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<https://orcid.org/0009-0008-6686-8618>[kuryliaknazarii02@gmail.com](mailto:kuryliaknazarii02@gmail.com)**THE USE OF ARTIFICIAL INTELLIGENCE IN TATTOO DESIGN: A TWO-MACHINE CONFIGURATION FOR UNPRECEDENTED BLACK AND GREY REALISM**

*This research explores the integration of artificial intelligence (AI) in tattoo artistry, emphasizing its application in black and grey realism through a dual-machine setup. It examines how combining AI-generated sketches with traditional artistic techniques can enhance creativity and efficiency. Additionally, the study evaluates the use of two specialized tattoo machines – one for light tones and gradients, the other for dark shades and contrasts – to achieve exceptional artistic and technical results.*

*The study employs a multi-faceted approach, starting with AI tools such as MidJourney to generate initial sketches. These sketches are refined using digital platforms like Procreate to ensure anatomical accuracy, followed by freehand drawing to add depth and a personalized touch. During the tattoo process, a dual-machine configuration is utilized: one machine is calibrated for soft tones and smooth shading, while the other focuses on dark tones and bold contrasts, ensuring an efficient and seamless workflow.*

*Findings reveal significant advancements in tattoo design and execution. AI accelerates the creative phase, enabling artists to conceptualize complex designs with speed and precision. These designs are tailored to complement the human form, resulting in tattoos that are cohesive and highly detailed. The dual-machine setup facilitates smoother tonal transitions, enhances realism, and improves efficiency while reducing skin trauma for faster healing. Together, AI tools and dual-machine techniques elevate artistic standards, allowing the creation of lifelike tattoos with sculptural depth.*

*The study introduces a pioneering hybrid system that merges AI-driven design processes with dual-machine tattooing methods. It seamlessly incorporates AI into tattoo workflows while showcasing a unique application technique, establishing new standards for precision and innovation in tattoo artistry.*

*The integration of AI technology and dual-machine techniques offers significant advantages for tattoo studios. These innovations optimize workflows, minimize skin trauma, and enhance the overall quality of tattoos. By implementing this framework, studios can boost both creative development and operational efficiency, achieving superior outcomes for artists and clients alike.*

*Keywords: Tattooing, black & grey realism, dual-machine set-up, shading method, tattoo art of the modern age.*

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**1. FORMULATION OF THE PROBLEM IN GENERAL TERMS AND ITS CONNECTION WITH IMPORTANT SCIENTIFIC OR PRACTICAL TASKS**

In modern society, tattooing has emerged as a distinctive and multifaceted form of self-expression, blending artistic creativity with deeply rooted cultural traditions that have shaped human history. As a subject of scientific research, tattoo styles are analyzed through a wide range of perspectives, including their historical development, cultural significance, psychological impact, and artistic foundations. Scholars and researchers in this field aim to explore various aspects of tattooing to classify and understand the defining characteristics of contemporary tattoo styles, illuminating their complexity and evolution over time [8].

Consequently, the need to reduce the time spent on creating tattoo sketches drives artists to embrace modern innovative technologies that enhance the creative process. One such tool is neural networks – programs capable of analytically processing analog designs,

identifying their features, and generating unique visual content based on them. These networks consist of numerous interconnected neurons that operate similarly to the human brain.

The application of artificial intelligence in design, particularly in the creation of tattoo sketches, represents a promising direction that is being intensively researched and developed. Recent studies highlight that technologies based on artificial intelligence significantly transform the creative process, offering innovative tools for generating visual content and optimizing designers' workflows.

**2. ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS**

In modern society, the integration of artificial intelligence is becoming increasingly significant, drawing the attention of specialists from various fields. The application of artificial intelligence spans a wide array of tasks: from everyday activities to advanced technological developments. This study, however, focuses on a specific aspect – the use of artificial intelligence

in the creation of tattoo designs. This innovative approach not only expands possibilities for artists and admirers of unique art in tattooing but also encourages a reevaluation of the interplay between technology and art.

According to O. Kolisnyk, R. Mykhailova, O. Berehovi, V. Vlasiuk, and D. Kurovska, neural networks like Midjourney exhibit high efficiency in generating multiple variations of graphic images, significantly streamlining the process of obtaining diverse conceptual ideas for further project development. This enables designers to save time during the initial stages of creativity and concentrate on tailoring sketches to clients' individual preferences. Researchers highlight that the use of neural networks enhances the quality and diversity of visual products [5].

