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Artificial Intelligence as a Creative Tool in Generative Costume Scenography

Abstract. The contemporary development of theatrical art is characterized by the active integration of digital technologies, which transform traditional approaches to visual images of the characters. The visualization of a character in costume design is no longer regarded solely as an artistic process and increasingly relies on innovative technologies. This research aims to analyze the role of artificial intelligence (AI) as an innovative means in the development of contemporary generative costume scenography. The central ideas of the work focus on the convergence of neural network modeling and classical principles of theatrical aesthetics. The scientific significance lies in theoretically justifying methods for using generative algorithms to create character visuals, thereby expanding the conceptual framework of scenographic studies. In contrast, the practical significance of the research is expressed in the enhancement of artistic exploration in visualizing images of the characters, grounded in a clearly articulated conceptual framework of scenographic ideas. The methodology is based on systematic art-historical analysis and the method of comparative modeling. The evidence shows that AI expands the range of creative exploration, enabling the synthesis of complex historical and imaginative contexts. The main findings confirm that neural networks redefine artistic practice by broadening the scope of stylistic and genre innovation. The value of the research is determined by its contribution to the development of digital costume design and the actualization of the conceptual framework in this field. The practical significance of the study lies in advancing interactive teaching methodologies in costume design education, enabling the modernization of pedagogical practices through the integration of innovative approaches.

Keywords: neural network modeling, stage costume design, character visual image, digitalization, generative costume scenography, artificial intelligence in art.

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Генеративті костюм сценографиясында жасанды интеллектіні шығармашылық құрал ретінде қолдану

Аңдатпа. Қазіргі театр өнерінің дамуы цифрлық технологиялардың белсенді енгізілуімен сипатталады, олар сахналық бейнені визуализациялаудың дәстүрлі тәсілдерін трансформациялайды.

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Кейіпкерді костюмнің генеративті сценографиясында визуализациялау тек көркемдік үдеріс болудан қалып, барған сайын инновациялық технологияларға сүйенеді. Зерттеудің мақсаты – қазіргі заманғы генеративті костюм сценографиясында жасанды интеллектіні (ЖИ) инновациялық құрал ретінде қолдану рөлін зерделеу. Жұмыстың негізгі идеялары нейрожелілік модельдеу мен театр эстетикасының классикалық қағидаттарының конвергенциясына бағытталған. Зерттеудің ғылыми маңыздылығы генеративті алгоритмдерді сахналық бейнені құруда қолдану әдістерін теориялық тұрғыдан негіздеуде көрініс табады. Зерттеудің практикалық маңыздылығы драматургиялық кейіпкерді визуализациялау үдерісіндегі шығармашылық ізденістерді нақты тұжырымдалған сценографиялық идеяның теориялық тұжырымдамасына сүйене отырып оңтайландыруда айқындалады. Методологиясы жүйелі өнертанулық талдау мен салыстырмалы модельдеу әдісіне негізделген. Зерттеу барысында ЖИ шығармашылық ізденістің вариативтілігін кеңейтетіні анықталды, күрделі тарихи және қиял-ғажайып контексттерді синтездеуге мүмкіндік береді. Негізгі нәтижелер нейрожелілердің суретшінің рөлін трансформациялап, стильдік және жанрлық шешімдердің мүмкіндіктерін кеңейтетінін дәлелдейді. Зерттеудің құндылығы – цифрлық генеративті костюм сценографиясының дамуына қосқан үлесінде және осы саладағы ұғымдық аппаратты өзектендіруінде. Жұмыстың практикалық маңызы костюм суретшілерін даярлау үдерісінде интерактивті педагогикалық әдістерді жаңғырту мүмкіндігінде айқындалады.

Кілт сөздер: нейрожелілік модельдеу, сахналық костюмді жобалау, кейіпкерді визуализациялау, цифрландыру, костюмнің генеративті сценографиясы, өнердегі жасанды интеллект.

