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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON DESIGN: THE EXAMPLE OF DALL-E

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ABSTRACT

Applications of artificial intelligence, initially utilized during the Digital Revolution and continuously developing with advancing technology, are starting to appear more frequently in the field of design. Today, we encounter artificial intelligence in a wide range of fields, and, wittingly or unwittingly, one can benefit from it. The study is concerned primarily with the uses of artificial intelligence in graphic design, which is a visual art form communicating ideas and demanding creativity, and the potential future outcomes of machine learning-based design. In this context, the artificial network developed by OpenAI called Dall-E, which converts texts in written language into images, was examined as an example. The qualitative research method was used in the study. Printed publications and visuals related to artificial intelligence, technology, and design were scanned, and data collected by observation and document scanning was compiled. Samples were produced using artificial intelligence applications, after which they were interpreted and analyzed using descriptive analysis method. In conclusion, we consider that machine learning programs cannot go beyond the data they process and that they cannot have human emotions, intelligence, and creativity even if they can generate infinite variations by being 'inspired' by a work of art. By this assumption, in terms of discussing the effects of artificial intelligence on the field of design, it is significant to understand that, while the value of what is produced by artificial intelligence will decrease, the value of the original work will continue to increase in that the original will always be more valuable.

Keywords: *Artificial intelligence, Graphic design, Design.*

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YAPAY ZEKANIN TASARIMA ETKİSİ VE DALL-E ÖRNEĞİ

• Prof. Dr. Birsen ÇEKEN[*] • Bartuğ AKGÖZ[**]

ÖZET

Dijital devrim ile başlayan ve geçmişten günümüze teknolojinin gelişmesiyle evrimine devam eden yapay zeka uygulamaları tasarım alanında da görülmeye başlanmıştır. Bugünlerde yapay zeka bir çok alanda karşımıza çıkmakta ve kişi isteyerek ya da farkında olmadan yapay zekadan yararlanmaktadır. Yaratıcılık gerektiren bir görsel iletişim sanatı olan grafik tasarım alanında yapay zekanın kullanımı ve makine öğrenmesine dayalı tasarımların gelecekte yol açacağı potansiyel sonuçlar, bu çalışmanın asıl problemini oluşturmaktadır. Bu bağlamda OpenAI tarafından geliştirilen ve yazı dilindeki metinleri görsellere dönüştüren yapay bir ağ olan Dall-e örneği incelenmiştir. Araştırmada nitel araştırma yöntemi kullanılarak yapay zeka, teknoloji ve tasarım konuları ile ilgili basılı yayın ve görsel taraması yapılmış, gözlem ve belge tarama yöntemi ile toplanan veriler bilgisayar aracılığıyla, yapay zeka programı kullanılarak örnekler üretilmiş, yorumlanmış ve betimsel analiz yöntemiyle çözümlenmiştir. Sonuç olarak makine öğrenmesine dayalı programların işlenen verilerin dışına çıkamayacağı, bir sanat eserinden 'ilham alarak' sonsuz diyebileceğimiz varyasyonları üretebileceği ancak insan duygularına, zekasına ve yaratıcılığına sahip olamayacağı düşünülmektedir. Bu varsayımla, üretilenlerin değeri düşerken orijinal eserin değerinin artmaya devam edeceği çünkü özgün olanın her zaman daha değerli olacağı konusunun anlaşılması, yapay zeka tasarımlarının alana etkilerinin tartışılması bakımından önemlidir.

Anahtar Kelimeler: *Yapay zeka, Grafik tasarım, Tasarım.*

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1. INTRODUCTION

The word 'design' is a commonly used, impressive word. However, its exact meaning is not fully understood. "Design is not about making a model, mold, or ornament." A design should have a structure within itself and a planning behind this structure. The foundation of all arts is a design" (Becer, 2011: 32). The cover of Elizabeth Adams Hurwitz's book reads: "Design: A Search for Essentials". According to another American designer Bob Gill, "you can't hold design with your hands. It is not an object; it is a process, a system, a way of thinking" (Ambrose and Harris, 2013: 5).

As for graphic design, it positions itself in a very different place with its usage areas and advancing technology, although theoretically not far from its earlier definitions today. Gutenberg's printing press and the industrialization move in the 18th century paved the way to the mechanization of the graphic design, which has a long history dating back to the drawings on cave walls.

Uçar emphasized that graphic design is a dynamic branch of visual communication with numerous specialized fields, intensive techniques, and extensions, where innovations are made on a daily basis (Uçar, 2004: 156) In the last three decades, the technology environments we live in have changed in many ways as a result of the increasing use of digital technology, from computers to portable electronic devices. Digital devices have quickly become a part of the culture at home, at school, at work, and individuals from all segments of society, young and old, have started to use these technologies intensively (Ersan, 2016: 2).

