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The application of artificial intelligence in the design of printed hanging and their impact on interior space

تطبيقات الذكاء الاصطناعي في تصميم المعلقات المطبوعة وتأثيرها على الفراغ الداخلي

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Abstract
With the growing interest in AI, various applications emerged to generate numerous designs within seconds. It becomes essential to investigate AI applications in creating printed wall hangings and measure their ability to achieve the elements and principles of design, ensuring the aesthetic and functional aspects. Then use them as wall hangings in interior design.
This research paper aims to introduce various AI applications then used to generate printed wall hangings. Assess the aesthetic and functional aspects based on design principles.
To achieve that aim several research methodologies were implemented starting with a literature review, many design experiments were made using three artificial intelligence applications to compare the results. A questionnaire was conducted to measure achieving the aesthetic and functional aspects. The findings of this paper have enclosed that mid-journey tool is superior to the other two tools in terms of achieving the foundations and elements of design and aesthetic values.

Keywords
Artificial Intelligence Applications, Printed Wall Hangings, Design Elements, Foundations of Design, Interior Design.

Introduction

Artificial intelligence is the most important product of the fourth industrial revolution, and it has multiple uses in various fields, including industry, economy, science and technology, medical care, education and services, and design. It is expected to open the door to endless innovation and lead to more industrial revolutions, which will result in fundamental life changes. Humans, because it is the tremendous rapid development of technology that the world is witnessing, artificial intelligence will be the engine of progress, growth, and prosperity in the coming years.(1:p363-

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380) Some countries have developed scientific and local professional capabilities in the field of artificial intelligence through various mechanisms and created a culture of artificial intelligence at all levels of society to promote the development of artificial intelligence as it worked to facilitate the spread of the use of tools that depend on these technologies and create digital citizens who can deal with them.(2)

Artificial intelligence is the branch of computer science that focuses on creating machines that can engage in behaviors that humans consider intelligent. AI techniques exhibit heuristic and intelligent natures, which have the potential to provide superior solutions over classical techniques.(3)

Artificial intelligence means "the ability of a machine to simulate human intelligence, or it is computer programming that learns and develops itself to simulate human thinking to perform certain tasks made for it through artificial neural networks, such as making various inferences, processing information and its ability to learn from its mistakes." This makes it perform its tasks and tasks quickly and with great skill, thus shortening the time and effort.(4:p1-15)

The introduction of artificial intelligence plays an important role in reducing the excessive dependence on people in design, improving the randomness of feeling and inspiration in design, adapting to the requirements of fast rhythm and short period in customized design and production, and improving the overall technical level.(5:p1-16)

Statement of the problem

The research problem is summarized in the following question:

1.How can artificial intelligence applications be used in producing designs for printed textile hangings to achieve the aesthetic and functional aspect?

2. What is the possibility of creating printed designs inspired by the Damietta

Artificial intelligence technology has been helping us to do things faster and better in many fields, and this also applies to the field of designing Printed Wall Hangings.

Printed Wall Hangings are a non-modern issue. They have been used since ancient eras in various printing methods such as direct drawing, tie and dye, using batik, printing by using hand-blocks, printing with stain-cell and screen printing with (Semi-automatic, automatic, and rotary), and at end the digital printing and the rapid evolution in terms of speeds, accuracy and types of colorants used.(6)

Digital printing is an important technology in the future of textile printing. Some of the areas where digital printing excels are in the availability of unlimited colors, production of photo quality images, ability to capture three-dimensional qualities, quick response to change, and a shortened time from concept to sample. Due to these areas of excellence, digital printing holds great potential for new and innovative design ideas.(7)

Therefore, the current study attempts to use artificial intelligence applications in creating and generating designs inspired by the Damietta environment and using them in the implementation of printed wall hangings. In which these designs achieve the elements and foundations of design, aesthetic, and functional aspects, in addition to employing them in interior designs.

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environment?

Research objectives

1.Using new approaches to design through artificial intelligence applications.
2. Benefiting from technical progress in digital printing and design applications specialized in drafting designs for printed textile pendants.
3. Benefit from artificial intelligence applications in creating printed designs inspired by the Damietta environment

Research significance

1. Enriching the local market with printed textile hangers of a modern nature that contribute to the development of the field of textile printing.
2. Taking advantage of artificial intelligence applications and computer programs in creating innovative designs for printed textile hangings.
3. Shedding light on some tools and programs for artificial intelligence.

Research hypotheses

1. Benefiting from artificial intelligence applications in creating various designs for the Damietta environment and employing them in the production of printed textile pendants.
2. The possibility of employing printed textile pendants in the interior spaces of contemporary residential buildings.

Research delimitations

Time limits:-

• the research deals with the use of some artificial intelligence applications in design, which are available in the period from 2023 to 2024.

Place limits: -

• the printed textile designs of the pendants are inspired by the Damietta environment.
• The implemented designs are used in the interior spaces of houses and living rooms in the Arab Republic of Egypt.

Objective limits:-

• the study deals with several topics such as: the elements of the dynamic environment, applications of artificial intelligence, and digital printing

Research methodology the experimental approach

through the production of innovative designs from the Damietta environment for printed textile suspensions.

Descriptive Approach: In describing and analyzing the designs of printed textile pendants inspired by the Damietta environment through the use of artificial intelligence application

Literature Review

This research deals with the applications of artificial intelligence and how to use them to create designs for printed wall hangings and employ them in interior space. The methods sections will outline the Definition of artificial intelligence, applications of artificial intelligence in the field of image processing printed wall hangings, and how to achieve the elements and foundations of design. Then the experimental study, which includes making a comparison between three applications of artificial intelligence and then conducting a questionnaire to evaluate the designs developed from these applications through the elements and foundations of design, aesthetic, and functional aspects, in addition to employing them in interior designs.