In the study by T. Bozhko and V. Arefyev, the prospects of using neural networks in the creation of visual content for various products related to graphic design are examined. The authors conduct a detailed analysis of the effectiveness of platforms such as Maze Guru, MidJourney, and Leonardo AI in the context of character concept generation, location visualization, logo design, and the development of branding elements. However, attention is also given to the limitations of these technologies, particularly in areas such as font work, engineering graphics, layout design, and infographic materials. According to the authors, the inherent advantages of neural networks include high speed in creating graphic content and the ability to integrate various software solutions. At the same time, the disadvantages include the monolingual nature of the algorithms and the tendency for uniformity in results with similar queries. The results of the study demonstrate that neural networks can significantly optimize the process of developing graphic content by offering innovative solutions to design challenges, especially in fields such as computer game development, printed material creation, and brand identity formation. However, the authors emphasize the importance of further technical advancements in neural networks to solve more complex design problems, outlining prospects for deeper research in this area [2].

The replacement of human activity with artificial intelligence in the field of art is becoming increasingly common. In 2005, the first artificial intelligence capable of drawing human portraits was created, enabled by facial

recognition and image reconstruction technologies. Drawings produced in this manner resembled human-created works so closely that their handmade origin was beyond doubt. However, this fact remained unnoticed by art professionals until 2018. It was then that the French team «Obvious» used a generative adversarial network («GAN») to create a portrait of Edmond de Belamy, an imaginary French aristocrat, which was sold at auction for \$432,500. This event came as a surprise to the art and marketing industry, as prior to this, similar generated works had not achieved such significant prices. This event not only sparked discussions regarding the valuation of art created by artificial intelligence but also raised questions about the risks of displacing human creative labor and the potential devaluation of personal contributions in art [4; 5].

The ethical implications of AI usage in graphic design development were also explored. Specifically, Melanie Stockton-Brown's work, «Inking Cultures: Authorship, AI-Generated Art and Copyright Law in Tattooing», examines the interplay between artificial intelligence (AI), authorship issues, and legal regulation in the tattooing industry, particularly in the context of AI-driven artistic design creation. The author provides a thorough analysis of the cultural, legal, and creative dimensions of tattooing, focusing on the challenges of defining authorship in algorithmically generated artistic works. The article introduces the concept of a new model of collective authorship, which acknowledges the tattoo artist's role as a creative agent, alongside the cultural and personal contexts of clients [8].

The researcher conducts a pilot empirical study based on an analysis of user comments on the YouTube platform to explore the professional tattooing community's perspectives on the impact of AI-generated designs on their practice. The article's primary conclusion is that AI cannot be regarded as a traditional «author» of tattoos due to the multifaceted nature of the creation process, which blends human artistry, cultural heritage, and clients' personal narratives. This study addresses gaps in the academic literature regarding the effects of artificial intelligence technologies on the tattooing field, while proposing a culturally sensitive approach to tackling the legal and creative challenges in this profession [8].

### **3. IDENTIFICATION OF PREVIOUSLY UNRESOLVED PARTS OF THE GENERAL PROBLEM TO WHICH THE ARTICLE IS DEVOTED**

The art of tattooing is currently undergoing profound changes, seamlessly intertwining centuries-old traditions with innovative technological approaches that are rapidly finding their place in this creative process. One of the most impressive and promising trends today is the integration of artificial intelligence (AI) in the development of tattoo designs. Thanks to the capabilities of artificial intelligence, the creation of complex sketches is significantly simplified, allowing artists to draw inspiration from a wide range of ideas and stylizations. However, even the boldest AI-generated concepts require subtle adaptation to the individual anatomical features of the human body, which becomes an essential part of the artistic process.

At the same time, traditional tattooing techniques have their limitations in reproducing smooth color gradients and high levels of detail, which often become challenges for artists. In response to these modern demands, a dual-machine tattooing technique was developed – an innovative method aimed at achieving stunning realism with precision down to the smallest details. This approach opens up new possibilities for the black & grey realism style, ensuring impeccable tonal transitions and exceptionally natural rendering of forms.

The primary goal of this study is an in-depth analysis of the impact of artificial intelligence on the process of tattoo design formation and the evaluation of the effectiveness of the dual-machine technique for precisely and elegantly executing realism stylistics. The integration of these modern tools has the potential to radically change perceptions of the art of tattooing while simultaneously expanding the creative possibilities of artists.