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Использование искусственного интеллекта как творческого инструмента в генеративной костюмной сценографии

Аннотация. Современное развитие театрального искусства характеризуется активным внедрением цифровых технологий, которые трансформируют традиционные подходы к визуализации сценического образа. Визуализация персонажа в генеративной сценографии костюма перестаёт быть исключительно художественным процессом и всё чаще опирается на инновационные технологии. Цель исследования заключается в исследовании роли искусственного интеллекта (ИИ) как инновационного инструмента в современной генеративной сценографии костюма. Основные идеи работы сфокусированы на конвергенции нейросетевого моделирования и классических принципов театральной эстетики. Научная значимость заключается в теоретическом обосновании методов применения генеративных алгоритмов в создании сценического образа. Практическая значимость исследования заключается в оптимизации творческих поисков визуализации драматургического персонажа на основе четко сформулированной теоретической концепции сценографической идеи. Методология базируется на системном искусствоведческом анализе и методе сравнительного моделирования. В ходе исследования выявлено, что ИИ способствует расширению вариативности творческого поиска, позволяя синтезировать сложные исторические и фантазийные контексты. Основные результаты подтверждают, что нейросети трансформируют роль художника расширяя возможности стиливых и жанровых решений. Ценность исследования определяется вкладом в развитие цифровой генеративной сценографии костюма и актуализацией понятийного аппарата в этой области. Практическое значение итогов работы заключается в возможности модернизации интерактивных педагогических методов в учебном процессе при обучении художников по костюмам.

Ключевые слова: нейросетевое моделирование, проектирование сценического костюма, визуализация персонажа, цифровизация, генеративная сценография костюма, искусственный интеллект в искусстве.

1. Introduction

In the context of digitalization, the theme of artificial intelligence expands the range of artistic thinking and experimental forms of visual dialogue between art, technology, and theatre.

The problem of the study lies in the fact that today, in the educational process in universities, there is no methodology for teaching disciplines on the visualization of a stage character in the generative scenography of a costume using artificial intelligence tools.

The relevance of the research task lies in the fact that it is necessary:

1. To form a methodology and model for designing stage costumes using AI tools for the educational process in the process of teaching students - future set designers, make-up artists, and theater costume designers.

2. The developed toolkit is intended for teaching purposes in design and art disciplines, in order to develop students' project competencies.

3. In the educational process of studying artificial intelligence tools, students should learn how to make a stage synopsis or analysis of a play, which contains: a comparative analysis of dramatic works; an analysis of past and current productions and costume models in classical or experimental theaters; artistic features of changes in form, color, and individual details; the impact of a particular color or accessory in the expression of the character's personality; historical and cultural context.

4. As a result of the knowledge gained and the competencies formed, the student must learn to formulate and independently create a visualization of cultural codes, as well as emotional and dramatic features of a stage character through a costume.

The experience of predecessors, documented in the art-historical works of authors such as K. Khalykov and S. Karzhaubaeva, demonstrates that the key *problematic* field has always been the correlation between the technical realization of a sketch and the depth and multidimensionality of dramaturgical intent (Khalykov 2021: 86; Karzhaubaeva et al., 2023: 37). The conducted study revealed that existing tools generally focus either on the historical-theoretical aspects of costume or on purely software-based solutions (e.g., Marvelous Designer or CLO 3D), while ignoring the qualitative leap offered by neural network modeling.

Object of study: the process of stage costume design using digital technologies.

Subject of study: methods and results of neural network modeling for visual images of the characters.

Research objectives:

- To identify AI tools for the visual image of the character in generative costume scenography.

- To develop and test a Model of Integration of Neural Network Modeling into the Traditional System of Visual image of the character for Generative Costume Scenography.

- To evaluate the artistic and practical value of AI-generated results using examples from student scenographers' work.

The manuscript employed a comprehensive set of research methods: general scientific *methods* (analysis, synthesis, induction, deduction) and specific art-historical *approaches*, including systemic, comparative-historical, and semiotic analysis of the visual image of

the character as a sign system. The principal method used in the study is practical neural network modeling (based on Midjourney and Stable Diffusion), followed by art-historical interpretation of the results.

The hypothesis of the study rests on the assumption that neural network modeling functions not as an alternative to the academic sketch but as an AI-based tool of intellectual synthesis, allowing the overcoming of professional inertia and expanding the range of creative exploration.

The study's scientific novelty lies in a specific result: a step-by-step model for developing a stage character's costume image using generative AI is proposed, and its criteria for artistic evaluation are systematized.

Generative costume design refers to costumes created through algorithmic processes, where artificial intelligence generates stylistic forms, textures, and concepts rather than relying solely on manual design.

Digital costume created entirely within a digital environment, without physical embodiment, as exemplified by fully 3Dmodeled attire in CGI films such as *Avatar* and by character "skins" in video games.