Data and Methods

The researcher made an inventory of **the artificial intelligence applications** available until September through traditional search methods through search engines and specialized sites such as the Future Pedia website

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https://www.futurepedia.io/ai-tools/image-generator. This site is the largest directory of tools. Artificial intelligence (AI tools) is updated daily, as it includes more than 3,500 tools classified into 54 categories, for example, those related to writing, making videos, generating images, or creating program codes and making applications.

Approximately 255 tools were found dealing with generating images from written texts, some of these tools are: (Dream AI -Night 81Cafe - DALL-E2 - Art breeder AI -Dream Studio - Craiyon - Deep Dream -Starry AI -Midjourny - Photosonic - Deep AI - Lexica - Playground - Dream Like - Instant Art)

Artificial intelligence, definition, aim, applications, characteristics, and importance.

Artificial intelligence is the behavior of computer programs, to make them simulate human mental capabilities and mode of work. The most important characteristics of artificial intelligence are the ability to know, learn, infer, and react to situations programmed into the machine. The ability of the system to correctly interpret external data, learn from this data, and use that knowledge to achieve goals and tasks. defined by flexible adjustment.(8)

The science of artificial intelligence aims to simulate some of the processes of perception and logical deduction that humans are fluent in automatically and at a high speed, as well as accomplish many difficult and complex tasks that were done manually. Using advanced artificial intelligence techniques, these technologies can be integrated with computer-based information systems to increase the capabilities of computers and expand the range of applications that are made using them.(2)

Many people associate artificial intelligence with robots when they hear it, but these two concepts are not the same. If we think of a robot as a person, artificial intelligence can be seen as its brain or central nervous system. Before analyzing artificial intelligence, we must first grasp the concept of "intelligence". The word intelligence comes from Latin, which is understood literally as collection, collection, collection, and selection.(13:p107) It is generally believed that intelligence is the ability of humans to express themselves through mental work in activities that recognize and transform the world. "Intelligence" can also be seen as "intelligence" and "ability". The combination of the two has the meaning of intelligence.

Although both human intelligence and artificial intelligence contain "intelligence", they cannot be equated. The difference between human beings and artificial intelligence is that human beings have the subconscious of dreaming. Long ago, human beings dreamed of creating tools or machines to solve all kinds of physical labor (14) The emergence of the steam engine in the 18th century, the arrival of the information revolution in the 1940s, and the emergence of artificial intelligence in the 1950s are all based on the unremitting pursuit of the human dream.(15)

Artificial intelligence is defined as "the theory and development of computer systems capable of doing tasks ordinarily requiring human intelligence, such as visual perception, speech recognition, decision-making, and language translation," according to the Oxford Dictionary.(16) It

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is defined as the ability of a particular system to correctly analyze external data, and to learn from this data, deriving new knowledge bases from them, adapting these rules, and using them to achieve new goals and tasks through flexible adaptation.(17)

Artificial intelligence as a term consists of two parts: "intelligence" which means the power of thinking, and "artificial" which means man-made. Thus, artificial intelligence means the power of man-made thinking.(18)

Artificial intelligence applications: Artificial intelligence has several applications, including the design of expert systems, games, robotics, speech and writing recognition, human-machine interaction, understanding languages, planning, and others (19). The most important uses can be listed as follows:

-Intelligent robotics.
-Educational process.
- Exploration of outer space.
- Technical and design processes.
-customer service.
- Smart applications of all kinds.
-health care.
- Electronic games.
-Banking sectors.
-Interact with the visual system
- Digital media and sonic.
- Audio and visual aids default.
-Interaction with handwriting
- websites.(20),(21),(2٢:p79-101)

Characteristics of artificial intelligence: Artificial intelligence has many characteristics and advantages to solve problems, the ability to think and perceive. The ability to use old experiences and employ them in new situations, the ability to use trial and error to explore different things, the ability to respond quickly to new situations and circumstances, and the ability to visualize, create, understand, and perceive visible things.(23)

Artificial intelligence works digitally through a set of specialized programs to analyze and design algorithms and absorb large amounts of training data that are used to form associations and patterns that can be used later in future predictions, such as automatic response in smart robots, and the process of identifying and describing objects in images by reviewing Millions of examples saved to the smart device.(24)

The importance of artificial intelligence in design: Artificial intelligence is of great importance in enhancing the creativity of designers, and it acts as a virtual assistant by completing some work that requires the time and effort of the designer, such as focusing on building ideas and creative aspects. Perhaps the most prominent strength of artificial intelligence focuses on its ability to improve and speed up achievement. Designers who rely on artificial intelligence can create designs faster and at a lower cost due to the increased speed and efficiency that artificial intelligence gives them. In addition, artificial intelligence can analyze huge amounts of data and then suggest modifications to the design, so the designer chooses the appropriate suggestions for him and adopts appropriate modifications based on the results. that data and analyze it.(4:p1-15)

Artificial intelligence and the designer's role: According to statistics published by the Telegraph newspaper from a study conducted by the University of Oxford, there is a possibility that artificial intelligence will replace 700 jobs in the world right now, but character designers

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enjoy a lower percentage of replacement rates with robots and artificial intelligence. with his work, but artificial intelligence and modern systems can contribute to the elimination of tedious repetitive activities and the production of modern personalities with more innovative solutions, and perhaps the change in the collective work environment and the need for a smaller number of designers to complete the most complex projects.