### **4. FORMULATION OF ARTICLE OBJECTIVES**

The article aims to analyze the impact of artificial intelligence (AI) on the tattoo design creation process, specifically the use of neural networks and platforms like MidJourney to accelerate creative processes and generate innovative ideas. The study focuses on evaluating the effectiveness of the dual machine technique in ensuring smooth tonal transitions and the realism of tattoos, as well as examining ethical

and legal aspects of authorship and intellectual property rights in the context of AI-generated designs. Additionally, the article explores the integration of traditional tattooing methods with modern technological approaches, identifying development prospects for tattoo art and its influence on the black & grey realism style.

### **5. PRESENTATION OF THE MAIN STUDY MATERIAL WITH FULL JUSTIFICATION OF THE OBTAINED SCIENTIFIC RESULTS**

The art of tattooing is rapidly evolving, blending centuries of traditional expertise with a surge of recent technological innovations. One of the most notable trends in recent years has been the use of artificial intelligence (AI) in the initial design phase.

It has revolutionized the workflow entirely: preliminary sketches can now be created in seconds, a task that previously required hours of human effort. While AI has transformed the way designs are conceived, the actual artistic process of tattooing remains rooted in transferring these concepts onto skin. Meanwhile, visionary tattoo artists are pushing boundaries not only in design but also in the very techniques used to create tattoos. Clear evidence of this evolution can be seen in the authorial twin-machine setup – a two-tattoo machine system employed in one session: one configured for lighter colors and softer shading, the other for darker colors and heavy contrast. This system delivers smoother gradients, reduced session times, and depth that redefines excellence in black & grey realism. Artificial intelligence is swiftly becoming an indispensable creative tool across all artistic fields, and tattooing is no exception [1; 3]. Platforms like MidJourney enable tattoo artists to generate dozens of potential sketches in mere minutes.

One prompt can produce a range of visually engaging compositions, sparking ideas that would have taken hours to create by hand. The speed and agility of AI open up an entirely new universe of creativity: from detailed mythological environments to abstract forms and sculptural motifs that might otherwise never be imagined. However, sketches produced by AI are rarely «tattoo-ready» [6]. They are not anatomically correct, often requiring adjustments to the curves and planes of the body, and need refinement before they can serve as the foundation for a high-quality, long-lasting tattoo. This is where the

artist's interpretative work begins: redrawing, restructuring, and reshaping the image to fit an arm, back, or chest, while achieving balance. One of our hallmarks is a patented, multi-step process for creating sketches using both technology and traditional skills. In the first phase, we use MidJourney to generate numerous iterations of the concept, exploring a variety of potential compositions, styles, and moods for the future tattoo [3]. In the second phase, we transfer those images into Procreate, meticulously refining the details: adjusting proportions, perfecting lines, and designing the piece to naturally complement the body.

MidJourney has become one of the leading AI-based generative art platforms, widely utilized for creating tattoo sketches. According to scientific sources and analytical reviews, the platform facilitates the creation of highly detailed, stylish, and innovative visual images based on textual prompts. This opens up vast opportunities for self-expression and personalized approaches in the art of tattooing. However, experts emphasize that while MidJourney is a powerful tool, the final design requires professional refinement and adaptation to the anatomical specifics of each individual, carried out by the tattoo artist.

Scientific research highlights that integrating artificial intelligence technologies with traditional tattoo techniques not only accelerates the sketch creation process but also fosters the emergence of new stylistic approaches. This effectively blurs the line between digital and manual art. Thus, MidJourney becomes an innovative tool that transforms the creative process and opens up new perspectives in the development of the tattoo industry.

The role of using the Procreate application in enhancing communication between the tattoo artist and the client is particularly notable. Thanks to the ability to pre-create visualizations of the future tattoo directly on a photo of the client's actual body part, it becomes possible to make more informed decisions regarding composition and style. This technological solution not only accelerates and optimizes the creative process but also significantly increases the level of individualization and creativity in modern tattoo art.

Procreate represents one of the leading digital tools for sketching tattoos, popular among contemporary artists due to its multifunctionality. Specifically, the application provides extensive

access to working with layers, various types of brushes, high-level detailing, and allows testing the placement of designs directly on the client's body. Analysis of scientific literature and specialized reviews reveals that platforms like Procreate significantly transform the traditional approach to tattoo design. They enable artists to experiment with shapes, proportions, color characteristics, and placement of future designs before the artwork is applied to the skin.