Hybrid costume design can be exemplified by theatrical productions where traditional costumes are enhanced with digital projections or AR elements, and by performances in which fabric and accessories interact with sensory systems and multimedia content.

This article shows the potential of applying these recommendations in educational programs at theatre and art universities to improve the efficiency of professional creative teams in preparing stage productions and film projects.

2. Research Methods and Materials

In this section, we studied AI case tools for visualizing stage characters in generative costume scenography on the topic of Kazakh literary and folklore heritage (fairy tales, epics, legends, plays, etc.). The use of computer programs for statistical analysis of SPSS data consisted of several stages. Comparison of neural networks showed that in *Midjourney* and *Stable Diffusion*, the scores for "ethnocultural authenticity" turned out to be statistically higher.

The validity of the conclusions and the effectiveness of the applied research methods are substantiated by the formation of a representative database. The research material consisted of a complex of visual data, structured across three key aspects: quantitative, qualitative, and technological.

1. Quantitative indicators of the sample: The total volume of analyzed material includes:

- *Generative dataset (150 iterations):* Digital visualizations created in AI systems Midjourney (v. 6.0) and Stable Diffusion. Work with AI was based on the methods of linguistic modeling (prompt engineering), comparative analysis, semiotic method, iconographic analysis, project-experimental method, and testing using literary primary sources. Each of the ten second-year students developed a costume for their character based on the literary and folklore heritage of Kazakh fairy tales, epics, or legends. As a result, a total of 150 iterations were generated. The generation process included a sequential evaluation of 15 generations (iterations) per sketch. Validation and evaluation of the obtained images were

carried out according to specific criteria, including measurements: figurative and aesthetic compliance, accuracy of transmission of the source, semiotic completeness, proportions, color scheme, texture of materials. The assessment of these parameters was carried out directly by the performers - students, that is, the authors – developers, and under the guidance of the supervisor. The final works were evaluated by a commission of teachers of the Department of Scenography and a group of independent experts, specialized specialists.

- *Comparative (control) dataset (20 sketches)*: Authorial concept art created by traditional digital means (Adobe Photoshop, Procreate), serving as a benchmark for verifying the artistic solutions generated by AI.

- *Project-technical package*: Professional documentation including specialized texture maps and standardized color palettes developed for the realization of stage costumes.

2. *Qualitative characteristics and thematic structure*: The substantive part of the material was classified according to genre-thematic categories, covering the evolution of Kazakh literary and folkloric heritage, which are presented below in Table 1: Primary Sources for the Generation of Character Images from Literary and Folkloric Heritage.

Table 1. Primary Sources for Generating Character Images from Literary and Folkloric Heritage	
Genre-thematic Categories	Kazakh literary and folkloric heritage
Classical Dramaturgy	• Mukhtar Auezov – “Enlik–Kebek”, “Aiman–Sholpan”, “Karagoz”; • Gabit Musrepov – “Kozy Korpesh – Bayan Sulu”, “Akan Seri – Aktokty”; • Beimbet Mailin; Saken Seifullin; Ilyas Zhansugurov; (Karzhaubaeva et al., 2023: 38)
Kazakh Folk Tales and Myths	Er Tostik, Aldar Kose, Zhirenshe Sheshen, Ajdahar, Shaharistan Dastandary (Asanova, 2024: 25)
Plays Based on the Kazakh Epic	Kobylandy batyr, Alpamys batyr, Er Tostik, Ajdyn batyr, Er Targyn, Kyz Zhibek; (Zhanguzhinova et al., 2022: 245)
Ritual-Mythological and Syncretic Forms	Kozy Korpesh – Bayan sulu, Kambar batyr (Asanova, 2024: 25)
Folkloric Theatrical Compositions	BatyrLAR zhyry, Anyzdar aley (Nurzhasarova, 2005: 23)
Contemporary Kazakhstani Science Fiction and Fantasy	Yilmaz Nurgaliev – series “Dastan and Arman”; Zaure Turekhanova – “Amina Turan in the Land of Nomads”; Zira Naurzbayeva and Lilia Kalas – “In search of the golden bowl: The Adventures of Batu and His Friends”; Timur Yermashev – “Qaira tirilgen afsana” / “The Legend revived” (Zhanguzhinova et al., 2022: 245)

3. *Verification and Reliability of the Material*. As a result of the conducted empirical study, the qualitative value of the sample was identified and determined by two fundamental criteria:

1. *Ethnocultural Authenticity*: The iterations are based on a profound analysis of the national context, which ensures the preservation of the identity of the visual image when employing global digital tools.