The conclusion: creativity and innovation, even managing multidisciplinary teams, are the tools and properties of the human mind alone, and thanks to artificial intelligence, the world can design creative personalities, and the work is limited to details and repetition for machines.(4:p1-15)

Printed Wall Hangings.

Printed Wall Hangings refer to decorative textiles or artworks designed to be displayed on walls. They typically feature various printed designs, patterns, or images and are used to enhance the aesthetic appeal of interior spaces. These hangings can be made from various materials such as fabric, tapestry, or paper, and they serve both functional and decorative purposes, adding character and visual interest to walls within homes, offices, or other indoor environments. Printed Wall Hangings can be executed using various printing methods and different materials such as wood and textiles.

Printing is by inserting design into the computer with any of its input tools and applying them to the materials that are prepared for printing to be compatible with printing colorants after taking the printing order from the computer. This is done by the color units installed by the digital print heads.(6)

Digital textile printing is becoming a commercially viable textile printing technology, and the outlook is optimistic. Digital textile printing offers a preferable printing technology over analog printing technology in terms of new design styles, mass customizations, just-in-time productions, agile manufacturing, and sustainable systems. However, the industry is challenged by a flux of technological conversions from analog to digital printing technology. Instead of implementing digital textile printing technology into a new business model, the current technology utilization has retrofitted its system and processes into preexisting workflows. It is a time to shift a paradigm in the digital textile industry. Surface imaging is one solution to disrupt the current textile printing industry system to create a prosperous and holistic digital printing system for the future.(28)

Digital printing technology is known as inkjet printing, in this method design entered into the computer is implemented by one of the input tools and applied to the materials equipped for printing to be compatible with printing colorants after taking the order of printing from the computer and this is applied by the color units installed digital print heads with fine headers which jetting colorants on pretreated materials.(12:p2)

Design, fundamentals, elements, and interior design.

Design linguistically is a work with a purpose based on planning that results in an activity, a phenomenon, or a final product[10], but technically it is something its aim is its existence even though its elements existed before (11:p15) **.**

Design elements are the vocabulary of the language of form that the designer uses to

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express his vision. They are called elements of design or formation due to their flexible capabilities in taking any flexible form and their ability to merge and combine to form a complete form of the work of art.

The foundations of design depend mainly on balance, movement, and rhythm. These elements include the **point**, **line, area**, **size, color**, **and void**.(36)

Interior Design: is defined as" the sum of planning and design of interior spaces and spaces, which aims to harness the material, spiritual and social needs of people, which in turn ensures the safety of the home. " (40:p165-184) or is "The art of manipulating a space or area and all its dimensions in a way that exploits all design elements in an aesthetic way that helps work inside the building" (37:p154) or "One of the engineering sciences that link architecture with functional needs in the interior establishment and achieves psychological and physical comfort for the individual" (38:p39)

The effectiveness of artificial intelligence applications in designing printed wall hangings.

Computers can simulate human intelligence, such as learning, problem-solving, and decision-making. This increasingly advanced technology is being used day by day in product design to help companies and designers create new, innovative, and ever-evolving products. With the ability to generate excitingly diverse ideas and simulate real-world behavior, this exceptional innovation proves to be a more than valuable tool for any designer looking to create and develop successful products.(29:p203-224)

The textile printing designer seeks to achieve interconnection and cohesion between functional and aesthetic performance. Therefore, in order to complete his goal, there must be an arousal of the sense of beauty so that the result represents a harmonious unity between the intellectual and emotional data of the design.(39:p153-173)

The importance of this research was determined to take advantage of artificial intelligence techniques to assist the designer in creating new designs that have the foundations and elements of artistic design according to the requirements and needs of the consumer, in the fastest time, with the least effort and the highest possible quality. In the following, we discuss different applications of artificial intelligence systems in artistic design, as these applications deal with the data that the user enters and convert it into elements with artistic meanings and designed according to the general principles and rules of design and artwork, and according to the vision or detailed description that was previously entered by The designer or the user, without the need for any prior technical experience.(9:p2281)

Artificial intelligence applications in image generation are used in the following processes: Generating high-quality images of imaginary things that do not exist. Generating images that express specific text inputs, as this technology allows simple text descriptions to be entered for some small objects, and the generation of realistic images that express these descriptions.(30:p75-86)

Creating images using artificial intelligence tools The process of creating images from written texts has evolved through a model known as the Stable Diffusion Model, where the written text is entered into the

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natural language in what is called the Prompt, which is responsible for telling the machine the image that we want to generate understandably, from During the process of encoding the words that make up the text, the ideas in the text are captured and converted into a digital image in what is known as text encryption, and then this information is presented to the image generator, and the image generator goes through two stages: the first stage is the image information generator, which begins to make matrices They are organized lists of numbers that result in a distorted image, followed by a second stage, which is Image Decoder, which processes information matrices and converts them into a clear final image. (31:p77-85) ,(32)

Artificial intelligence tools (AI) that are used to generate images from written texts vary in terms of their subscription systems, some of which are free, some of which provide some free trials, and some are then subscribed to through some of the fees imposed by the tool, and some of them operate with a specific package system. With several images monthly or annually, the most prominent of these tools are:

1. Dream AI https://dream.ai
2. Night Cafe https://creator.nightcafe.studio
3. DALL-E2 https://openai.com/dall-e-2
4. Art breeder AI https://artbreeder.com
5. Dream Studio https://beta.dreamstudio.ai/generate
6. Craiyon https://www.craiyon.com
7. Deep Dream www.deepdreamgenerator.com
8. Starry AI www.starryai.com
9. Midjourny https://midjourny.com/home
10. Photo sonic https://writesonic.com/photosonic-ai-art-generator
11. Deep AI https://deepai.org/machine-learning-model/text2img
12. Lexica https://lexica.art
13. Playground https://playgroundai.com
14. Dream Like https://dreamlike.art/creat
15. Instant Art https://instantart.io

One of the most famous sites that made it possible to benefit from artificial intelligence technology in artistic design is the MidJourney website.