Moreover, with Procreate, it is simple to modify developed sketches, integrate images generated by artificial intelligence, adapt them to the anatomical features of each client, and create unique, original works. This combination of automation and the individual artistry of the artist ensures a new level of quality and creative self-expression in the field of tattoo art.

The final process involves freehand drawing directly by hand, with signature flair, understated strokes, and layered depth. This process of layering – from AI concept development to digital redrawing and finally freehand completion – ensures every tattoo is truly one-of-a-kind, with a degree of detail and expression unattainable through a single method alone. This fusion of AI-driven creativity and the interpretive skill of the tattoo artist has produced a hybrid process where technology inspires and accelerates design [1; 3], yet the artist remains the ultimate author of the artwork. While the design has evolved, a similar transformation has occurred in the application stage of tattooing. For decades, most tattoo artists used one machine per session, constantly reconfiguring the same machine for multiple uses: lighter shading, darker filling, fine lines, and so on [6]. This constant reconfiguration, while functional, had clear limitations.

Chopping voltage, needle group switching, or pausing to rezero often disrupted rhythm, slowed progress, and could lead to uneven shading. The author's double-machine setup addresses all these issues directly. Instead of relying on one machine to handle everything, the artist uses two, each performing a distinct role. The first machine is precisely calibrated to render light tones, delicate transitions, and smooth gradations. It creates the delicate highlights and glints that bring a face to life, as well as the appearance of light on stone or skin. The second machine is set for dark tones and deep contrast, producing shadowy depth, sculptural weight, and richness that anchors the composition.

By swapping machines, the artist avoids wasting time re-tuning a single machine. The work process remains uninterrupted: one for light, one for dark – an unbroken tonal choreography that yields brilliant results. The benefits of this method are clear. Technically, it saves time and enhances focus. The artist stays «in the zone», seamlessly shifting between machines without missing a beat, resulting in faster sessions and less exhaustion for both client and artist [7]. Physiologically, it's better for the skin. Since each machine is tailored to its specific use, there is less damage to the skin being tattooed, leading to neater healing and reduced irritation. Aesthetically, the results are remarkable: increased tonal range, smoother transitions, and a more realistic feel.

Tattoos created in such a way will have a «sculptural» quality to them, as if the image can lift off the skin [2]. When the groundbreaking dual-machine system is used in conjunction with AI-generated sketches, an alliance of imagination and realization is achieved, pushing the horizons of tattoo artistry to new heights [3; 8]. AI provides the idea seed: an ocean of creative possibilities. The dual-machine system ensures that those concepts are brought to life on flesh with unparalleled tonal definition and quality. Tattooing is now at the forefront of a new frontier. The technique and the technology no longer exist separately; they meet and improve one another [1]. Artificial intelligence isn't eliminating the artist; it's magnifying the vision of the artist [8]. The two-machine technique isn't a trick; it's an intentional choice to push the art forward, refining the process and resulting in a more advanced and enduring outcome. Collectively, these technologies are no fad. They

are the foundation for the next chapter of black & grey realism, where innovation, precision, and creativity combine to produce art that will shape the future of tattooing.

## 6. CONCLUSIONS FROM THIS STUDY AND PROSPECTS FOR FURTHER RESEARCH IN THIS DIRECTION

The integration of artificial intelligence into the tattoo design creation process fundamentally transforms the creative approach, offering high speed and diversity in sketch generation while maintaining the need for artistic adaptation to the client's anatomical features. Employing a dual-machine system for tattoo application – one managing light tones and the other handling dark shades and contrast – ensures smoother transitions, enhanced detail richness, and heightened realism. This approach significantly shortens session durations and minimizes skin trauma. Such a comprehensive method, combining intelligent design generation with advanced execution technologies, establishes a new benchmark in the art of black & gray realism.

### Prospects of our future scientific research.

Further advancements in this field focus on refining artificial intelligence algorithms capable of not only generating innovative sketches but also automatically adapting them to the client's three-dimensional anatomy, ensuring seamless integration with dual-machine application systems. Research also seeks to optimize collaboration between human creativity and artificial intelligence while defining ethical standards for the use of technology in tattoo art. These efforts aim to safeguard copyrights and preserve cultural authenticity without stifling innovation.

