
The Effect of Artificial Intelligence on Developing the Interior Designer's Performance in Interior Architecture

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Abstract— Artificial intelligence has become one of the basics of the current era, and the field of interior design is one of the fields that has been greatly affected by it, but so far, artificial intelligence has not been able to replace humans in an integrated manner, because interior design is a successive integrated process consisting of many steps from idea, design and implementation according to many criteria that the machine learns, and it is not be certain that the interior design will always and forever have the largest and effective role in the interior design process in the modern and future era, but the interior design will continue to be subject to several wonderful human criteria, and it has been possible for science and scientists and Designers adapt the machine and teach it many steps and commands through many different programs that it can do instead of the human with great accuracy, both in the accuracy of design and implementation, and this research sheds light on what the artificial intelligence can do and visualize what can be done it too. A comprehensive review has been presented in this paper to give the modern knowledge about the relationship between AI and interior Design nowadays.

Keywords— Interior Design, Artificial intelligence, Interior Architecture, Machine Learning, Digital Fabrication.

1. INTRODUCTION

It is not strange now that you find that social networking sites have discovered the existence of a picture of you or someone who looks like you, how did he know your features or the features of someone who looks like you, , but rather it has become to determine that you are from any country as well and perhaps in any City, it is artificial intelligence that has become very dangerous in our current world and may also be very useful. And here comes the role of scientists and scholars in how to adapt this technology for the benefit of humanity, especially in our field, the field of interior design, which is subject to the development of ages and is affected by technologies, whether in thought, material, and in design, and by advanced technologies such as artificial intelligence. And artificial intelligence is not born of the moment, but it has a long history. The first time it appeared was in 1956 AD, but artificial intelligence was not at the pinnacle of success all those years, but it went through stages of success and stages of failures.

Challenges of traditional interior design: Interior design pertains to the arrangement of spaces within a structure by designers. This task poses a considerable challenge, requiring designers to consider regulations, spatial functionality planning, color palettes, and material choices in order to define the aesthetic of the space. Beyond simply meeting the preferences of clients, designers must also strive to ensure that the design is visually appealing, as a pleasing design evokes emotional satisfaction (1).

A significant obstacle in the field of interior design is achieving aesthetically pleasing designs. Interior designers need to consider things like furniture placement, color harmony, material selection, lighting design, and overall space layout. A combination of practicality, artistic sensibility, and inventiveness is needed for designers.

The idea of human cooperation with the machine in the past, for the machine to do what the person asks of it, is a wonderful idea for the machine to act and do the work, but for the machine to have the ability to learn to give unexpected results, here the person is supposed to coexist with the machine.

The idea of the digital environment in which humans have become coexistent from the beginning, whether in urbanization that contains architecture, then interior architecture that contains interior design and interior architecture, then design details in terms of idea, implementation, and systems Modern automation in internal spaces is a succession of artificial intelligence technologies (2)

According to how we live in the digital age, the research will demonstrate some of the stations that interior design adopts and the role that artificial intelligence. As a result, it will show how the performance of interior designers as well as the development of interior design will change.

Artificial Intelligence, initially a mathematical and scientific endeavor, transforms into a practical solution for human issues when it takes on computational aspects.

Within the realm of Artificial Intelligence, Machine Learning functions as a subset, focusing on the enhancement of computer algorithms through experiential learning. This discipline delves into the development of algorithms capable of learning from data and generating predictions. With exposure to additional data, machine learning adapts its actions and responses, thereby enhancing efficiency, adaptability, and scalability and there is a classification of AI which is given in figure (1).

Deep Learning, a methodology employed in implementing machine learning algorithms, utilizes Artificial Neural Networks to train data, leading to highly effective decision-making processes. (3) This neural network engages in intricate computational micro-calculations across multiple layers, enabling it to perform tasks akin to human capabilities (4).