2. *Semiotic Validity*: The generated images correspond to the semiotics of the visual image of the character (color symbolism, ornamental load, silhouette signification) – degree of Study and Software Tools. During a review analysis of existing works describing AI as

a means of auxiliary graphics, the analysis indicates that this study introduces an element of cognitive novelty.

Within the framework of this study, the assessment of the parameters "*ethnocultural authenticity*" and "*semiotic validity*" was carried out using the developed 5-point interval scale. The introduction of a quantitative measurement scale made it possible to translate the qualitative characteristics of visual art into verifiable metrics:

1. *5 points* – absolute compliance (full preservation of ethno-cultural identity, unmistakable reflection of national semiotics, absence of digital AI artifacts);
2. *4 points* – insignificant deviations (high authenticity with minimal errors in the detailing of the ornament or silhouette);
3. *3 points* – partial correspondence (basic ethno-cultural markers are recognizable, but there are generalizations inherent in global AI algorithms);
4. *2 points* – low correspondence (serious distortions of the cultural context, eclecticism, substitution of national codes with universal patterns);
5. *1 point* – complete discrepancy (ethnocultural identity and semiotics of the stage character are completely lost).

To minimize the subjective factor and ensure the objectivity of the results, an expert panel was formed, which included 7 independent specialists. The selection of experts was carried out based on their professional profile: the group included specialists in the field of scenography and costume design (3 people), experts in traditional culture and ethnography (2 people), as well as specialists in the field of digital art and generative graphics (2 people).

Statistical analysis of the results of the examination demonstrated a high level of agreement with experts' opinions. The degree of agreement was checked by calculating the *Kendall concordance coefficient* (SW), the value of which was $SW = 0.84$ (with a significance level of $p < 0.01$). Such a high index of inter-rater agreement suggests that the developed evaluation criteria (semiotics of the silhouette, color symbolism, ornamental load) have clear objective markers that can be read by specialists independently of each other.

Unlike most existing studies, where artificial intelligence is positioned exclusively as a means of "auxiliary graphics" for the rapid generation of sketches, this study introduces an element of cognitive novelty, representing neural networks as an intelligent tool for co-authorship.

The experiment proved that the final quality and authenticity of a visual image directly depend on the degree of knowledge and IT competencies of the operator (prompt engineer). A deep preliminary analysis of the national context and mastery of linguistic modeling methods made it possible to overcome the "averaging" and globalization of images embedded in the Midjourney and Stable Diffusion algorithms. The study identifies a set of AI tools for visualizing images of the characters in generative costume scenography, presented in Table 2 below.

Table 2. AI Toolkit for Visualizing Images of the Characters in Generative Costume Scenography		
Title	Primary Function	Description
AI Toolkit for ideas and artistic concepts (image, epoch, style)		
CHAT GPT	- dramaturgy - character design	Generates ideas and text descriptions of visual images of the characters; forms the concept of costume, era, symbolism, and image of characters
Mi-djourney	concept development	Creates expressive visual concepts of the visual image of the characters and costumes, considering the era, style, and artistic metaphors
DALL-E	sketching	Creates visual concepts for visual images of the characters; allows you to experiment with the shape, color, and style of costumes
Artbreeder	character design	Creates visual images of the characters, variations of appearance and costumes, as well as quick visualization of artistic concepts of characters
AI Toolkit for sketching and costume development		
Stable Diffusion (by means of ControlNet)	sketching	Designs stage costumes with precise control of posture, silhouette, and structural details. Creates prototypes of visual costumes based on text, diagrams, and sketches.
Adobe Sensei	image design	Develops styles, shapes, and textures while maintaining the author's creative solutions.
AI Painter	pictorial sketching	Creates artistic sketches of hand-effect costumes, detailed and expressive visual concepts in a traditional style
GAN (AI-trained models)	artistic styling	Generates unique visual sketches of stage costumes.
AI Toolkit for creation of fabrics, textures, and color		
Adobe Sensei	image design	Creates costume sketches, automatically selects colors, adjusts images, creates masks, and accurately visualizes details.
DeepArt, Prisma	stylization	Stylizes costume sketches, imitates pictorial, graphic, and decorative art techniques, and improves fabrics and textures with a unique and expressive visual style.
Evoto.AI	detailing	Improves the visual accuracy of costume sketches, carefully works out texture, textiles, and chromatic schemes in the development of stage costumes.
AI Toolkit for presentation of the costume in motion		
RunwayML	motion	Visualizes images of the characters in dynamic movement, creates animations and concept art of costumes in theatrical practice, and generates costume scenography.
Kaiber. AI	visual shaping	Visualizes the dynamic movement of visual images of the characters, creates animations and concept art of costumes, and generates performance costumes in theatrical productions.
Autodesk Generative Design	structural formation	Generates complex costume designs, models structural frameworks, adapts dynamic stage performance, and combines with graphic editing environments.

