discussed with people about its role in their lives. That same year, the androids Thomas and Janet sang, danced and even kissed in the Taiwanese version of the L. A. Weber's musical *The Phantom of the Opera*.

In 2010, the first robot theater was opened in *Copernicus Science Centre* in Warsaw. The robots played in the performance *Prince Ferricks and Princess Crystal*, based on one of the popular *Tales pf the Robots* by Stanislav Lem. From the postproduction materials posted on the website of the scientific center, we learn that the British developers created two 20-minutes plays, the work on which lasted four months. Their goal was to connect *the old-fashioned fairytale style with the modern scientific and technical terminology* (Felkel, 2022). They had a rather silly story about how a young robot Ferricks falls in love with a robot-girl Crystal. But Crystal dreams about love with a man, instead ignoring the feelings of the robot. Then Ferricks decides to win the heart of his beloved by dressing as a human.

The robots used in the production are designed by a team of British engineers from *Engineered Arts Ltd* under the direction of Will Jackson. They are able to move independently, to make rather difficult movements. They know how to nod their heads, gesture, express emotions. They are polyglots, can speak ten languages. In the play they are voiced by famous Polish actors. The role of the narrator is played by Piotr Fronchevsky. Special lighting (blue and pink) allows you to distinguish the sex of the robot. *"The robots play perfectly, although you can clearly see all the technology of their action. You can hear how the engines work, but at the same time, thanks to the voices of great actors, they have a life. The robots express feelings with the play of light and gestures, their emotions are visible in the big eye-screens. Just like humans"*, said Robert Firmhofer, director of the scientific center (Legierska, 2014). Szymon Felkel assures that thanks to the efforts of engineering-and-artistic team they got a multifaceted show – *"amusing, rather than gloomy, sometimes funny though not shallow and sometimes calling for reflection"* (Felkel, 2022). However, in our opinion, the show solves another task – it quite consistently creates the illusion of a theatrical production, in which the robots play the role of the actors.

Japanese scientist and artist Hiroshi Ishiguro is known as the creator of several series of robots and androids, as well as the android theater *Sayonara*. In 2013, using the androids, he staged a play *Three sisters: Android-version*, where a mechanized robot, an android and nine actors were present on the stage together. In 2014, he showed *Metamorphosis: Android-version*, where the android played with four actors. Both performances were constructed as an android's communication in predetermined sequence with one of the actors.

As we can see, the various versions of robotic-theater mentioned above nevertheless demonstrate the same approach to the use of robots in the stage space. Each time it was programmed so that the mechanical performers looked close to natural: their gait, movements, gestures, and even emotions were as similar as possible to human ones. When the robots performed on stage with the actors, the show's engineers and directors made efforts to make it seem as if the androids were working autonomously. This meant that neither the stage partners nor the audience could predict their behavior, thus creating the illusion of improvisation inherent in the artistic process.

3.4 Peculiarities of Interaction Between Actors and Androids on a Professional Stage: Actualization of Issues and Problems of Audience Perception

In the second part of 2010s digital performance significantly expanded its own aesthetic horizons. At this stage, modern computer technology creates not only a special environment, but a different stage reality, and the coexistence of human-like robots and live actors has reached another dimension, forcing theater critics to seek new approaches in analyzing and evaluating what have seen. However, it turned out that the ordinary audience perceives digital performances ambiguously: there are cases when the participation of robots in the action actualizes the social problem to which the theater appeals, thereby returning interest to it and contributing to the success of the performance, however, there are also cases of the exact opposite, when spectators treated the robots with suspicion and disgust and didn't identify them as performers.

3.4.1 The Role of the Robots in Actualization of Gender Issues

Let's consider the example of the performance of 2018 on the small stage of the *Gesher Theater* in Tel-Aviv *Lolita/Jeanne D'Arc* based on the famous novel by Vladimir Nabokov and the protocols of the trial of the Virgin of Orleans. A separate act was dedicated to each of the heroines, but at the same time director established a connection between them. Ezheskel Lazarov explained this connection as follows: *"The decision to unite Lolita with Jeanne D'Arc arose spontaneously — thoughts and images suddenly intersected and something new emerged from this alloy. It's possible to try to comprehend this connection only at the intersection of intellectual, emotional and mystical principles and, of course, such a combination raises many questions. For me, the central theme of the play was morality in conditions of physical danger and fear"* (Sheihatovich, 2018). The play, in fact, experimented with relationship between a man and a woman, and demonstrated a new view of love and justice.