Through the Midjorney Platform, You can create a variety of high-quality images for use in multiple purposes, such as logging designs, or illustrations for books, magazines, or work designs and configurations suitable for printing Other uses, they are an easy-to-understand and use platform, and do not require any experience in design, and they are considered a great tool for companies to save time and money, where they can work for their high-quality promotion design, and at the lowest possible cost. (33),(34)

The researchers conducted a comparison to identify the characteristics of these tools, the way they are used, and their ability to create and generate various designs through written design text. This study revealed that these tools are similar in many characteristics and methods of use, while they differ in the quality of the designs developed through these tools and their compatibility. With the written design, and

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accordingly, the artificial intelligence tools Midjourney - Dream AI tool - Night Cafe (AI) were chosen to be the subject of the applied study. The characteristics of the three tools were also analyzed and compared among them, and the following table shows this:

Table 1

comparison	Midjourny AI tool	Dream AI tool	Night cafe AI tool
The cost of the service provided with the tool used	A tool that allows the user to create only 25 images for free, then subscribe to the paid packages system in dollars monthly or annually	A free tool that allows the user to create an unlimited number of images	It is based on the credit system. The more credits you have, the more images you can create. You can earn credits by participating in the community or making purchases.
Speed of generating designs	The tool is considered to have a moderate speed in the process of generating designs	The tool is very slow in generating designs	The tool is fast in the process of generating designs
Tools settings	There are no settings within the tool for updated images	There are settings within the tool for newly created images, such as the size of the images and It provides many different artistic styles	It provides many different artistic styles
Number of images created	The tool gives 4 suggested images for each text description each time	The tool gives 4 suggested images for each text description each time. The first suggestion is free and the other three are based on a monthly or annual subscription.	The tool gives one suggested image for each text description at a time
Retrieve newly created images	The images cannot be called updated	The images cannot be called updated	Previously created images can be recalled through the creations button on the site

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Account type	You must first create an account on Discord before entering the site	An account is created directly on the site without the need for a Discord account	An account is created directly on the site without the need for a Discord account

Empirical study

The applied study has been divided into two parts: Section I develops designs inspired by the Damietta environment through the texts and descriptive writing has been introduced to three artificial intelligence applications. The researchers conducted five design experiments to compare their results and guarantee accurate findings. Section II A questionnaire has been made to assess the capacity of these applications to produce proportionate designs with inputs and check items, design, aesthetic, and functional aspects.

The following is a presentation of proposals for text descriptions written in the English language, which were entered into the three tools under study, there are five proposals to develop various designs for printed wall hangings inspired by the Damietta environment, and they are shown in the following table:

Table (2) Comparison between the new designs of the three applications when entering textual description No. 1 conducted by researchers.

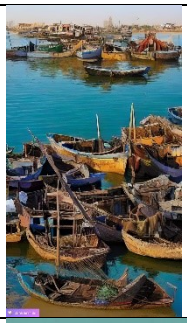
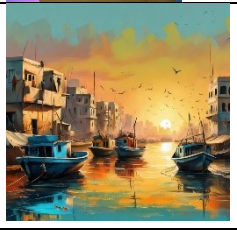
The first design					
Boats on the Nile in Ezbet El-Burj in Damietta at sunrise, behind them beautiful concrete-colored houses and fishermen are fishing with nets filled with fish					
Midjourny AI tool					
Dream AI tool					
Night café AI tool					

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Table (3) Comparison between the new designs of the three applications when entering textual description No. 2 conducted by researchers

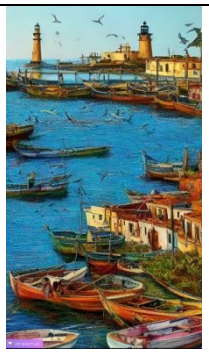
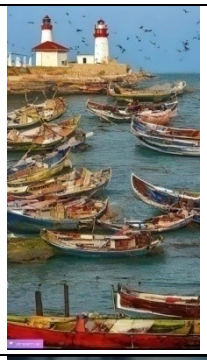
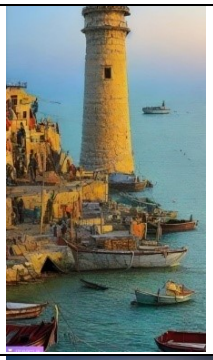
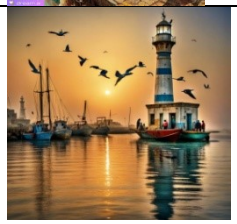
The second design					
At the Damietta lighthouse at sunrise, the sky is clear, the birds are flying, the water is blue, the colorful boats are sailing, and the fishermen are casting their nets					
Midjourny AI tool					
Dream AI tool					
Night café AI tool					

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Table (4) Comparison between the new designs of the three applications when entering textual description No. 3 conducted by researchers.

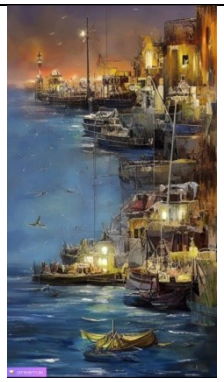
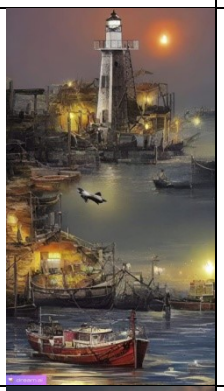
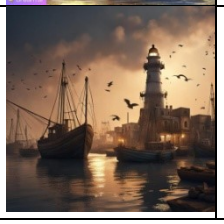
Third design					
In the port of Damietta, there are fishing boats, fishermen catch fish, the lighthouse lights up the place, and birds in the sky.					
Midjourny AI tool					
Dream AI tool					
Night café AI tool					

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Table (5) Comparison between the new designs of the three applications when entering textual description No. 4 conducted by researchers.