Magnific AI	3D concept development	Creates and refines three-dimensional concept models, enhances details, and transforms costume images using text input.
AI Toolkit for stage presentation for director and production team		
Colorize.cc, Evoto.AI, Artisto	artistic styling	Stylizes and perfects costume sketches, enhances color, restores and transforms conceptual images into artistic styles, and creates presentations for the stage director and production team.
Canva	presentation	Generates collages, mood boards, and complex design albums, and visualizes theatrical costume concepts.
Beautiful.AI	• concept development • presentation design	Creates a visual structure, concept, images of visual image of the characters, and costume design.

Thus, while studying AI-based tools for the visualization of visual images of the characters, the main *taxonomic groups* with criteria for prompts were identified, depending on their aims, tasks, and functions within generative costume scenography:

- *dea and artistic concept (image, epoch, style)*, with an emphasis on dramaturgy and character development, visual concept, quick sketches, and personas. Criterion: *Dramaturgical accuracy* – correspondence to epoch, social status, age, and character of the hero. The costume must “tell” the story even before the actor speaks (Daniele & Song 2019: 157; Manovich 2024: 4).

- *Sketch and costume development*, producing professional sketches, artistic refinement, painterly drafts, and authorial style. Criterion: *Stage functionality* – consideration of movement specifics (whether the actor needs to jump, fence, or change quickly) (Schaffland et al., 2020: 45; Lewis 2019: 2).

- *Fabrics, textures, color*, providing representation of image work, stylization, and detailing. Criterion: *Materiality and tactility* – clear understanding of fabric type (velvet, silk, torn burlap). AI must convey how light will fall on the surface (Zhanguzhinova 2024: 290; Selvi et al., 2025: 2).

- *Costume in motion/stage space, forming costume dynamics*, plasticity of the image, construction, and 3D concepts. Criterion: *Silhouette legibility* – on stage, silhouette is more important than small details. The spectator from the last row must recognize the character by outline (Clark & Sood 2022: 8; Selvi et al., 2025: 4; Zhanguzhinova, 2024: 290).

- *Presentations for the director and production team*, conceptualizing the overall representation of artistic styles, presentations, and idea delivery. Criterion: *Color dramaturgy* – interaction of costume color with intended lighting and stage decorations (He 2023: 147; Choi 2022: 3).

The *research methodology* is based on a comprehensive approach; therefore, the following *methods* were employed: comparative analysis, prompt engineering, semiotic method, and approbation. Considering the above, the central *research question* of this study is: “How do generative design algorithms transform the traditional methodology of creating a visual image of the character, and are they capable of ensuring the artistic integrity of costumes in accordance with dramaturgical intent?”

Based on the findings of both theoretical and empirical analysis, the *research thesis* can be formulated as follows: in the context of digitalization, neural network models function as

effective AI-based tools for expanding artistic thinking in generative costume scenography, enabling the creation of visually expressive and conceptually profound images of the characters. Their application integrates dramaturgical expressiveness, cultural codes, and experimental forms of visual dialogue between art, technology, and theatre.

Drawing on previously obtained data, the following *stages of research* were identified:

1. Analytical-preparatory stage – formation of a textual descriptor of the character based on dramaturgical analysis.
2. Generative stage – multi-step neural network modeling of visual concepts.
3. Art-historical selection – expert evaluation and selection of images possessing artistic value.
4. Final design stage – refinement of the digital image into a working sketch suitable for material realization.

The research tasks were addressed through the following *methodical approaches*:

- Prompt engineering method – linguistic modeling: encoding art-historical categories into technical queries for AI.
- Comparative analysis method – juxtaposition of generative design results with canonical principles of theatrical aesthetics.
- Semiotic method – analysis of costume as a system of signs transmitting the inner state of the character.
- Iconographic analysis method – applied to the study of visual sources (epic illustrations, archival photographs of theatrical productions) to ensure historical and artistic authenticity of the designed images.
- Project-experimental method – employed in the creation of technical documentation (texture maps and palettes), enabling the translation of abstract digital iterations into practical design.
- Approbation method – experimental implementation of digital sketches in the process of virtual prototyping of stage costumes.