A small theatrical space, limited by two rows of chairs, where, however, Humbert's car was located and here was room for a ballet class, forced the actors to play at arm's length from the audience (stage design – Zohar Schoef). In the first part, the audience attention was focused on Humbert in the elegant and free performance of Israel Demidov. There was no Lolita on the stage, we only heard her voice, and maybe we saw her in the window, where behind the tulle certain young girls from the ballet studio beautifully arched their backs to the beat of the music.

The second part was dedicated to Jeanne D'Arc, which role was played by 160-cm-tall and 80-kg robot promoter KIKI. It could move and was programmed to have dialogue with a man (the Hebrew text was voiced by Alona Zimberg). The main task of the director and sound engineer Michael Weisburd was to teach the girl-robot and actor Doron Tavori in the role of Judge to interact, to conduct a natural and relaxed dialogue between a live actor and machine. Thanks to the skillful control of the robot, as well as artistry of Doron Tavori, whose communication with KIKI was full of vivid emotions, even despite the artificial form and mechanical voice, the theater has achieved a certain effect of confidence

in the mechanical character. So, the two parts of the play didn't oppose each other, but formed two halves of the story of the *"tragic and great fate of women"* (Sheihatovich, 2018).

3.4.2"Uncanny Valley" Effect and Other Problems of Audience Perception of Androids on Stage

Judging by the opinion of audience and critics about the *Gesher's* performance, it raised again the question, which arises every time when human-like machines take part in the art events with people. There are currently two approaches to this topic. According to some, the external similarity with people simplifies the perception of machines. Others believe that too much similarity, on the contrary, creates confusion: where is the person and where is the machine? In the 1970s, the Japanese robotics technician Masahiro Mori (2012) found that people were afraid of naturalistic robots. This effect was called the *uncanny valley*.

The play *Uncanny Valley* by *Rimini Protokoll* co-founder Stefan Kaegi just answered the question of how an artificial creature affects people: do we feel uneasy or do we forget that the hero isn't real? This time the hero of the, in fact, mono-show is the animated double-avatar of the well-known German writer Thomas Melle, who cannot speak to the public due to bipolar disorder. In 2016, Melle published an autobiographical book *The World Behind the Back*, in which he described his life with illness, his inherent sense of loss of control, and literary creativity as a method of combating these problems. He allowed the director to create his copy for the play. Kaegi also used in the play the personality and life facts of one of the first AI researches, Alan Turing, who, let's recall, invented a test where a program tries to deceive a person, and a person make an effort to recognize deception.

The *Rimini Protokoll* company has given performances in different countries, each time choosing a small hall for the show, which is suitable for close communication between the public and the performer. Viewers see the German writer Thomas Melle, who makes a report on the problems of emotional instability. Character's appearance, attire, gestures seem to belong to a living being, although, when the double makes movements, you hear the jingles, his gestures look unnatural, his posture remains the same, and the look from under the eyelids seems lifeless. From behind you can see that there is a gaping hole on the back of the character's head from where wires and information storage devices stick out. His gestures and movements, each of which was accompanied by a quite mechanical jingle, are controlled by 32 servomotors. *"Most likely, it can be called theatrical props. But, on the other hand, this is a new member of the troupe. After all, he will be alone on the stage all evening, creating a play"*, says Stefan Kaegi (Pauker, 2019). The director explains that he was *"really interested in creating something inanimate in living art"* and that the situation when an android replaces a person on stage answers several important questions, namely:

- What makes a person human?
- Whether errors distinguish a person from an android and whether a robot can make mistakes?
- What the original feels when a copy takes the initiative?
- Can a person get to know himself better by watching his double?
- Whether a human and a double-robot compete with each other or they help each other?
- How easily a person can be programmed and how similar androids should be to humans (Sergienko, 2019).

