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The impact of the development of artificial intelligence on computer graphic design

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Abstract
The article is aimed at studying the impact of artificial intelligence(AI) on graphic design and presenting a possible future vision of the industry as a result of its development. Since the advent of artificial intelligence in graphic design, it has posed a serious challenge to the traditional graphic design industry and designers. In the article, we will look at how AI is used in graphic design, including task automation, the creation of new design ideas and the development of individual design, we will also consider the potential advantages and disadvantages of AI in computer art design.

Keywords
artificial intelligence; graphic design; computer graphics; digital technologies; development

El impacto del desarrollo de la inteligencia artificial en el diseño gráfico por ordenador

Resumen
El artículo tiene como objetivo estudiar el impacto de la inteligencia artificial (IA) en el diseño gráfico y presentar una posible visión futura de la industria como resultado de su desarrollo. Desde la llegada de la inteligencia artificial al diseño gráfico, ha planteado un serio desafío para la industria y los diseñadores del diseño gráfico tradicional. En el artículo, veremos cómo se utiliza la IA en el diseño gráfico, incluida la automatización de tareas, la creación de nuevas ideas de diseño y el desarrollo de diseños individuales; también consideraremos las posibles ventajas y desventajas de la IA en el diseño artístico por computadora.

Palabras clave
inteligencia artificial; diseño gráfico; gráficos de computadora; tecnologías digitales; desarrollo

Artificial intelligence (AI) is based on the idea that human intelligence can describe a way that allows a computer to easily reproduce it and complete a task set by someone. Artificial intelligence has three main goals: learning, reasoning, and understanding. Venture capitalist Kai-Fu Lee, who previously developed artificial intelligence applications for Microsoft and Google (2019), said in an interview with CBS 60 Minutes that artificial intelligence will replace 40 percent of the global workforce over the next 15 years. The proof of this statement is also chatgpt, introduced in 2022, which, according to studies of Goldman Sachs econimists (Toh, 2023), is capable of performing the functions of 300 million people. It is a fast-growing field that has already revolutionized many areas, and graphic design is no exception. AI's ability to analyze and interpret huge amounts of data, combined with the ability to learn and adapt, has led to the development of new tools and techniques that are changing the way graphic design is applied. From automating repetitive tasks to creating visual effects based on data and user preferences. On the one hand, AI can work as a transformative method, turning the world into a preferred place to live, making it easier for people to live, on the other hand, it becomes obvious that AI is a technology that can surpass humans in creating extremely powerful tools. In this article, we will look at how AI is used in graphic design, its impact and the future possibilities of this technology.

As Yaron Meron notes in his research, the modern history of graphic design is inextricably linked with design and the technologies of that time. Designers participation in multimedia, their interactive approach to visual communication became a paradigm shift in the graphic design industry and social media in the 1990s. The integration of artificial intelligence tools into graphic design, its potential, and future developments in this field are new challenges for professionals and researchers of the twenty-first century. According to Kaiser's prediction, which he states in his study "Creativity as Computation: Teaching Design in the Age of Automation", it is predicted that the use of artificial intelligence in graphic design will become increasingly relevant (Kaiser, Design and Culture, 2019).

In 2016, Google developed the integration of artificial intelligence in the field of graphic design in the United States, which undoubtedly posed a great threat to graphic design professionals. Currently, human society has entered the information age. On the one hand, it makes our lives more convenient than before, on the other hand, it gradually changes the entire field of design. While the designer can determine the appropriate design form, a style based on the customer's requirements, combined with the general agreement of the market and aesthetic knowledge, and wisely use design elements such as color, grid layout. Shan Wu notes that AI has powerful functionality, it can only simulate an existing system, but cannot achieve independent innovation. Consequently, in the future of graphic design, artificial intelligence designers such as Alphaged will replace those who don't have innovative thinking. Therefore, how to develop designers and the entire design industry in this era is a problem that needs to be seriously considered and urgently resolved.