The consumer economy that emerged in the Western world as a result of the industrial revolution increased the demand for high-quality design, which led to the evolution of graphic design while raising a number of questions. In addition to printed materials, graphic design, which is expanding and developing by incorporating new technologies, includes digital designs created with the aid of video and computers. In the age of information and technology we currently live in, graphic design produces a lot of interdisciplinary work and is constantly establishing new fields for itself. Design and technology have been continuously influencing each other and evolving together. Technological transformation happening at an ever-faster pace in recent years and many seemingly extraordinary developments in the field of digital technology become quickly mediocre.

Computer technologies, which emerged with the digital revolution and rapidly entered our lives, have become an indispensable medium for designers to reach their target audience and keep up with the requirements of the age. The technologies we use in our daily lives are advancing so fast that graphic designers have to update themselves much

faster than before and follow the latest trends.

Artificial intelligence has entered our lives quickly and unavoidably, just like many other technological developments. In today's world, most of us interact with this technology wittingly or unwittingly. Artificial intelligence is a key technology in numerous industries these days. For instance, today's simple banking transactions, mobile applications, autonomous vehicles, and search engines all make use of artificial intelligence.

This research, entitled "The impact of artificial intelligence on design and the example of Dall-e", aims to answer the following questions using descriptive analysis method: 1. Can artificial intelligence replace designers? 2. What is the contribution of AI to the design industry? 3. What is the future and position of artificial intelligence in the field of design? The data collected through observation and document scanning was analyzed with the descriptive analysis method frequently used in qualitative research. Description is the process of identifying what the collected data means in relation to the research problem and what results they reveal in general (Doğanay, Ataizi Şimşek, Salı and Akbulut 2018: 185). In this method, data are classified, summarized, and interpreted according to predetermined themes. A cause-and-effect relationship is established between the findings; comparisons are made between the cases if necessary (Yıldırım & Şimşek, 2008: 224). The concept of artificial intelligence and the example of Dall-E were explained. In the second stage, works produced with artificial intelligence were sampled according to the determined thematic framework. In the third stage, the findings organized according to the thematic framework were compared and analyzed in a comprehensible way. In the fourth stage, the findings were interpreted.

2. ARTIFICIAL INTELLIGENCE

Since the dawn of civilization, philosophers and thinkers from numerous cultures have discussed and written about automation.

> "The quest for Artificial Intelligence (AI) begins with dreams, as all quests do. Machines that embody human capabilities have long been imagined: automats that can move and devices that are capable of reasoning. Human-like machines have been described in several stories and depicted in sculptures, paintings and drawings" (Nilsson, 2010: 19).

"The Iliad of Homer mentions self-propelled chairs called "tripods" and golden "attendants" made by the lame blacksmith god, Hephaistos, to help him get around" (Nilsson, 2010: 19). The concept of artificial intelligence was first coined by John McCarthy in the 1950s, following the work of a group of researchers in Germany (Russell and Norvig, 2010: 17).

In his 1950 article *"Computing Machinery and Intelligence "*, which took the question "Can machines think?" as the starting point, Alan Turing defined "machine" and "thinking" and claimed that this question could not be answered, but rather could be understood with a test he called *"the Imitation Game"* (Turing, 1950: 433). The purpose of this test is to determine whether a machine is capable of thinking logically. In the Turing Test, an interrogator is in a room separated from a computer and a human. The interrogator communicates with both of them without knowing which of them is the person and which is the machine. A screen shows the written answers of the machine and the human to the questions asked. The objective is for the evaluator to distinguish between the computer and the human when evaluating the responses (Pirim, 2006: 90). The computer is deemed to have passed the test if, after several attempts, the interrogator is unable to identify the human.

As a result of these innovations, research into artificial intelligence gathered steam, and numerous businesses throughout the world began to experiment and create their own AI programs. Perhaps the most sensational of them is IBM's "Deep Blue," an artificial intelligence program that can play chess. This software, defeating world chess champion Garry Kasparov in a chess match in 1997 (Image 1), was programmed to calculate millions of chess moves per second. After this match won by artificial intelligence, it was suggested that computers could outperform humans in some situations.

Image 1. *Garry Kasparov vs Deep Blue, "Chess Match", 1997, (http 1).*

According to studies on the subject conducted over the past 50 years, there will be three phases of development for artificial intelligence. The first phase is called Artificial Narrow Intelligence. The aim of this phase, also called "Weak AI," is to create systems designed to address simple problems (Jajal, 2018: 1). Examples of Artificial Narrow

Intelligence include Facebook's facial recognition system, Apple's voice assistant service 'Siri', and Tesla's autonomous vehicles (Kaplan and Haenlein, 2019: 2). Numerous technological tools that we use on a daily basis, whether wittingly or not, can be used to highlight the contributions of Artificial Narrow Intelligence to our daily lives.