According to Russian critics, during the play about AI and the interaction of people and machines, the audience involuntarily becomes a participant of the experimental performance. They need to ask themselves if they emphasize with the robot and understand how much people can be deceived by empathy for mechanisms (Sergienko, 2019). This opinion is confirmed by the director when he says: *"I'm interested in asking the question: are we able to emphasize with the machine? Besides, it's easier to believe an object that portrays a person than a living actor who turns into a hero who he isn't"* (Ibid).

In our opinion, despite the brilliant idea, the only problem that the theater couldn't solve was how to make the audience focus on a single character for almost an hour, even after their fascination with the android's resemblance to a living person has passed? On other words, *Uncanny Valley* proves that the creation of digital-performance follows the same rules as a regular one-man show. Therefore, when programming the success of a play, the theater shouldn't only think about how to satisfy the public's interest in technological innovations, but it must take care of the content of the story, the diversity of the visual side and the attractiveness of the central character.

4. Discussion

4.1 The Role of AI in the Multifaceted Artistic Process of Creating Musical-and-Dramatic Performance

Despite the significant interest of the theater audience and the certain success of productions, the greatest artistic progress of modern stage art is achieved when computer technologies and AI only help in shaping the content, aesthetics and form of the production. In the space of musical performance we know about shows in which robotic

mechanisms performed functions of a team member and a performer (for example, music group *Compressorhead*, Germany, 2013), or digital characters created by a neural network that perform alongside electronic musicians (in particular, project *Actress and Young Paint*, *Transmediale*, 2019). But, as in the case of cyber-drama, the most successful musical performances are created in cooperation, when AI systems produce an artistic product at the request and under the direction of the artists. The good example is the *Proto* album by Holly Herndon and her ensemble, recorded in 2019 with the participation of an AI system called Spawn.

Among the recent Ukrainian musical performances, to confirm our opinion, we will name the *PhD-opera What Zarathustra is silent about*, in September 2021 presented in Kyiv by the *New Opera* formation. As noted in the program and announced in large letters on multimedia screen, the material of the opera was created with a help of AI. However, the small number of musicians (4 people) prevents us from calling this artistic event a full-fledged opera; we rather witnessed a musical-dramatic performance composed of individual vocal-instrumental numbers.

The verbal component of the performance combined singing and recitation of Friedrich Nietzsche's maxims. Director Vlad Troitsky considers this choice a challenge to him and the entire cast: *"Singing philosophical texts with complex meanings isn't easy. And there is not a single thought I wanted to convey. This is the whole spectrum. I focused on the choice of vocalists of Nova Opera. They independently chose from the texts of the playwright KLIM (he wrote the play "So said Zarathustra") those moments that touched them the most"* (Stelmaschevska, 2021). *"We are just voices that express certain ideas"*, baritone Andriy Koshman will later say about the work of the performers, adding that each spectator will be able to read his own context and get the portion of questions that hurt just him (Ibid).

The musical score of the opera includes piano miniatures of the German Philosopher: composers Serhiy Wilka, Yana Shlyabanska and Andriy Merhel begin and end the performance with these musical fragments, processed by live electronics. Certain musical moments were generated by AI. S. Wilka greatly respects the creative capabilities of the AI, considers it a kind of technological archetype of Nietzschean *superman* (Stelmaschevska, 2021). However, the composer emphasizes that the last word in the performance still remained with the people – the composers themselves chose fragments from the written AI and added the necessary emotionality to the sound.

The result of careful creative collaboration was a performance of combinatorial style: live and electronic music, recitation and singing, synthetic video projection, developed director's plan and performer's improvisation, use of hand-made, ready-made and AI-made objects.