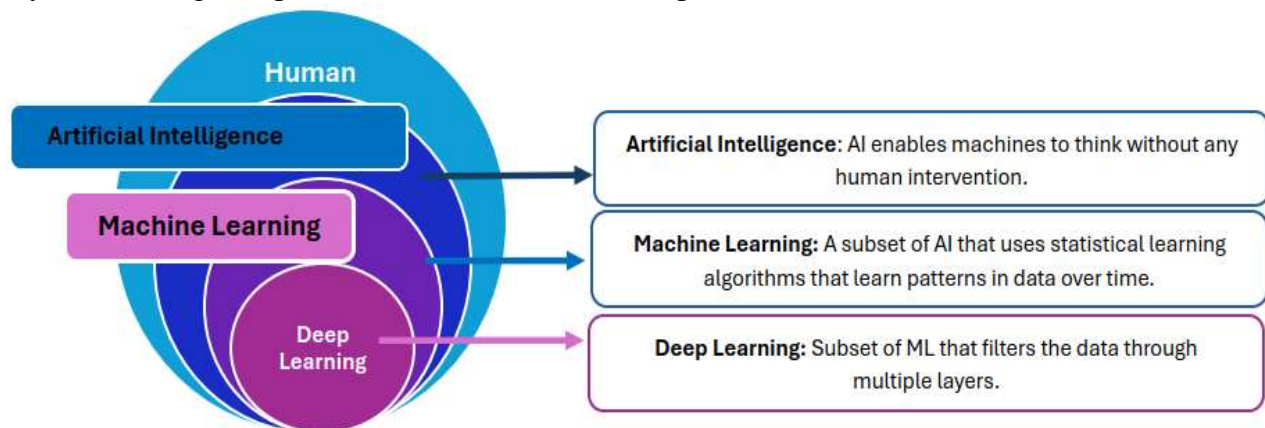


Fig1. Artificial intelligence, machine learning and Deep learning.

2. LITERATURE REVIEW MACHINE LEARNING

a) *Intelligent Architecture*

The development of artificial intelligence has created new opportunities and difficulties for environmental design. Environmental art design has been significantly reconstructed because of the multiple coupling of "technology-space-society," and the trend toward a digital environment is becoming more and more obvious. Modern environmental design has also acknowledged the shift from supporting industrial to supporting digital civilization, which has significant practical implications (2).

Moreover, AI contributes to enhanced personalization in interior design by analyzing user preferences and behavior, allowing designers to tailor spaces according to individual client needs. Machine learning algorithms can continuously refine design suggestions based on feedback, ensuring a dynamic and evolving design process. Additionally, AI-powered software can aid in cost estimation and budget management, providing accurate forecasts and preventing financial discrepancies during project execution. The integration of AI in interior design fosters sustainability by optimizing resource usage and recommending eco-friendly materials, aligning with contemporary environmental considerations. As the field continues to evolve, ongoing advancements in AI technologies promise to revolutionize the way designers' approach and design , execute projects, further maximizing efficiency and client satisfaction ,this steps shown by figure no.2 (5) .

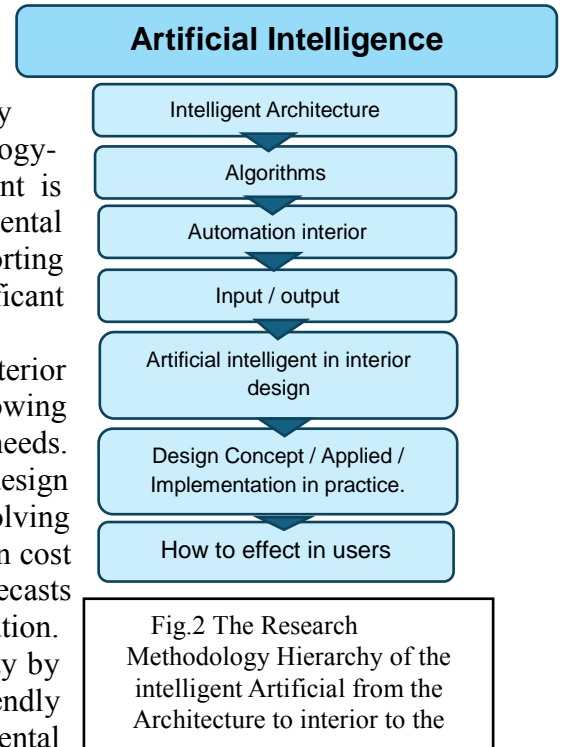
b) *Computational Intelligence in Architecture And Interior Design*