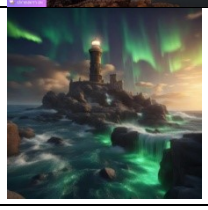
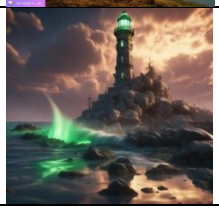
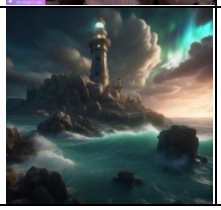
Fourth design					
The lighthouse in the city of Ras al-Bar, and the sky has the phenomenon of the aurora borealis, and the lighting is reflected on the seawater, and the rocks are mimes					
Midjourny AI tool					
Dream AI tool					
Night café AI tool					

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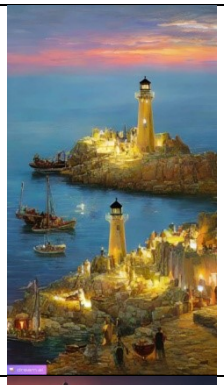
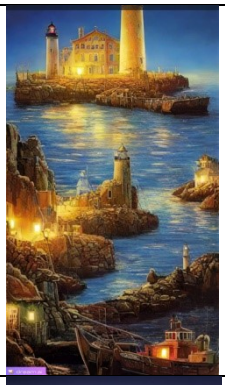
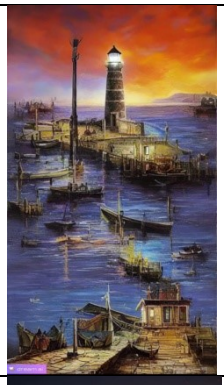
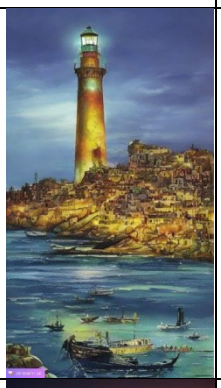
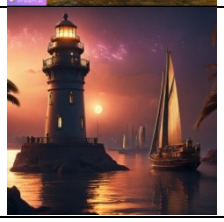
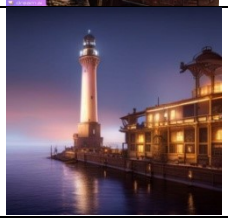
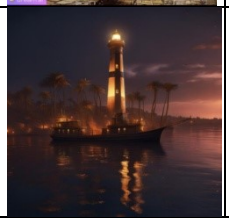
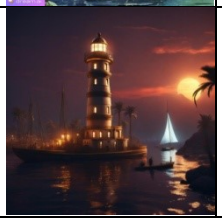
Table (6) Comparison between the new designs of the three applications when entering textual description No. 5 conducted by researchers.

Fifth design					
The lighthouse lights up at night to guide boats and ships, and the colors of lighting reflect on the waters of the Nile					
Midjourny AI tool					
Dream AI tool					
Night café AI tool					

After completing the applied experiment, the researcher concluded that artificial intelligence applications in general help the designer reach innovative, creative solutions, save time and effort, and reduce the error rate without eliminating the value of the designer. Artificial intelligence provides advanced algorithms that help designers create multiple designs, simultaneously short.

The Survey studies

The proposed designs under research were judged through a questionnaire form, which was prepared and adjusted specifically for

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the current research, and then directed to a group of (50) individuals, to identify the extent of success of the proposed designs under research in achieving the research objectives and identifying the best ones, as The researcher divided the questionnaire form for evaluating the designs under research into three main axes. The first axis: achieving the foundations and elements of design. The second axis: achieving the aesthetic and innovative aspect of design, adhering to design principles, and the functional aspect of design. Each axis contains several statements that contribute to measuring it accurately, the standard scores for acceptance levels were as follows:

Table No. 7 Standard scores for acceptance level conducted by researchers					
Acceptance level	excellent	very good	good	acceptable	weak
Standard score	٥	٤	٣	2	1

Based on the above, the designs proposed by the designers were judged as shown in the following table:

Table No 8: Analysis of questionnaire data conducted by researchers.

TOOLS		**Midjourny AI tool**			**Dream AI tool**							**Night cafe AI tool**				
Evaluation items		Des 1	Des 2	Des 3	Des 4	Des 5	Des 1	Des 2	Des 3	Des 4	Des 5	Des 1	Des 2	Des 3	Des 4	Des 5
	The first axis: achieving the foundations and elements of design															
Achieving a balance between design elements		**175**	**170**	**175**	**169**	**169**	**124**	**129**	**133**	**123**	**123**	**139**	**139**	**145**	**141**	**134**
Achieving contrast between design elements		**162**	**166**	**163**	**168**	**168**	**125**	**132**	**121**	**125**	**121**	**144**	**143**	**132**	**140**	**146**
Achieving unity between design elements		**158**	**169**	**160**	**171**	**165**	**122**	**129**	**125**	**126**	**124**	**140**	**137**	**142**	**138**	**133**
Achieving coherence between the foundations and elements of design		**168**	**164**	**158**	**173**	**162**	**121**	**130**	**130**	**125**	**122**	**134**	**136**	**143**	**143**	**143**
	The second axis: achieving the aesthetic and innovative aspect of design. conducted by researchers															
Achieving an element of		**169**	**163**	**165**	**177**	**168**	**124**	**119**	**129**	**125**	**126**	**133**	**129**	**146**	**140**	**141**