The second phase, called Artificial General Intelligence (AGI), aims for a machine intelligence that can learn and comprehend intellectual tasks. The common theme in science fiction and dystopian future scenarios is frequently artificial general intelligence, also known as "Strong Artificial Intelligence." Artificial general intelligence should be capable of performing tasks such as problem solving, reasoning, analyzing, language learning, strategic planning, and decision making (Teigens, 2022: 1-3). The primary distinction between the two phases is that the second phase can learn on its own without a command or an instructor. In the literature, this type of learning, also referred to as deep learning, is a subfield of machine learning. Along with many other traditional artificial intelligence fields, deep learning is used extensively in natural language processing and semantic parsing (Guo et al., 2016: 27).

This phase, referred to as Artificial Superintelligence, is the third and final phase of artificial intelligence. University of Oxford philosopher Nick Bostrom defines it as "any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest" (Jajal, 2018: 1). According to Kaplan and Haenlein (2019: 2), Artificial Superintelligence is interpreted as "truly self-aware and conscious systems that will make humans redundant". Considering the research and studies of scientists on this subject, one can argue that super artificial intelligence, the final phase of AI, will possess consciousness which was absent in the first two stages, and that, thanks to this consciousness, it will be able to become more intelligent than human beings.

As machine learning software have advanced, they have begun to be used in design and art, as in many industries. Artificial intelligence programs focused on design-based production have evolved into tools that are fed with data by programmers along with designers, and have become widely used in graphic design as in many other fields.

Prior to 1980s, graphic design works were produced with conventional methods; however, as of the 1990s, the computer-assisted process for graphic design was introduced. Artificial intelligence entered the design industry in the ensuing years as a result of the rapidly advancing technology and the inevitable adoption of computer-assisted graphic design (Hashemieh, 2020: 1).

Graphic design is increasingly becoming automated. Artificial intelligence applications will inescapably gain ground in the graphic design industry as technology advances.

With AI codes, anyone with no prior experience can now design on websites created specifically for this purpose. For example, corporate identity, layout design, illustration, and websites can be created with them. In this case, the originality and creativity of these works may become questionable in terms of design (Karaata, 2018: 184-185).

In today's world, where the relationship between artificial intelligence and graphic design is gradually increasing, there is discussion about whether artificial intelligence will merely facilitate designers' work or totally replace them. Speed is vital for designers in the modern world, as such positioning the relationship between design and technology correctly will help designers and make them more productive.

Future applications of artificial intelligence are expected to focus primarily on speed and optimization. Designers will be able to create their designs faster and with less workforce thanks to the features offered by the software, such as analyzing large amounts of data and making suggestions on design settings. Thus, when the designer creates a design draft, artificial intelligence will process this data and produce the most effective design to present to the designer. Additionally, it will assist the designer by offering alternative designs to help him or her make the best choice. By rearranging this data, the designer can complete the project (Philips, 2020: 1).

Concept is crucial in graphic design even though we do not exactly define creativity. Various processes have been developed to spark creativity and come up with unique solutions to problems. Every designer has his or her own unique style. Today, AI software produces designs by using pre-programmed algorithms and mimicking user actions through machine learning. In this case, the artificial intelligence that assumes the role of designer works without any design process and needs no power or inspiration to trigger the creativity that a real designer needs. This begs the question: "Can artificial intelligence really pass these tests and become a designer?" Although AI lacks the creativity required for design, it can perform the tasks of a graphic design operator faster and easier. For instance, it can systematically place a layout designed by an art director or graphic designer on the page and organize it as trained. A significant part of the graphic designer's or operator's work is not creativity, but the swift and flawless execution of the design or the requested command. Compared to human beings, artificial intelligence is less likely to make mistakes, so the work is more likely to be close to perfection (Karaata, 2018: 187).

Machines versus Humanity debate began with the invention of machines. When machines were first developed, it was feared that humans would become obselete in terms of production and design, which would lead to a reduction in employment. Indeed, machines have largely replaced people in many industries. However, this has not exhausted

people's options at all; on the contrary, machines have enabled them to accomplish new objectives. A similar situation exists in the relationship between the design industry and artificial intelligence. Artificial intelligence will not entirely eliminate the need for designers, but with the technology it currently possesses, it will allow them to achieve higher goals in a faster and more manageable way. Today, artificial intelligence design systems are able to identify different shapes, colors, patterns, and texts presented to them. They can categorize various data, and thus organize and use only the portion that is specifically required. They are capable of storing data for longer and have better memory compared to humans (Cass, 2019: 1).

It is also known that, as well as designing, artificial intelligence is capable of performing behavioral analyses, such as identifying the target audience in the advertising and marketing industry, selecting the right visuals for them, and determining which advertisement, service, or product to offer to which consumer. In order to create personalized experiences, designers may prefer to use AI. Major global brands use artificial intelligence designs for this purpose.