The most recent developments in architectural science related to computational intelligence, with an emphasis on interior design. We discuss different learning models used to solve problems in interior design, such as selecting the appropriate furniture type, arranging furniture, coordinating styles, or adding ornamental decoration. This is followed by an explanation of the current research being done to develop a scalable, economically feasible method for automatically arranging furniture according to a floor plan (6).

Artificial intelligence (AI) is currently used in the architectural engineering field in subfields like architectural design, style, ornamental decoration, and furniture arrangement inside., with the aim of automating human tasks, providing individualized support for subject-matter experts, offering professional guidance to amateurs, etc. In the 1990s, there was already a lot of research being done on the application of machine learning (ML) to design.

3.The construction of an artificial neural network model using algorithms.

The two aspects of input and output (intelligent calculation and automation design for interior decoration) are as follows: the first is automatic graphical identification of the apartment, which identifies all of its components automatically, including walls, doors, windows, and so on. in



addition to modeling in three dimensions. As the second step in intelligent computing and automation design, the room's design layout is automatically completed in accordance with the room function attribute, contour structure, and to-lay furniture (7).

The state-of-the-art applications of AI, with an emphasis on CI and ML, in interior design and architecture, including an examination of the underlying data models. We go over the benefits and drawbacks of the models, how they vary depending on the situation, how they have evolved and compared across the main design subfields, and what opportunities arise from combining different approaches.

a) Interior Design Field and Artificial Intelligence

The latest technological development explores artificial intelligence in the field of interior decoration layout design and uses artificial neural network models “figure no.3” shows the calculations between input and outputs to calculate interior decoration intelligence and

design layouts, assisting both professional designers and regular people in their interior design projects. Rough experiments, the efficiency and usefulness of artificial neural network models in the layout design of indoor decorations, saving a large number of people and time, can give users more options. Currently, middle-class and low-income consumers are the target audience for this method of intelligent decoration design, while senior designers continue to provide one-on-one service to high-end consumers. We intend to expand this model to more experienced users in the future and enhance the novelty and originality of layout design (3).

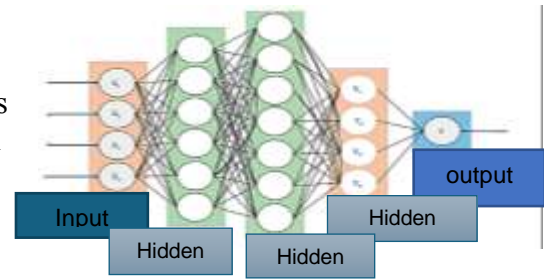


Fig. 3: Network structure Diagram

b) Designer and Design Tools

Popular generative artificial intelligence (AI) tools were used in a series of exploratory experiments. These experiments focused mostly on exploring the creative potential that these AI tools provide, as well as the tools' limitations and potential applications in the workflows of designers.

The use of CAD as a valid tool in the design process, which gradually replaced manual technical drawings, led to a redefine of interior design tools, furniture design methodology, and object shapes. Designers were motivated to utilize all of the tool's capabilities. Furthermore, it is argued in this paper that CAM as a tool could open up new possibilities for the design of specialized furniture by providing the furniture designer with more control over the process. the use of digital design tools as part of an all-encompassing design process that reimagines the process from conception to production. (7).

Almost all of our traditional and contemporary furniture was made with handicraft or industrial technologies, which is one clear obstacle to mass customization in the furniture industry. Naturally, mass customization was not the intended use for Computer Numerically Controlled (CNC) processes such as laser cutting and CNC milling. Consequently, the concept of industrial design must give way to the idea of customized design, and a whole range of new products must be developed.