The stage space was transformed into an ordinary office of some company. *"This office is a prototype of the world in which we live and which has already become… virtual"*, baritone Ruslan Kirsch explains the spatial idea (Baziv, 2021). Four vocalists (Anna and Ruslan Kirsch, Marianna Golovko, Andriy Koshman) behave like ordinary employees of the company – they write something on laptops, walk between tables, and talk to each other. At the same time, they don't let go of their mobile phones. It later becomes clear why – because everything that is happening in the office is broadcasted on a huge screen directly from their gadgets. Thus, the conceptual interaction of technology and art, which is the basis of the director's idea of the opera, is visualized primarily through the cooperation of the performers with the virtual space, which they themselves form before the eyes of the audience.

By comparing reality and its online image, a little man on stage and his magnified silhouette and outline of face, the creative team visualizes the main philosophical content of the opera, in our opinion, pushing the public's consciousness to the now important issues:

- Where are we real – in reality or online?

- Where are we more sincere – when we communicate with each other or when we broadcast our own thoughts with the help of the latest gadgets?

- And who is the real author of those thoughts – we, or AI, which already knows in advance what we want, thinks much faster than the human brain and in its choice isn't burdened with human fears, taboos and superstitions?

4.2 Questions for Discussion

1) It is worth distinguishing robotic performances, which demonstrate to the public the capabilities of robots to act as performers, and digital-performances of cyber-theater, in which high technologies expand and not replace human creativity (Anantrasirichai & Bull, 2022, p. 589).

2) Cyber-theater performances, in which humanlike robots act today, are able not only to entertain the audience, but also to solve complex problems of human existence and social communication.

3) Creative teams of digital-performances must be competent in the application of high technologies in the organization of the performance space, in mise-en-scene and audio-visualization of the action, as well as in the partnership with artificial beings and artificial intelligence.

4) The audience of digital-performance, for its part, must be ready for the perception of a non-traditional spectacle with special problematics and ethical issues and its own system of codes and symbols.

5) Audience's perception of the cyber-theater productions is the biggest problem for the performing arts researchers. We agree with the colleagues quoted above: "*The quality of the solution in such cases is difficult to define and will inevitably depend on audience preferences and popular contemporary trends*" (Anantrasirichai & Bull, 2022, p. 637).

5. Conclusions

In the modern theatrical process, there are constantly more examples of digital-performances, to which samples of cyber-drama have recently been added. However, in theater science, in particular, Ukrainian, the phenomenon of cyber-theater is insufficiently studied. The article considers the genesis of cyber-theater and the formation of digital-performance as a separate type of stage show. Cyber-drama and digital-performance are presented as relevant components of the modern theatrical process and as a different dimension of creative communication.

Studies of American, British, Ukrainian and other scientists and critics in the fields of computer science, artificial intelligence, creative industry and theater and drama were analyzed.

The process of cyber-drama creating is characterized by three communicative positions: the interaction of theater people with high technologies, creative relationships between members of the team in working with a cyber-text, the perception of *machine drama* by theater audiences and critics. The role of multimedia, projection and audiovisual technologies in the process of creating of digital-performance is established. The special competencies that a director and a creative team should have in staging a cyber-drama and creating a digital-performance have been clarified.

With the help of the samples of digital-performance presented in the study, its human-centered character is indicated. It's proved that with the help of combinations of aesthetic and technological means the art of cyber-theater contributes to the important task of *humanization of technology* (Popper, 2007), and its creators in the best examples achieve extra-artistic goals.

The existence of communication barriers in the perception of cyber-theater works, which it creators and viewers faced, has been identified. Based on above theoretical and practical material, the following changes should be introduced to solve the communication issues associated with the product of cyber-theater:

1) It would be more careful choice of the correct form of transmission of the produced content and performers who, according to psychophysical capabilities and relevant skills, are able to perform extraordinary partnership tasks;

2) To avoid misinterpreting the meaning of the play, the theater should work with the audience, explaining the moments that are most difficult to perceive;

3) The director's individual approach should be combined with an understanding of the professional level of the performers and the competencies of the audience to whom the production is addressed;

4) In order to overcome the negative effects, the level of audience's involvement in the performance of cyber-theater should be brought closer to the appropriate level of traditional performance.

The materials of this article can be useful for theater directors, computer, theater and cultural scientists, critics, teachers, students who are involved in such areas as theater studies, cultural studies, creative industry and others.

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