Thus, while *studying methods* of the visual image of the character by using AI generative costume scenography, a system of criteria for evaluating the “digital costume” is expected to be developed. These criteria are essential for ensuring reproducibility of results and for identifying patterns of AI’s influence on the architectonics of the visual image of the character. Considering the specificity of the research object, this will allow the transition from random generation to the conscious application of artificial intelligence in generative costume scenography to be documented.

2.1 Materials

The analysis of the theoretical foundation of the study allows existing works to be distributed across three key vectors: theory of theatrical costume, digital transformation of art, and applied use of artificial intelligence.

Fundamentals of generative costume scenography. The basis for understanding the nature of the visual image of the character remains the works of both domestic and international classics. The research of M. Zhanguzhinova and M. Nurzhasarova established a methodology for analyzing costume as a socio-cultural code. In Kazakhstani art studies, A. Asanova’s work holds fundamental significance, as it examines in detail the semantics of

traditional costume, which is critically important when employing AI for the interpretation of national imagery (Asanova 2024: 20). However, these studies are limited to the pre-digital era (Zhanguzhinova et al., 2022: 245; Nurzhasarova 2005: 45).

Digitalization and contemporary generative costume scenography. New approaches to design are presented in the works of Selvi, P., Santhiya, M., Madhumitha, M., Shrimathi, V.A., Choi, K.-H., and Lewis, J., who examine the impact of 3D technologies on the materiality of clothing (Selvi et al., 2025: 2; Choi 2022: 2; Lewis 2019: 3). Issues of digital aesthetics in the Kazakhstani context are raised in publications by scholars in the fields of art and culture, where the transition to screen-based forms of art is documented (Khalykov 2021: 87).

Artificial intelligence in art. The influence of neural networks on visual creativity is actively discussed in the works of L. Manovich, who introduces the concept of "AI Aesthetics", and M. Ridley. These authors analyze AI as a tool of generation but hardly address the specificity of stage costume design, which requires consideration of actor dynamics and theatrical laws (Manovich & Arielli 2024: 4; Ridley 2020: 10).

Thus, the above literature review served as the basis for identifying gaps and the scholarly contributions of all authors to the study of generative costume scenography. Despite the presence of significant works, modern scholarship demonstrates the following deficiencies:

1. The absence of methodologies linking linguistic prompts of neural networks with art-historical categories of theatrical costume composition.
2. Insufficient exploration of authorship and artistic integrity in the transition from "machine-generated" sketches to material embodiment.

This study addresses these gaps by proposing an authorial Model of Integration of Neural Network Modeling into the Traditional System of Visual Image of the character for Generative Costume Scenography. In this study, AI is approached as part of the scenographic process, while the costume designer retains the key role.

3. Discussion

This allows us to argue that the AI generates hyperdetailed images, such as multilayered fabric simulations and microornamental detailing, which are difficult to reproduce manually at the sketch stage. For example, three-dimensional textured details of a suit, which can be made on a 3D printer, are visually depicted by AI so that they can be implemented. This establishes a new level of detail, comparable to traditional costume sketches.

However, limitations were identified: despite its technological superiority, AI still requires an art-historical filter to correctly interpret ethnographic and historical codes, confirming the irreplaceable role of human intelligence in creating profound artistic meaning.

4. Results

Through empirical analysis, research materials and methods were examined, and *primary sources for generating images of characters from literary and folkloric heritage were identified, along with AI tools for the visual image of the character in generative costume scenography and taxonomic groups with criteria for prompts.*

Scientific proposition 1. The AI toolkit for the visual image of the character in generative costume scenography includes the following stages: analysis and concept (pre-

AI), textual description (Prompt Engineering – Linguistic Modeling: Encoding Artistic-Historical Categories into Technical Queries for AI), iterative generation, detailing and technical refinement, elimination of limitations, and methodological risks. Analysis and Concept (Pre-AI). The formation of a visual image in neural network generation represents a multi-stage process beginning at the pre-conceptual stage ("Pre-AI") and based on analytical modeling of the character. Psychological and semantic elaboration of the image determines the choice of stylistic and visual strategy, which is subsequently formalized into a structured textual prompt. Final verification ensures that the generated result corresponds to the initial concept, whereby neural network generation functions not as a random act but as a controlled method of creating a conceptually coherent visual object. Example of textual description (Prompt Engineering):

Scientific proposition 2. For achieving high-quality results, the following formula is proposed – the authorial Model of Integration of Neural Network Modeling into the Traditional System of Visual image of the character for Generative Costume Scenography (see Scheme 1).