There are many tools that helped the interior designer to plan spaces and design in general, whether two-dimensional or three-dimensional, as well as calculating places, which is applied

under the item of Machine learning, and these tools are volunteered for the interior designer to implement what he wants, such as two-dimensional and three-dimensional programs such as AutoCAD, maya - Autodesk 3Ds Max – Grasshopper, Planner 5D and many programs that help visualize the design of the interior spaces and interfaces by new ideas and new product “figure no.4”, which aim at ease and integrated visualization of the design (3).

c) Artificial intelligence Production

AI management system materials and procedures can be coded to facilitate the realization of artificial intelligence in the production process, thereby improving quality and production efficiency in production monitoring and auto-controlling. In addition to the quick design and fitting procedure used to create the products, the expert system can automatically monitor and control changes in the important parameters online through information transmission and the AI management system's control model (8).



Fig. 4: Using software to produce high-quality designs (AutoCAD - 3D Max - Revit)

Artificial intelligence can be realized more easily in the production process by coding materials and by utilizing information transmission and the control model of the AI management system, procedures are carried out which is for example should have a great database for interior architecture manufacturers elements and the relation between inputs and out puts like sheet materials , technical methods, Cutting banding drilling ..etc. “figure no.5”for Schematic diagram of information transmission , the expert system can rapidly design a fitting process to generate products and also continuously monitor and automatically control changes in the primary parameters online (9).

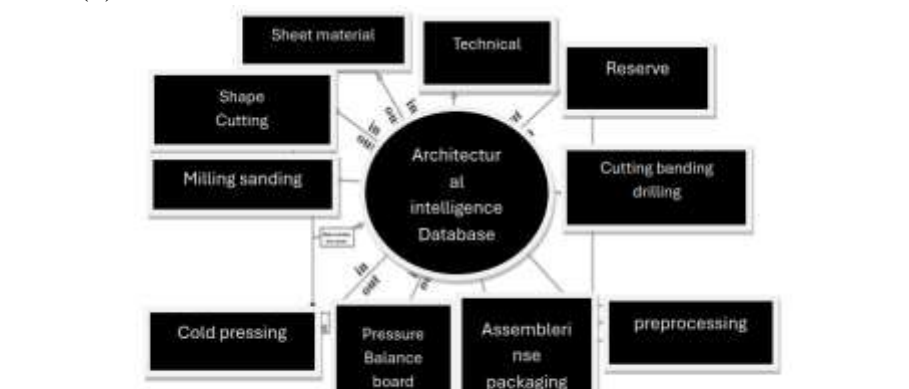


Fig. 5: Schematic diagram of information transmission and auto controlling model

4. AUTOMATION IN INTERIOR DESIGN

The combination of AI and home design, multi-angle analysis of the current development and future prospects are referred to as "artificial intelligence and smart home," and they include features that use remote control systems, wireless security systems, and systems that control electronic and wireless devices. To provide solutions for the storage issues with children's, kitchen, and bedroom items(10). Storage is a significant issue for designers as well as a challenge for users. But it is possible to give users a first-rate experience with the aid of AI, "Artificial Intelligence is centered on human behavior, storage content, storage partitioning, and adaptability to various family situations. A home can now be more easily controlled online when its owner is away thanks to the over 4,000 new smart home gadgets that have artificial intelligence built into them.". Thermostats, residential entertainment systems, door locks, and other security cameras are a few examples. Another use involves managing indoor temperatures and lighting by turning on and off appliances as needed. Automation for security and safety is offered to protect building occupants' property and lives. It functions as a security and defense system against calamities such as assaults, fires, crimes, and natural disasters. Another component of the access control system, which employs software and hardware systems to stop illegal entry into buildings and to log attempts at such intrusion. In order to stop unwanted access to the premises and facilities, these systems regulate and keep an eye on who enters and exits the building. Logical access control (security for computer connectivity and data) and physical access control are the two types of access control (11). Sensors: The primary element of a smart lighting system, sensors are used to monitor and control BAS. Sensors are used for a variety of tasks, such as mechanical operations, accurate color reproduction, and energy conservation with artificial and natural lighting. Examples include the monitoring and management of air pressure, flow, and velocity in ducts and indoor spaces, frost protection, humidity or CO2 level in HVAC systems, and control of lighting. Sensors can occasionally be used to create ambient lighting by positioning them close to windows or other natural light sources. Building operations frequently use lighting motion sensors known as LDRs (light dependent resistors) to save energy and incorporate them into their energy management plans. The resistance of an LED depends on how much light is shining on it. They are now required in many places and are outlined in local authorities' building codes.