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novelty and modernity in the design.																
Achieving the artistic and aesthetic aspects of design		**167**	**164**	**171**	**164**	**176**	**128**	**122**	**129**	**120**	**131**	**145**	**131**	**135**	**134**	**144**
Achieving integration and technical belonging to the Damietta environment		**169**	**161**	**163**	**165**	**163**	**130**	**138**	**125**	**119**	**131**	**139**	**138**	**140**	**130**	**145**
Achieving the innovative aspect of design		**170**	**166**	**160**	**167**	**170**	**126**	**120**	**125**	**128**	**124**	**137**	**125**	**140**	**135**	**137**
	The third axis: the functional aspect of design.															
Suitability of the design to the target group		**165**	**174**	**172**	**167**	**161**	**131**	**138**	**137**	**122**	**129**	**142**	**140**	**144**	**128**	**139**
Adapting the design to express the Damietta environment		**171**	**159**	**167**	**169**	**167**	**127**	**146**	**128**	**128**	**129**	**142**	**146**	**150**	**132**	**138**
Adapting the design to express the elements of the Damietta environment.		**168**	**153**	**160**	**162**	**156**	**126**	**130**	**136**	**119**	**128**	**145**	**138**	**152**	**135**	**137**
Appropriating the design to enrich the aesthetic value of the design of printed textile pendants		**173**	**162**	**165**	**169**	**165**	**127**	**131**	**128**	**124**	**129**	**137**	**133**	**152**	**147**	**145**

Results

Analysis of survey responses

The first question in the survey was asked about the identity of the survey respondent. There were 50 participants in the survey. The number of "specialized" designers was 20, with 40%, while the number of those

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interested in design was 30, with 60% (see Figure No. (1)

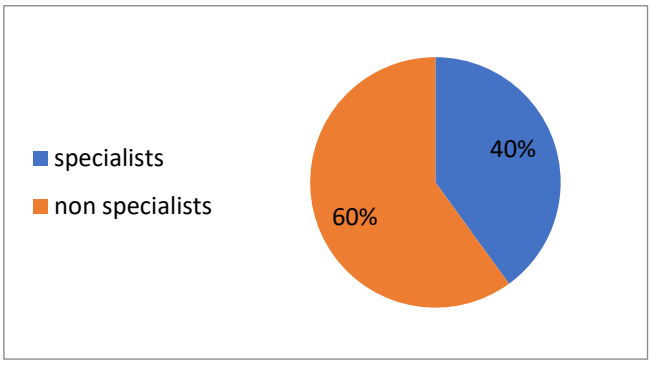

Figure n (1) for the number of responses. Source: Authors

The second question was asked in the survey about achieving design fundamentals in the designs generated by artificial intelligence applications. The results showed that the Mid Journey tool received the highest percentage of votes in achieving the foundations and elements of the design, at 66.66%. Followed by the Night Cafe tool with a rate of 55.84%, and in last place comes the Dream AI tool with a rate of 50.2%. As shown in figure n. (2)

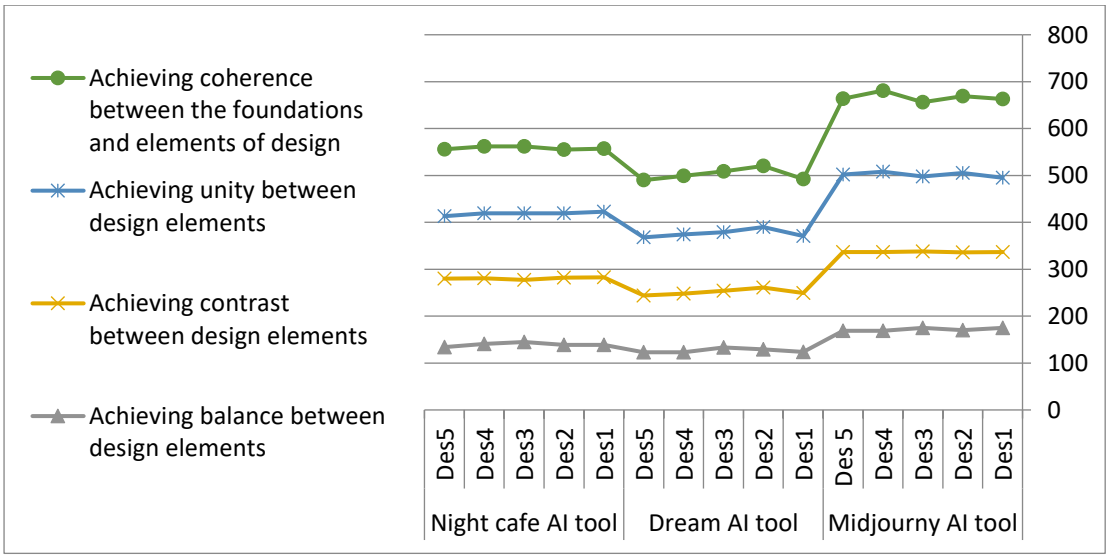

Figure n (2) for Questionnaire Result (achieving the foundations and elements of design). Source: Authors according to the survey responses

The third question was asked in the survey about achieving aesthetic and innovation in the designs generated by artificial intelligence applications. The results showed that the Mid Journey tool received the highest percentage of votes in achieving the aesthetic and innovative aspect of design, at 66.76%. Followed by the Night

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Cafe tool with a rate of 54.88%, and in last place comes the Dream AI tool with a rate of 50.38%. As shown in figure n.(3)