Below is an example of Prompt Engineering – linguistic modeling for Midjourney (v6+), constructed according to the proposed formula: *young male warrior, dragon-themed costume, dark fantasy aesthetic, three-quarter view, studio gray background, asymmetrical armor with dragon-shaped shoulder pauldron, sculpted metallic scales, blackened steel and leather, dragon scale textures, crimson sash around waist, layered fabrics, ritual ornament near the eye inspired by dragon symbolism, cinematic lighting, high realism, ultra-detailed fabric and metal, theatrical costume design, concept art, dramatic mood, sharp focus, realistic proportions --v 6 --style raw --ar 2:3 --q 2.*

Below is a sketch of the stage costume for the character Dragon, created with the use of AI-based tools by second-year student Berikkyzy Symbat, specializing in Theatre, Film, and TV Makeup, within the discipline of Character Design Development, under the supervision of M. Ye. Zhanguzhinova (see Fig. 1).



Figure 1. Sketch of the stage costume for the character Dragon, created by Symbat Berikkyzy.

As shown in Figure 1, the stages of designing costume sketches for the character were carried out using various AI tools: from analysis and concept formation (pre-AI), textual description (Prompt Engineering), detailing and technical refinement, elimination of limitations and methodological risks, as well as adjustments of final photographs on the actor-model.

In the educational process of working on the character of the Dragon for the Kazakh fairy tale, the student carried out several stages of work:

At the research stage, various literary works on the chosen topic were studied, and all theatrical performances in children's theaters in Kazakhstan were analyzed. Dragon costumes in different productions were studied for their shapes, colors, texture of fabrics, silhouettes, materials, style, and artistic solution.

At the theoretical stage, the student developed a synopsis of research for the character of the Dragon. The descriptive characteristics included: the character's personality, the role in the play, gender, temperament, color scheme, texture of materials, description of shapes and silhouette lines.

At the comparative stage, preliminary exploratory sketches and copies of works on productions in children's academic and experimental theaters were created.

At the creative stage, several sketches for the character Dragon were developed by hand on their own.

At the stage of sketch processing, sketches for the Dragon character were generated in AI. To do this, a prompt was developed based on the text that was compiled in the synopsis. In the process of generating a sketch, adjustments were made to improve the visual solution. Each student made at least 15 adjustments in the process of generating sketches. At the stage of editing the sketch, the student improved shapes, shades of color, texture, and silhouette.

At the stage of tailoring the costume, the student made several fittings of the product on the actor. In the process of fitting, changes were made to the fit of the product on the figure and detailed adjustments.

Thus, the generation of sketches of theatrical costumes using AI helps to summarize the existing global experience in theater design, improve the visual effect using AI tools, while not losing the author's intention.

Iterative generation. In neural network practice, the optimal visual result is achieved through iterative refinement, where the initial generation serves as a starting point for subsequent corrections. Mechanisms of local variations (Vary / Region) allow modification of individual elements of the image without disrupting the overall composition. Functions of frame extension (Zoom Out, Outpainting) enable the expansion of the image beyond its original boundaries while maintaining the visual integrity of the figure and environment. The image-to-image method employs a preliminary sketch as a structural basis for overlaying volume, detailing, and texture. The combined application of these approaches transforms the generation process into a controlled research cycle, enhancing authorial control over the outcome and improving the quality of the final visual solution.

Detailing and technical refinement. At the final stage of neural network generation, the image is integrated into professional graphic editors and AI-based post-processing tools to adapt it to production and presentation requirements. Upscaling increases resolution and

detail for printing or large-format display, while orthographic projections are created for complex object structures to facilitate interpretation. Color correction ensures alignment with the artistic palette of the project. Post-processing translates the generated result from the conceptual level into the applied domain, ensuring both functional and aesthetic suitability.