The emergence of smart kitchens and the advancement of artificial intelligence technology have significantly raised the happiness index of the populace. For example, the intelligent sound box products and a complete line of intelligent kitchen products communicate and interconnect to achieve more friendly interaction, more powerful functions, and better services. For instance, by connecting the speakers, all kitchen appliances that are electrically intelligent can use intelligent voice control. Additionally, the strong interactional capability makes it easier to understand how complicated kitchen appliances work. In an intelligent kitchen, the smart systems will instantly connect to the cloud platform, search the recipe database, and then move the ingredients to the cooking appliances as long as the user prepares the ingredients, enters instructions, or uses the function for recommended recipes. One-key cooking and reserved cooking save users time and hassle. One day, a refrigerator that can determine the freshness of food and alert users to it might be available (12).



Fig. 6 : House interior Automation in many functions and how its control in many functions
<https://www.xme.digital/post/how-to-build-a-smart-home-from-scratch-a-guide-for-construction-business>

5. FURNITURE MANUFACTURE

The data management system and the expert system make up the organic body of the AI management system. The AI management model for information transmission and control in furniture manufacturing is created. It offers technological solutions for the use of AI in the production of furniture (5).

When creating a knowledgeable system to oversee the production of furniture in the form of boards, for instance, the relevant technical staff inputs the necessary knowledge into the system in accordance with the furniture manufacturing process. Design strategy, technical specifications, material type, and shape parameter are among the knowledge that is required. For AI learning and application, furniture database, manufacturing is fed within the framework. Target, also material parameters are input by technicians. Several methods based on simulation are created by simulation schemes, mainly on the big data, the target parameters, the material parameters, and the knowledge extracted from the database. The best plan should be identified. Implement the simulated ideal plan. Find, evaluate, and then solve any issues that arise during the execution process. If the issue cannot be resolved, the previous steps should be repeated to choose a different execution plan. Following a successful practice, events and regulations added to the system's database to enable quick resolution of similar issues the following day.

Materials and procedures can be coded during production to make it easier to implement artificial intelligence. In addition to quickly designing and fitting products, the expert system can continuously track and automatically control changes in the key parameters online, using information transmission and the AI management system's control model.

a) *Digital Fabrication:*

To reimagine the process of designing furniture with Studying design techniques that incorporate precise and methodical understanding of CAD-CAM operations is essential when working with computer-assisted tools. This is especially true when it comes to understanding the different kinds of materials, such as metal, wood, and wood composites, that are appropriate for different additive and subtractive CNC tools. An appropriate design methodology for the mass customization paradigm ought to provide suggestions for enhancing machining strategies, including material and geometric constraints, movements, tools, and appropriate speeds (13). The ability to produce furniture at a rate that is comparable to industrial production “figure no.7”, the process' flexibility, and user participation in the design process have the potential to revolutionize the practice of furniture design. It might present furniture design as directly serving customers who have particular needs.



Fig. 7: 3D printing furniture refence

https://www.architectmagazine.com/technology/joris-laarman-labs-stunning-3d-printed-and-cnc-milled-furniture_o

b) 3D Printing:

AI might also be used to reduce resource usage. Participants believed that AI could produce forms and shapes that weren't previously possible when combined with 3D printing. For instance, building materials and components that are just as good as or better than their equivalents but use less material and resources to produce them. This is thought to then allow architects to push the limits of geometry and produce non-standard shapes that can be realized in the built environment through the use of 3D printing and AI. However, this is only the case if the AI is capable of handling the logistics needed in 20 constructions when parts are non-standardized, which the industry is currently unable to do effectively.