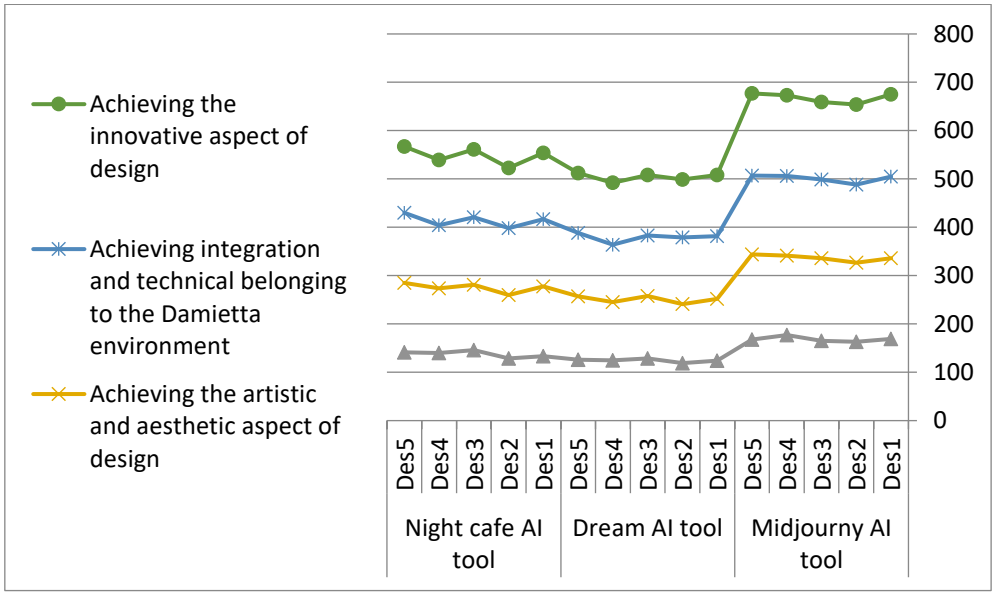

Figure n.(3) Questionnaire Result (achieving the aesthetic and innovative aspect of design). Source: Authors according to the survey responses

The fourth question was asked in the survey about achieving the functional aspect in the designs generated by artificial intelligence applications. The results showed that the Mid Journey tool received the highest percentage of votes in achieving the functional aspect of the design, at 66.1%. Followed by the Night Cafe tool with a rate of 56.44%, and in last place comes the Dream AI tool with a rate of 53.86%. As shown in figure n. (4)

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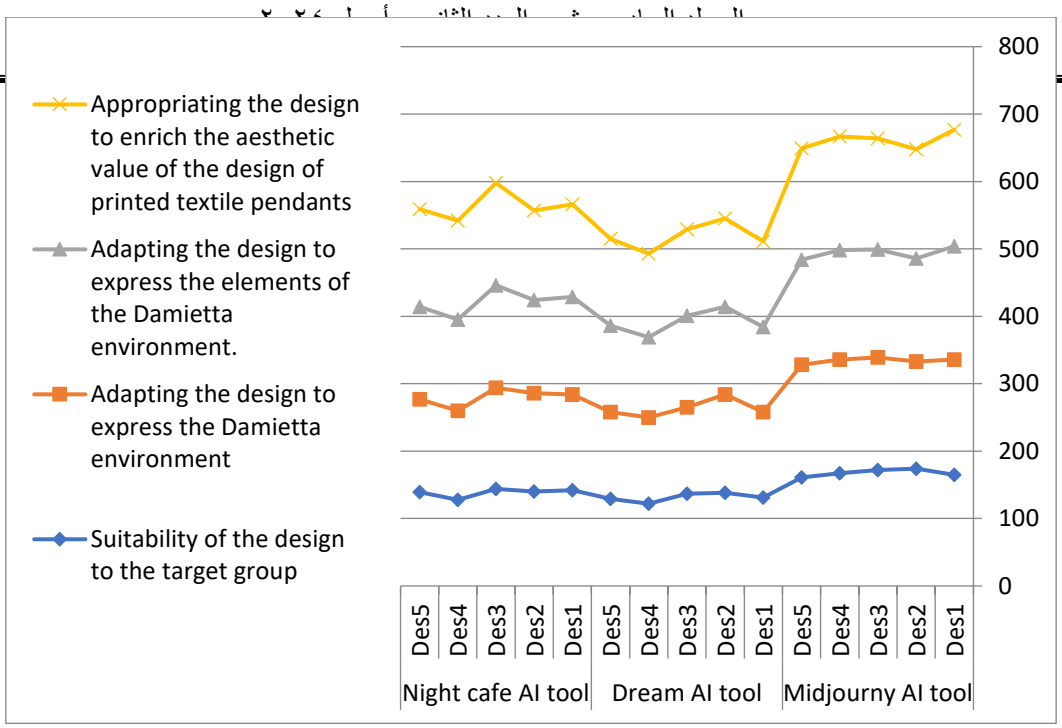

Figure n. (4) Questionnaire Result) achieving the functional aspect of design). Source: Authors according to the survey responses