Elimination of limitations and methodological risks. Experimental application of neural network modeling in generative costume scenography reveals fundamental constraints: "pattern hallucinations" render some visually convincing elements technologically or anatomically unrealizable, requiring expert filtering by the costume designer. Additionally, neural network images should be regarded as preliminary material requiring authorial refinement to ensure compliance with copyright. These findings summarize the results of AI applications and their theoretical interpretation within the context of contemporary generative costume scenography. The findings of the Independent-Samples T-Test suggest that the use of AI (based on diffusion models) reduces the prefiguration stage (search for visual metaphors). Unlike the traditional "mood board" method, AI synthesizes the visual image of the character not discretely but syncretically, combining historical cut, texture, and the emotional state of the hero within a single iteration.

Scientific proposition 3. Neural network modeling introduces into art studies the concept of the "dynamic sketch", which is not a static canon but a variable visual environment.

Comparative analysis. In contrast to classical approaches described in the works of K. Khalykov, where the sketch is a rigid fixation of the artist's intent, our results demonstrate a "diffusion of meanings." While L. Manovich considers AI as a tool for processing large datasets, in the context of costume design, we documented the ability of algorithms to "intuitively" select textures simulating stage lighting – a capacity previously regarded as the exclusive prerogative of artistic sensibility (Khalykov 2021: 100; Manovich & Arielli 2024: 13).

Thus, comparative analysis has shown that the gap identified in the literature review – the absence of a connection between textual prompts and costume semiotics – is overcome through the development of a "visual tag lexicon."

5. Conclusion

The study was tested based on term papers of students - set designers, make-up artists, and theatrical costume designers. The hypothesis was confirmed by the fact that student-crafted work carries the author's intention, while AI tools synthesize the world's best practices and expand the variability of generative costume scenography.

Knowledge:

1. Mastering the principles of generative graphics and artificial intelligence algorithms.
2. Understanding prompt engineering techniques for visualizing stage costume and scenery.

3. Knowledge of the ethical and cultural aspects of the use of AI in the theatrical arts.

Skills:

1. Formulate artistic problems and translate them into parameters for generative models.

2. Analyze and adjust digital sketches, adapting them to the dramatic context.

3. Integrate AI results into the traditional stage image development process.

Skills:

4. Work with Midjourney, Stable Diffusion, and similar tools.
5. Critically evaluate AI-generated visual solutions.
6. Create a synopsis and analytical comment on the generated thumbnails.

During the study, the following key scientific results were obtained:

1. *Five-stage design algorithm* – an end-to-end method for visualizing a stage character has been developed and tested, transforming the generation from a random act into a controlled process. The algorithm includes five consecutive phases: pre-generative analysis ("Pre-AI"), linguistic modeling (prompt engineering), iterative synthesis, technical detailing, and verification of methodological risks.

2. *Controllability of the creative act* – at the analytical stage of "Pre-AI", the factor of randomness is completely excluded. Semantic encoding of artistic-historical categories into technical prompts transforms work with neural networks into a strictly controlled method of creating a conceptually integral visual object.

3. *The author's integrative model* is a mathematical and artistic formula (model) that organically integrates neural network modeling into the traditional (classical) costume design system.

4. *The concept of "dynamic sketch"* has been introduced into scientific circulation as a new form of visualization in scenography, replacing static graphics with a variable digital environment.

This study was aimed at substantiating the effectiveness of artificial intelligence as an innovative tool in generative costume scenography. To achieve this goal, a comprehensive methodology was applied, combining neural network modeling (using Midjourney, Stable Diffusion, and others) with systematic art-historical analysis.

The integration of AI into the process of stage costume design enables the attainment of a qualitatively new level of detail and expands the range of creative exploration. The main findings of the study can be summarized as follows:

Artificial intelligence transforms the method of sketching from a linear process into iterative synthesis, where the designer controls parameters of style, texture, and semantics through prompt engineering. The success of a project in generative costume scenography is largely determined by the precision and competence of linguistic modeling for the AI prompt. This allows us to argue that neural networks are capable of correctly operating with categories of theatrical aesthetics.

AI tends to shorten conceptual exploration without affecting artistic integrity. The findings open broad perspectives for further research in the field of digital anthropology of theatre.

The proposed methodology can be incorporated into higher education curricula (such as at the T. Zhurgenov Kazakh National Academy of Arts) within the program Scenography. Practical application of the study's outcomes in professional theatre studios and film production will optimize pre-production processes and enhance the competitiveness of visual content. Future development of the topic lies in the exploration of ethical aspects of authorship in generative art and the creation of specialized neural network models trained on local ethnocultural material.

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