Considering two-dimensional design in graphic design, which refers to design elements such as 2D graphics, symbols, signs, it becomes clear that they are widespread and used in poster design, book design, fonts, logo design, website interface design and illustration design, from icons before the design of the entire website. The main characteristics are presented in a flat form. However, as the aesthetic needs of the public and the professional skills of designers improve over time, therefore, the monotonous dimension cannot keep up with the pace of the design era, which leads to expansion and requires three-dimensional design technologies that already exist, and this three-dimensional innovation also brings a fresh flavor to the design industry, as well as has a greater visual impact and it gives pleasure to the public. Under the influence of the latest technologies, traditional graphic design has expanded the field of measurement and is gradually developing, turning multilevel forms of expression into reality. thus, the former two-dimensional visualizations. Considering the software tools offered by artificial intelligence, it becomes clear that a graphic designer who does not even understand digital three-dimensional graphics, using AI, can get the model, image, visual effects that he represents. AI tools also allow the designer to significantly reduce the time of the design process, which is a significant advantage in a competitive environment, allowing you to get the best result in the shortest possible time.

Studying AI in the field of web design and website creation, we can say with confidence that it has made big changes here too. Sarah Mohammed Mamdouh Rezk in her research "The Role of Artificial Intelligence in Graphic Design" (2023), presents the popular Wix automatic website creation system (Wix.com, 2022). Wix was founded in 2006. This system for creating websites has a high level of usage. Wix has long been advertised as Wix ADI (Artificial Design Intelligence (AI design)). The user provides content and can use countless possibil-

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Figure 1. Nutella Packs with Artificial Intelligence (Digital Strategy Consultation, 2021)

ities to create an alternative design. the user can choose the version he prefers, and the program itself is responsible for the conversion. For non-specialists, the most simplified version is available, in which possible ways of use are presented step by step., you will learn how to create your brand, how to create a corporate identity, manage brand reputation, as well as many concepts related to business success and development, such as the branding process, logo design, photography, web promotionthe site, etc. All this gives the user hints about alternative solutions, but, of course, the automatic creation of a professional website using these technologies is still a long way off.

Ogilvy & Mather Italia Packaging Editor was created for Nutella, it has implemented millions of packaging designs (fig.1). Currently, the company uses artificial intelligence in the field of graphic design, developed using artificial intelligence, which is taken from dozens of databases: patterns and colors, various variants of the Nutella corporate identity, 7 million packaging designs have been implemented. In less than a month, all seven million cans were sold. Each can of Nutella is described as an attractive work of art (Rima Sabina Auf, 2017).

Applications and software, also powered by artificial intelligence, are making great strides forward in logo development, offering designers and giving them the opportunity to create a complete corporate identity and logo options in an instant (fig. 2).

Thus, the intersection of artificial intelligence and graphic design can be roughly divided into three categories: automation in professional commercial applications, design tools based on templates for amateurs (often online), and experimental academic research in the field of graphic design. Professional graphic design applications (such as Adobe InDesign, Adobe Illustrator) are difficult to use for beginners in design, so in recent years there has been an increase in the number of easily accessible online applications: for example, editors such as Canva (https://www.canva.com) and Adobe Spark (https://spark.adobe.com Moreover, few of these tools can currently be considered sufficiently sophisticated or adapted for professional graphics, and they have not even been targeted for use in the professional graphic designer market.

While amateur graphic design applications in They mainly rely on templates and templates, professional graphic design software based on artificial intelligence, as a rule, focuses on automating time-consuming tasks, where the use of professional graphic designers with creative thinking is encouraged. For example, Adobe Photoshop has long had operating systems that automate the duplication of editing effects on multiple images, as well as tools to simplify certain complex composition tasks. Professional graphic design applications use a limited set of artificial intelligence tools and team automation, but, for example, in Adobe