It is the data and AI-centric operating model of Netflix, an international content provider, which is using the power of artificial intelligence and big data to completely change today's media landscape. It is supported by an artificial intelligence infrastructure that collects data with machine learning techniques, personalizes user experiences, generates ideas for upcoming productions based on user preferences, and executes almost every action in the background. Netflix, which started using artificial intelligence in 2010, began to strengthen its recommendation engine a few years later, investing heavily in understanding viewer behavior, thus providing a personalized streaming experience for each user. The application screens that users see are designed by AI in "real time". Many boundaries are specified by human designers at the beginning of the process. However, the decisions about which movies to show to the user, in which order and how they will be displayed, which visuals to represent them with, and many other design decisions are implemented by algorithms embedded into AI problem-solving loops (Verganti et al., 2020: 216).

Among millions of images, artificial intelligence designs and presents the same content to different users in a way that best suits their personal preferences as well as tendencies and garners the greatest attention thanks to the personalized recommendation algorithm used by the Netflix application. The character images, which are usually prominent in the designs, are selected by an artificial intelligence algorithm using object recognition technology. Artificial intelligence analyzes millions of images and lines for these designs and determines the use of color and typography in the content. By doing so, it

can design personalized artworks for the same films and series. This software, which is an algorithm based on machine leazhings' series and has the artworks of the series designed by artificial intelligence thanks to the data obtained from this algorithm (Image 2). In this way, it aims for the most appropriate artwork-user relationship that can attract the viewer's attention.

Image 2. *Artwork for "Stranger Things", Netflix, (http 2).*

Netflix categorizes its content in accordance with your preferences and the information it has learned about you. This personal categorization includes data such as your favorite movie genres, which character is more popular in which country, or whether abstract artworks appeal to you. It processes this information to recommend the most relevant imagery for the user, and then it displays the artworks that are thought to be most likely to attract their attention. In this way, Netflix can be said to impact its viewers' motivation to watch.

Numerous AI-powered design websites have gained a lot of popularity recently, the most preferred of which are logo maker websites where you can create a logo and corporate identity work for a new brand without actually being a real graphic designer. "Looka" is one of the most popular AI-supported applications that can produce various logo designs based on your preferences. Founded in 2016 with the goal of producing a logo quickly and affordably, this application can create a logo according to your preferences at the end of a 6-step process (Image 3). You can also add an icon and slogan related to your. Before you begin creating the logo, the algorithm prompts you to make some decisions. These

include selecting a few logos you like from the sample templates, determining the color of the design, and choosing the style. Based on your selections, artificial intelligence generates alternate logos using templates. Mockups of corporate identity and other types of mockups related to the logo of your choice are also created by the software within seconds.

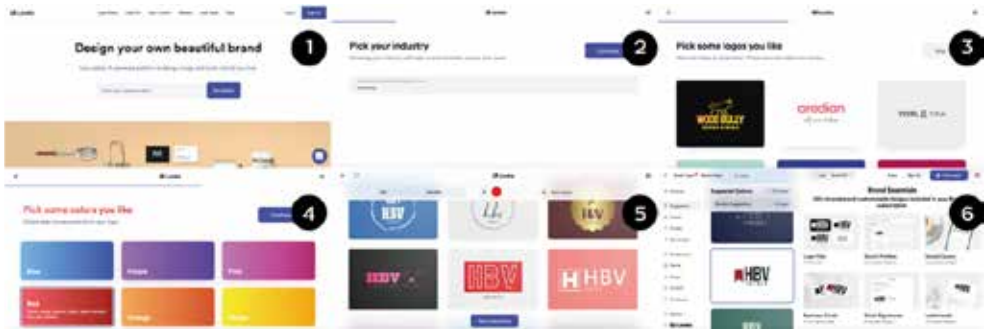

Image 3. *Looka, Logo design process, (http 3).*

Image 4. *LogoMaster, Logo design process, (http 4).*

Looka, Logomaster, and similar AI-supported design applications can create logos by matching various fonts, colors, and symbols trained to the machine. All the choices you make when creating your logo are recorded by artificial intelligence, which contributes to machine learning as well. There is no denying the significance of the logo, which is the most crucial visual component for the recognition and recall of your brand. These applications make it possible for unpretentious small businesses or companies to access simple and attractive logos; however, these images are unlikely to match the level of creativity of a skilled graphic designer because they lack the design principles that a logo should have.

The phenomenon of digitalization has unavoidably established itself in the field of art and in every other field of life in this process that we are currently going through and which we can refer to as the postmodern period. Art is being rapidly digitalized in the modern world, and this trend is becoming more common in Turkey as well. Refik Anadol, an artist who combines digital art and artificial intelligence to produce distinctive works, uses memories as the central theme of his exhibition Melting Memories, which he organized at the Istanbul Plevneli Gallery in 2018.