## References

1. Anantrasirichai, N., & Bull, D. (2020). Artificial intelligence in the creative industries: A review. arXiv preprint arXiv:2007.12391. Retrieved from <https://arxiv.org/abs/2007.12391>
2. Bozhko, T., & Arefiev, V. (2023). Neural networks as a graphic design tool. Bulletin of KNUKiM. Series: Art Studies, 48, 125–135. <https://doi.org/10.31866/2410-1176.48.2023.282475>
3. Cetinic, E., & She, J. (2021). Understanding and creating art with AI: Review and outlook. arXiv preprint arXiv:2102.09109. Retrieved from <https://arxiv.org/abs/2102.09109>
4. First AI-Created Art Work Sells for \$432,500 in New York (2018). URL: <https://learningenglish.voanews.com/a/first-ai-created-art-work-sells-for-432-500-in-new-york/4630694.html> [In English].
5. Kolisnyk, O. V., Mykhailova, R. D., Beregovyi, O. S., Vlasiuk, V. V., & Kurovska, D. V. (2023). MidJourney neural network as a tool for generating design graphics. Art and Design, (1), 106–115. <https://doi.org/10.30857/2617-0272.2023.1.10>
6. Lazarchuk, N., Pikhota, O., Rybiy, V., & Tsyutsyura, M. (2020). Neyromerezhevi instrumenty veb-dyzainu i veb-rozrobky. *Build-Master-Class-2020 [Proceedings of the Conference]*, 314–315. Kyivskiy natsionalnyi universytet budivnytstva i arkhitektury.
7. Musiyenko, O. (2022, 1 veresnia). Shtuchnyi intelekt u dyzaini ta rozrobtsi ihor: De my zaraz i shcho dali? *Imena.UA*. Retrieved from <https://www.imena.ua/blog/artificial-intelligence-in-design-and-gamedev/>

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**ВИКОРИСТАННЯ ШТУЧНОГО ІНТЕЛЕКТУ У ДИЗАЙНІ ТАТУЮВАНЬ: КОНФІГУРАЦІЯ З ДВОМА МАШИНАМИ ДЛЯ НЕПЕРЕВЕРШЕНОГО ЧОРНОГО ТА СІРОГО РЕАЛІЗМУ**

Це дослідження вивчає інтеграцію штучного інтелекту (ШІ) у мистецтво татуювання. Окрему увагу у дослідженні зосереджено на його застосуванні в реалізмі чорного та сірого через конфігурацію з двома машинами. У роботі досліджується, як поєднання ескізів, створених ШІ, з традиційними художніми методами може підвищити креативність та ефективність. Крім того, у дослідженні оцінюється використання двох спеціалізованих машин для татуювання – однієї для світлих тонів і градієнтів, іншої для темних відтінків і контрастів. Зазначений метод використовується для досягнення виключних художніх та технічних результатів.

У дослідженні застосовано багатогранний підхід, починаючи з використання AI-інструментів, таких як MidJourney, для створення початкових ескізів. Ці ескізи вдосконалюються на цифрових платформах, зокрема Procreate, щоб забезпечити анатомічну точність, після чого додається глибина та персоналізований штрих шляхом малювання вручну. Під час процесу татуювання використовується конфігурація двох машин: одна машина налаштована на м'які тони та плавне затінення, тоді як інша зосереджена на темних тонах і чітких контрастах, забезпечуючи ефективний і безперервний робочий процес.

Результати демонструють значний прогрес у дизайні та виконанні татуювань. AI прискорює творчу фазу, дозволяючи художникам швидко та точно концептуалізувати складні дизайни. Ці дизайни адаптуються до людської форми, що забезпечує єдність і високий рівень деталізації. Конфігурація двох машин сприяє більш плавним тональним переходам, покращує реалістичність і підвищує ефективність, зменшуючи травматизацію шкіри для швидшого загоєння. Інструменти AI разом із технікою двох машин підвищують художні стандарти, дозволяючи створювати реалістичні татуювання зі скульптурною глибиною.

Дослідження вперше представляє гібридну систему, яка об'єднує процеси дизайну, керовані AI, із методами татуювання двома машинами. Вона бездоганно інтегрує AI у робочі процеси татуювання, демонструючи унікальну техніку нанесення та встановлюючи нові стандарти точності й інновацій у мистецтві татуювання.

Інтеграція AI-технологій і техніки двох машин пропонує значні переваги для студій татуювання. Ці інновації оптимізують робочі процеси, мінімізують травматизацію шкіри та покращують загальну якість татуювань. Застосовуючи цю структуру, студії можуть покращити як творчий розвиток, так і операційну ефективність, досягаючи виняткових результатів для художників і клієнтів.

*Ключові слова:* татуювання, чорний і сірий реалізм, конфігурація двох машин, метод затінення, мистецтво.

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