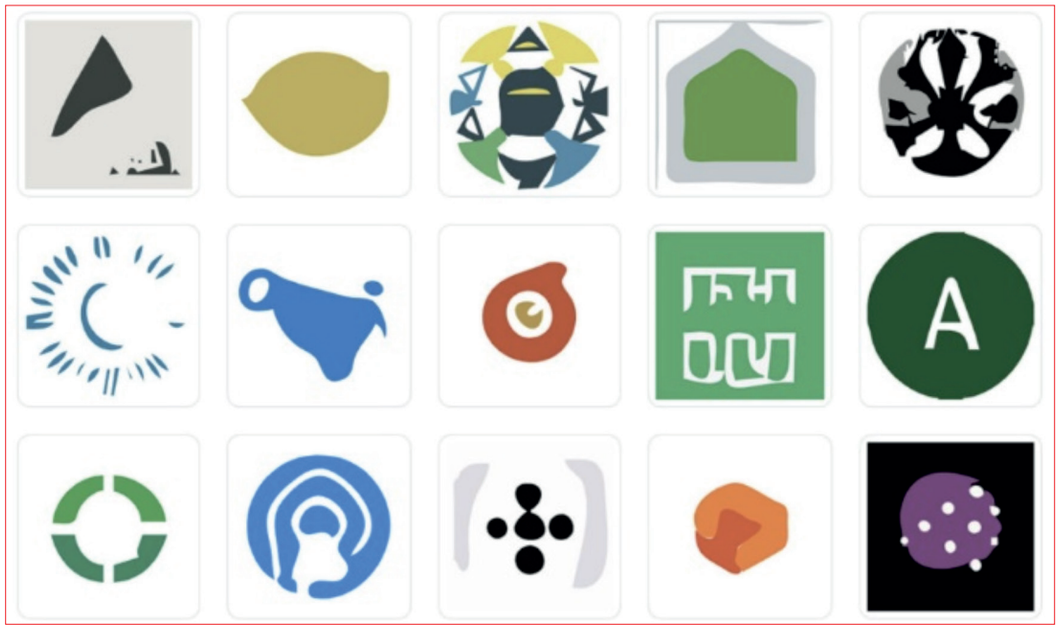

Figure 2: A series of logos created by the Zyro artificial intelligence generator

applications, the designer has the opportunity to independently and in detail develop the design that he imagines. Truly professional graphic design software strives to expand its capabilities by allowing professionals to precisely control the creative process. Thus, one can observe how AI allows automating more tedious and repetitive graphic tasks, allowing designers to focus on the more creative side of projects (Nolan, 2018). Adobe, as the market leader in professional software tools for visual design, focuses on automation, high accuracy and time savings, claiming that they allow designers to, quote, “find what you need, work faster, eliminate time-consuming tasks and reveal their design creativity without restrictions” (Adobe, NA).

This not only increases efficiency, but also allows designers to be more creative and expressive in their work, which can lead to more innovative and successful design. Automation of tasks such as image management, typography and layout can be achieved using various artificial intelligence-based tools. For example, image management tools can automatically adjust the brightness, contrast, and color balance of images, which can significantly save designers time. Similarly, printing tools can automatically adjust the font size, spacing, and text core. Layout tools can automatically adjust the position, spacing, and size of page elements. Artificial intelligence-based tools can analyze data such as user demographics, browsing history, and age group, offering a design indicating gender or geographical location that will help ensure that projects are relevant and attractive to the target audience, which can increase engagement and conversion opportunities. Machine Learning (ML) is a subset of AI that allows computers to analyse and interpret data without being explicitly programmed. Furthermore, ML assists humans in solving problems efficiently. The algorithm learns and improves performance and accuracy as more data is fed into the algorithm.

Artificial intelligence functions, as a rule, are synthetic cognitive abilities that have the right to exist to support the design process. The AI has the ability to classify different input data, and if necessary, certain data can also be used in the future. AI has a longer-term memory, which is superior to storing information in human memory. Artificial intelligence tools cannot “think” independently because they cannot assess the context in which a task should be performed. You should remember, for example, if social media platforms could not understand our preferences and instead displayed all available online content in our news feed, we would hardly find anything interesting as a result of a long waste of time, and all social media would be considered a terrible waste of time. The impact of AI on the personalization and interaction of graphic design is significant. which are specifically tailored to the needs and preferences of individual users, creating a more personalized and relevant experience for custom-