The question "What are memories, and what do they tell us?" is the starting point of the exhibition. Receiving permission to anonymously collect and use the data kept by the neuroscience laboratory at the University of California, San Francisco, which converts brain functions of both healthy and disabled individuals into data, analyzes them (Image 5), and conducts studies, Anadol feeds this data regarding the movements and vibrations that occur in the brain during the recall of a happy or sad memory into an algorithm and combines them with artificial intelligence to create multi-dimensional moving visual structures.

Image 5. *Artificial intelligence application used by Refik Anadol to visualize brain waves (Çoban and Kılıçoğlu, 2018:239).*

Consisting of three-dimensional canvases and digital sculptures, the exhibition features abstract works transferred to the image through LED screens (Image 6). The video produced by Refik Anadol using his brain waves is also available to visitors who take the

transparent elevator to the upper floors of the gallery. In addition to the images that continuously cycle on moving and three-dimensional canvases, the works are accompanied by sounds that were collected using data and converted into frequency with minimum human intervention (Çoban and Kılıçoğlu, 2018: 240).

Image 6. *Refik Anadol "Melting Memories", 2018, (http 5).*

2.1. Dall-E

Can machines produce art? As the development of machine learning has increased in recent years, this question has become a topic of discussion. Open AI, which defines itself as a non-profit artificial intelligence company, concentrated on this question and initially worked on a model of artificial intelligence called GPT-3, or Generative Pre-Trained Transformer 3. Using deep learning, this 3rd generation language prediction model can generate texts thanks to pre-trained algorithms. Following this software, in 2021, a new GPT-3 product, Dall-E, which was named after the combination of Salvador Dali, the surrealist artist, and Wall-E, the futuristic robot created by Pixar, was introduced by Open AI as another AI model that could visualize data. Dall-E, which is claimed to be as creative as an artist and as powerful as a robot, is an artificial intelligence software that can transform texts written by users into visuals.

One year after the debut of Dall-E, Open AI introduced its newest system, Dall-E 2, which can produce more realistic and accurate images with four times greater resolution than its previous version. Dall-E is a 12-billion parameter autoregressive transformer trained using a dataset of text-image pairs to produce images from text descriptions.

In addition to the picture-like illustrations, Dall-E can also produce very realistic photographs. Capable of combining concepts, attributes, and styles as well as modifying and editing existing images, Dall-E can also take into account light, shadow, reflections, and textures. Dall-E 2 can learn the relationships between images and the text used to describe them. It uses a process called "diffusion", which starts with a pattern of random dots and gradually changes that pattern toward an image when it recognizes certain aspects of that image (http 6).

After typing the phrase you want to visualize as a sentence into the search bar on Dall-E's interface, Dall-E generates several alternative designs for you (Image 7).

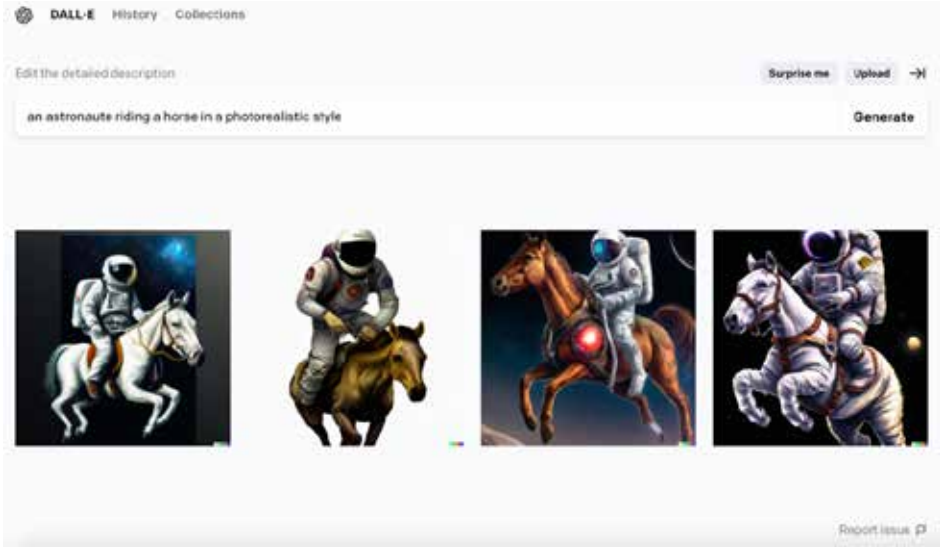

Image 7. *Dall-E 2, An image generated by artificial intelligence, 2022, (http 7).*

In order to further exemplify and deepen the research, it will provide a better understanding to compare the illustrations that two artificial intelligence tools, which can be considered pioneers in the field of data visualization, would create for the same text. Another popular AI tool that can convert texts into visuals is Midjourney, originally created by Discord, an online interaction and messaging tool. Midjourney was previously available with a free trial for up to 25 images; however, as of March 2023, the free trial was discontinued due to people abusing the system, and now one can subscribe to Midjourney with the most basic membership plan for 10 dollars per month. On becoming a paid member, users are asked to log in to Discord and create a channel or log in to one of the existing channels. After inviting the Midjourney bot to your channel, typing "/ image" in the command line, and then adding a description of the image you want it to

create, the AI bot will create 4 alternative designs for you (Image 8). Under each image set are eight different buttons named U1, U2, U3, U4, V1, V2, V3, and V4. The buttons with U expand the selected image to create a larger version with extra details. The V buttons, on the other hand, create four new variations of the selected image that match in terms of style and composition.