Discussion

To investigate achieving the foundations of design, the aesthetic and innovative aspect of design, and the functional aspect through AI-generated designs a questionnaire was published online for designers and those interested. We found that in the first axis, achieving the fundamentals of design, the Mid Journey application received a percentage of (66.66%), while the Night Cafe application obtained a percentage of (55.84%), and the Dream AI application came in last place with a percentage of (50.2%) This is similar to a ratio conducted by another study which is Midjourney tool dominates with the highest quality coefficient of 98.46%, making it the best choice for achieving the elements and foundations of design for innovative designs. It is followed by the Lexica tool with a quality factor of (96.68%). The last one is the Dreamlike tool with a quality factor (94.75).[1] we found also that the second axis achieves the aesthetic and innovative aspect of design. The Maid Journey application received a percentage of (66.67%), while the Night Cafe application obtained a percentage of (54.88%), and the Dream AI application came in last place with a percentage of (50.38%) This is similar to a ratio conducted by another study which is (95.49%) for the Midjourney tool, so it is considered the best in terms of achieving the aesthetic and innovative aspect of design, followed by very slight differences by the Lexica tool with a quality factor (95.06%), and the Dreamlike tool comes in last place with a factor of Quality (86.60)% (1:p363-380). We found also that the third axis: achieving the functional aspect of the design the Maid Journey application received a percentage of (66.61%), while the Night Cafe application obtained a

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percentage of (56.44%), and the Dream AI application came in last place with a percentage of (53.86%). This suggests that Artificial intelligence applications empower designers to discover diverse, creative, and innovative solutions that achieve the elements and principles of design while also considering aesthetic and functional aspects and aligning closely with the written text. Furthermore, this reflects the importance of the need for designers to be aware of artificial intelligence programs in design, which assist them in creating designs that prioritize both aesthetic and functional aspects, closely aligning with their imagination, and doing so quickly and with high quality and efficiency. As shown in Figure number (5) table n (9)

Table n.9 the percentages of the three axes. Source: Authors

Axis	Midjourny	Dream AI	Night Café
The first axis: achieving the foundations and elements of design	**66.66%**	**50.2%**	**55.84%**
The second axis: achieving the aesthetic and innovative aspect of design.	**66.67%**	**50.38%**	**54.88%**
The third axis: achieving the functional aspect of the design	**66.1%**	**53.86%**	**56.44%**

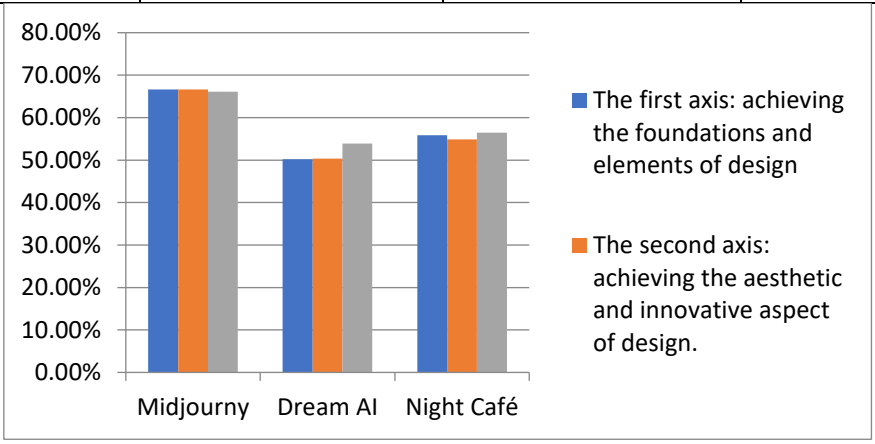

Figure n.5 the percentages of the three axes. Source: Authors

Conclusion

It can be concluded that the term artificial intelligence expresses the computer simulation of human behavior in terms of thinking, as well as training on human behavior and making decisions in different positions depending on available data.

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Artificial intelligence applications have caused a qualitative leap in the field of technical design and contributed over time and effort to overturn and have made a range of sites and platforms to take advantage of artificial technology in artistic design, and one of the most important and famous sites MidJornny, dream AI and night café.

These sites are treated with the exact description of the designer to introduce it on the site to provide many suggestions and designs by description or imagination, which is designed to choose from both ease and without being made any effort to mention, without the need to learn and use specialized programs, spend hours of work for such results. The generated designs achieve design fundamentals, aesthetics, and functional aspects, closely aligning with their imagination.

We have faced some limitations during the applicant part that we faced during the applied study, such as that some applications provide a limited number of free trials. This was overcome by registering with more than one email for these applications to benefit from the free trials for each email.

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الملخص:
مع الاهتمام المتزايد بالذكاء الاصطناعي ، ظهرت تطبيقات مختلفة لإنشاء العديد من التصميمات في ثوانٍ. أصبح من الضروري دراسة التطبيقات في مجال إنشاء المعلقات الجدارية المطبوعة وقياس مدى قدرتها على تحقيق عناصر ومبادئ التصميم، وضمان الجوانب الجمالية والوظيفية. ثم استخدمها كمعلقات جدارية في التصميم الداخلي.
تهدف هذه الورقة البحثية إلى تقديم تطبيقات مختلفة تستخدم بعد ذلك لإنشاء معلقات جدارية مطبوعة. لتقييم الجوانب الجمالية والوظيفية المرتكزة علي أساسيات التصميم .
ولتحقيق هذا الهدف، تم تنفيذ العديد من منهجيات البحث بدءًا من مراجعة الأدبيات، وتم إجراء العديد من تجارب التصميم باستخدام ثلاثة تطبيقات للذكاء الاصطناعي لمقارنة النتائج. تم إجراء استبيان لقياس مدى تحقيق الجوانب الجمالية والوظيفية. وقد توصلت نتائج هذا البحث إلى تفوق أداة (ميدجورني) على الأداتين الأخريين من حيث تحقيق أسس وعناصر التصميم والقيم الجمالية.

الكلمات المفتاحية:
تطبيقات الذكاء الاصطناعي، اللوحات الجدارية المطبوعة، عناصر التصميم، أسس التصميم، التصميم الداخلي.