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Figure 3: Task makes only with AI tools (Midjourney AI, Leonardo AI), student A. Galstyan

ers. In addition, the use of artificial intelligence in graphic design can also lead to more interactive and immersive design, improving user interaction. The design created by artificial intelligence can be more dynamic and responsive to incoming user messages, resulting in a more attractive and personalized customer experience. However, there is also an excessive similarity and generality of designs created by artificial intelligence, which leads to a decrease in uniqueness and individuality. As Meng notes in his article, this could lead to the unification of graphic design, which would have a negative impact on the design industry, as it values creativity and originality (2012). In addition, dependence on artificial intelligence algorithms can lead to a loss of human contacts and creative abilities in the field of design, reducing the overall quality and relevance of work in the field of graphic design. Artificial intelligence is undoubtedly revolutionizing the way graphic design is done, but the introduction of artificial intelligence into graphic design is fraught with difficulties. The introduction of artificial intelligence technologies into graphic design requires significant investments in logistics, software and human resources. This cost can be a barrier for small businesses and independent graphic designers, resulting in uneven access to this technology. One of the negative consequences of using artificial intelligence is the lack of creativity. Artificial intelligence-based graphic design tools are limited by their algorithms and cannot create truly unique and creative designs. Despite this, but not unambiguously, artificial intelligence-based graphic design tools are becoming more and more advanced, they can replace people, professional designers, which will lead to job cuts and loss of human creativity. There are also ethical issues related to the use of artificial intelligence in graphic design, for example, the issue of copyright and ownership of projects created using artificial intelligence. This is an area that requires further study and regulation.

I made a survey from November 2023 to January 2024, conducting a survey among a group of specialists working on the online platform (Graphic Designers (Armenia)) in the field of computer graphics in Armenia, as well as among students and teachers of the computer graphics department of the State Academy of Fine Arts of Armenia, it becomes clear that 92% of designers used the tools offered by artificial intelligence, 73% of them were able to partially get the result that corresponds to their ideas, 18% got everything they wanted in full, and 9% did not get the intended version of the design. 73% of survey participants believe that the development of artificial intelligence has a positive effect on the work of individual graphic designers, but at the same time, the survey showed that 50% of professionals assume that 73% of survey respondents believe that artificial intelligence tools can be used in educational programs of higher educational institutions. 64% said that the visual effects created using artificial intelligence are devoid of uniqueness, identical and not creative.

Teaching in the department of computer design, at the State Academy of Fine Arts of Armenia, in the 2023-2024 academic year, we conducted the following experiment together with 2 groups of students: one group of students was allowed to complete the given task using only the artificial intelligence software system (such as Midjourney AI, Leoanrdo AI), the other group worked with more standard methods and programs previously adopted, in which the artificial intelligence tools were not fully integrated (such asAdobe Photoshop, Adobe Illustrator). Summarizing the results, the group of students who worked only with artificial intelligence tools claimed that it was more time-consuming than expected to get the result exactly according to their ideas, but the final result was satisfactory, and compared to the other group, they finished the given task faster, but the quality of work was generally adequate (fig. 3, fig. 4).

Figure 4. Task makes with the main programs used (Photoshop, Illustrator), student A. Tadevosyan

Concluding the study of the impact of artificial intelligence (AI) on the graphic design sector, based on the conducted studies, mentioned quotations, carried out surveys as well as personally working as a practical graphic designer, teaching in the given field, communicating with specialists in the field, I can say that the results showed that most graphic designers and industry experts believe that artificial intelligence technology has great potential to greatly influence the future development of graphic design professionals who keep up with the times, and achieve certain advantages, such as automation of some functions, simplification of the design process, saving time, increasing labor productivity, of course, not excluding the unique approach of a creative person and the solutions offered in design. In general, studies show that the development of artificial intelligence in the field of computer graphics has more positive than negative effects, helping professionals to focus on taking more creative approaches and solving technical problems faster. The limitations and challenges posed by artificial intelligence technologies, including the risk of job loss, the technical skills needed to use technology effectively, and the ethical and moral consequences of using it. It is also important to approach the use of artificial intelligence in the design industry with caution and awareness and to closely monitor possible consequences. It is very important to ensure that artificial intelligence technologies are used to improve and support the work of graphic designers, and not replace them. It is also important to consider the ethical and moral implications of using artificial intelligence in graphic design and ensure responsible and sustainable use of technology. In conclusion, this study is intended to emphasize the importance of constantly studying and discussing the impact of AI on graphic design in order to fully understand its potential advantages and problems and best use it to support the work of graphic designers, promote the professional sphere and reach a new level.

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