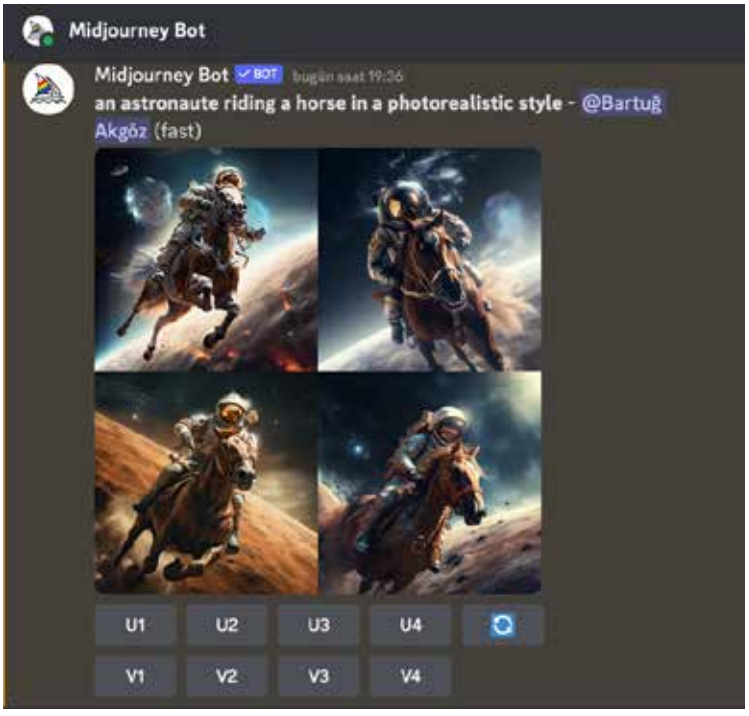

Image 8. *Midjourney, An image generated by artificial intelligence, 2024, (http 8).*

In an attempt to evaluate the functionality and results of both AI tools, we compared the illustrations created in the same style with the same descriptions by both Midjouney and Dall-E. In this context, Midjourney produced relatively better results considering the elements such as clarity, sharpness, details, light-shadow, and composition.

Another feature of Dall-E is that it can reproduce the illustration you want in any style you like. Besides many styles such as photorealistic, charcoal, and oil painting, one can also request illustrations in the style of a specific artist (Image 9).

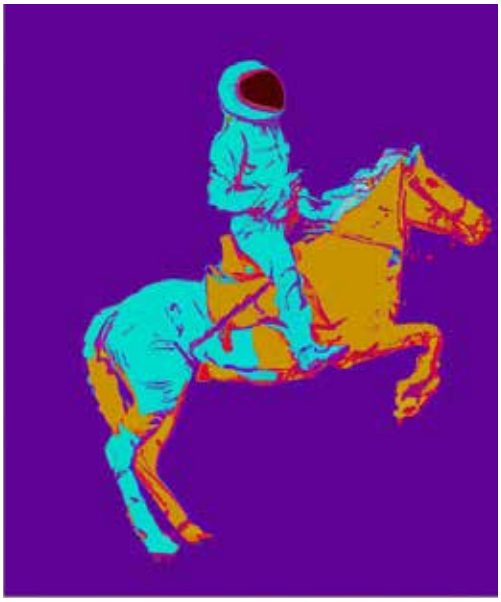

Image 9: *An Andy Warhol-style illustration created by Dall-E (http 9).*

The images in Dall-E 2's database and its ongoing learning process have greatly improved the program's ability to draw inspiration. We can also apply this feature of inspiration to works of art. With artificial intelligence, Dall-E can draw inspiration from Dutch artist Vermeer's "Girl with a Pearl Earring," also known as the Mona Lisa of the North, and create virtually endless variations of it (Image 10).

Image 10. *Dall-E 2, Variations of 'Girl with a Pearl Earring' generated by Artificial Intelligence, 2022 (http 10).*

Dall-E 2 can create a wide variety of artworks in a matter of seconds, which lowers the value of what is produced while raising the value of the original piece of art. Dall-E can also extend images beyond the original canvas to create expansive new compositions (Image 11).

Image 11. *Dall-E 2, 'Girl with a Pearl Earring' composition generated by Artificial Intelligence, 2022 (http 11).*

The latest version of Dall-E differs from the previous version in that it can modify and edit previously created images or taken photos, which is one of the most talked about features. Any other object can be added to any part of an image, and realistic edits can be made by considering textures, shadows, and reflections. A dog image, for instance, could be superimposed in a photograph previously taken in a museum by placing it, whether behind a man in a painting on the wall or on top of a stool on the floor in the photograph. Depending on the context, the AI detects the texture to place the object on and superimposes a dog image, whether behind a man in the painting on the wall in the style of the painting (Image 12) or on top of a stool on the floor in the foreground (Image 13).

Image 12. *Dall-E 2, Dog superimposed in a painting in a real photo by artificial intelligence, 2022, (http 12).*

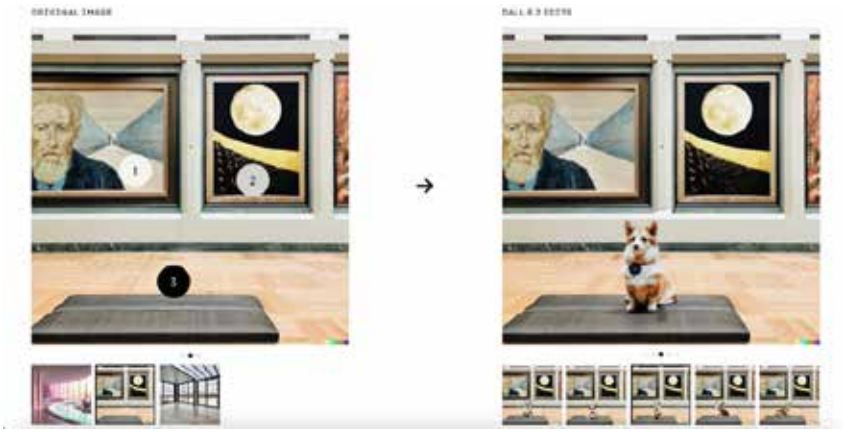

Image 13. *Dall-e 2, Dog superimposed on top of a stool in a real photo by artificial intelligence, 2022 (http 13).*

Dall-E, using GPT-3 technology, has yet to develop its ability to visualize texts or produce illustrations in different variations in more specific designs. We asked Dall-E to design a logo by entering a prompt similar to the ones we provide to AI-supported websites that are built to design logos ("Create me a logo for a University. The name of my brand is "AHBV". Let it be a simple design. The background should be red. You can use the following colors in the logo [Red, White]") (Image 14). The main issues with the resulting designs include barely visible letters, the presence of irrelevant words, and the lack of fonts or symbols that can be used as logos.

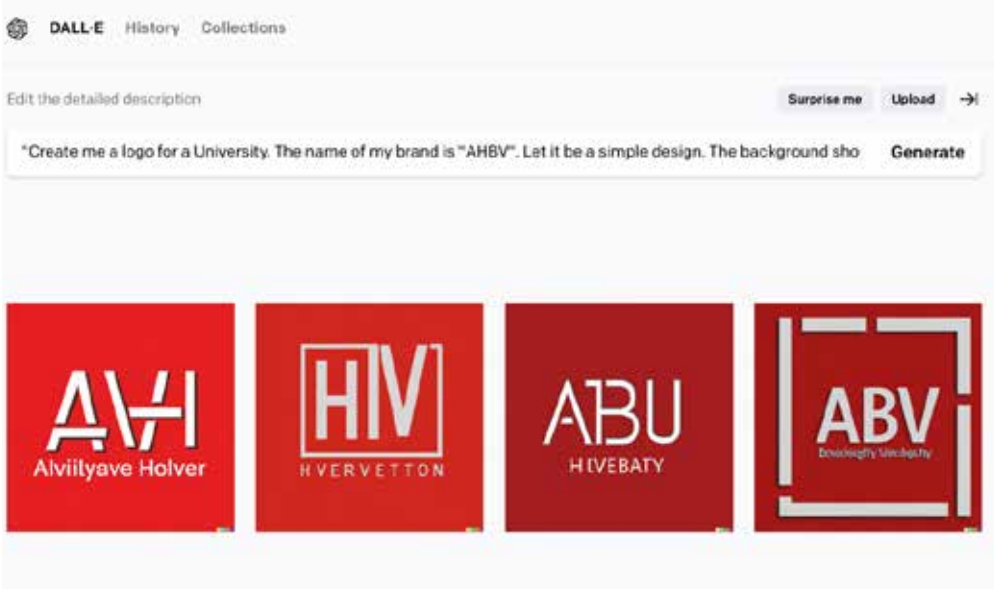

Image 14. *Dall-e 2, A sample logo generated by artificial intelligence, 2024 (http 14).*

When we asked Midjourney, another data visualization AI tool, to generate a logo with the same prompt (Image 15), it generated illustration-like visuals that were far from the principles of logo design as in Dall-E. It seems quite unlikely to use any of these images as a logo for any brand.

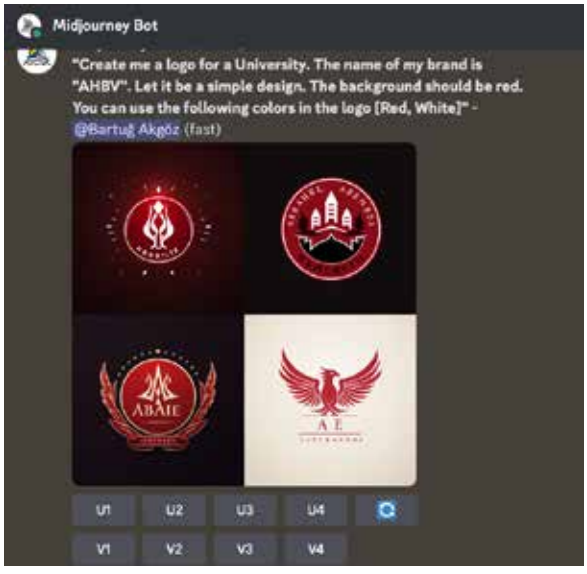

Image 15. *Midjourney, A sample logo generated by artificial intelligence, 2024 (http 15).*

With a significant place in Graphic Design and generally used as a visual communication tool to promote a specific event, product, service, or information, posters can also be produced with various artificial intelligence tools. Many factors, however, are involved in the creation process of posters that are generally designed to address large audiences. We asked Dall-E to design a poster for a Jazz festival (Image 16). The visual produced by Dall-E cannot convey an effective message and is far from all the basic factors that can be counted among the main purposes of an efficient poster, such as visual communication, promotion and advertising, strengthening the brand image, attracting the attention of the target audience, conveying information, and art and aesthetics.

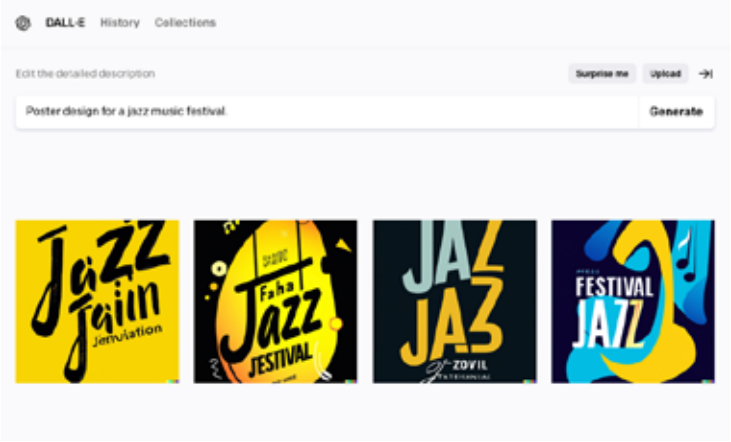

Image 16. *Dall-E 2, A sample poster generated by artificial intelligence, 2024 (http 16).*

Above, various design samples produced by two data visualization tools, Dall-E and Midjourney, have been analyzed and illustrated to facilitate a comparison. These illustrations are crucial for comprehending how an AI transforms written texts into images without the skills of a designer. It is remarkable that these softwares, relying solely on deep learning methods and given keywords, can understand and visualize attributes such as composition, color, shape, and texture accurately without human intelligence. However, one can assert that they are still very far from ideal in more specific design processes requiring creativity.

CONCLUSION

Given the state of technology today and in the future, it is evident that human-machine cooperation will be unavoidable. Moreover, the success of artificial intelligence in data visualization through algorithms should not be ignored. Artificial intelligence has

quickly advanced in the visualization and illustration fields and created works that can be used in visual communication. Nevertheless, it still has several issues. For instance, it is less successful in logo design than it is in data visualization because the resulting symbols are far from being creative, functional, and original. Studies aimed at developing artificial intelligence in the design field are increasing day by day and various theories about its future are being proposed, but a lack of creativity has always remained the primary challenge. The machine cannot go beyond numerical data, symbols, and trained models and remains dependent on the inputs from a designer or programmer when the human factors and the urge to be concerned and to design are neglected in the process of creating an art product.

When evaluated in this context, artificial intelligence may make positive contributions, particularly in graphic design, in the upcoming years. With its low error rate compared to humans, it will provide designers with advantages in terms of speed and time. Humans will never stop exploring the realm of art and artists and designers will continue to incorporate the technological advancements in artificial intelligence into their artistic production process.

At the present stage, it is evident that there has been a significant advancement in artificial intelligence, but predicting its future cannot go beyond utopian or dystopian visions for now. In terms of possessing qualities specific to humans as well as artistic and social sensitivity, art, which is perhaps the culmination of all human creative endeavors, will be a resistance area against many industries that are becoming increasingly automated with the rapid development of technology. In this process, taking advantage of the pragmatism of artificial intelligence is inevitable.

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