A recent technological advancement that greatly aids in the design process is 3D printing. According to their capabilities, these technologies were first understood from the standpoint of modeling or prototyping, which allowed for the quicker and less expensive creation of complex one-off objects when compared to conventional model-making techniques. Layers of material are stacked and then released in 3D printers to create three-dimensional objects(14).

**6. GENERATIVE ARTIFICIAL INTELLIGENCE AND CREATIVITY -2022
(Virtual Design Process)**

Artificial intelligence (AI) pertains to the capacity exhibited by a computer system, or a robot under computer control, to perform activities typically carried out by humans, as these tasks necessitate human intelligence and judgment.

Since it is one of the most fundamental human abilities, the definition of creativity has been a subject of discussion for many years. However, it still seems that there is some ambiguity or incompleteness in the definition (15) the Oxford Advanced Learner's Dictionary defines creativity as using learned abilities and imagination to come up with something fresh or to create art.

There are many different ways to approach creativity, which is partially explained by the fact that it is interdisciplinary. The definition of the term "creativity" depends on the context in which it is used; for instance, an act of creativity in a business setting may be wholly different from an act of creativity in an artistic or psychological setting. According to Amabile, creativity is "behavior that results from specific constellations of personal characteristics, cognitive abilities, and social environments." Amabile's definition doesn't mention producing anything; instead, it talks about being creative in one's persona. One of the areas where researchers are in agreement is that creativity is produced in a particular setting, and that setting is so important to the production of creativity. She omits it from the definition, but she does define Creativity

emerges from the interplay of three forces: natural talent aptitude, the specific methods used (process), and the surrounding conditions. This interaction allows individuals or groups to generate original and valuable outputs that are recognized as such within their social context.

7. CREATIVITY & SENSE OF HUMAN & CUSTOMER

For AI to create the soul of a building, it must successfully transfer human traits like experience, intuition, and other characteristics. As one participant put it, a product becomes imbued with soul when customers actively participate in its development. This requires them to grasp the impact of various choices and settings, allowing them to essentially co-create the essence of the product with their business and product." (16). Intelligent design

must be more compassionate In addition to focusing on technology, intelligent design must also consider the feelings of others. The home should be transformed into the most satisfying, comfortable conditions possible in order to ensure that each family is able to enjoy their lives to the fullest.

8. UNEXPECTED AND INFINITE ALTERNATIVES AND DESIGNS

In the year 2022, new applications appeared within the artificial intelligence, such as the application of the mid-journey, which, by means of a method, translates the text into a design and the image into a design, and it also contains many diverse and endless alternatives, and here you ask the interior designers, will the role of the interior designer end in the field of design and replace it with artificial intelligence? Through experience and study, it has been proven that the field of interior design is one of the professions that does not end with the emergence of the terrible technical development that the world is witnessing in that field.

In supervised learning, the relationship between input and output data is captured through labeled training examples, which enables the output variable to be predicted for new data. It is widely utilized in many different industries for tasks like spam filtering, predictive modeling, image and speech recognition. While labeled data is used in supervised learning, user feedback for labels is used in active learning to enhance performance. However, uncertainty during monitoring or labeling and the high cost of obtaining labeled data can be barriers to supervised learning (17) AI is used in the field of interior design as a tool for a variety of tasks, such as combining various images, working on lighting, choosing, and combining colors and textures, and adding objects to renders. The creation of concept using supervised learning tools like Midjourney and DALL-E is the main topic of this article. All these tools use multimodal generative to produce images from input text; however, they may reinforce biases from training data. Indicators that distinguish creativity from other aesthetic standards include a design's typicality and how much it deviates from the viewer's mental image.

Furthermore, a comparative study of pairs of designs helped define creativity in both general and particular contexts. Creativity is defined as the capacity to produce original and emotionally

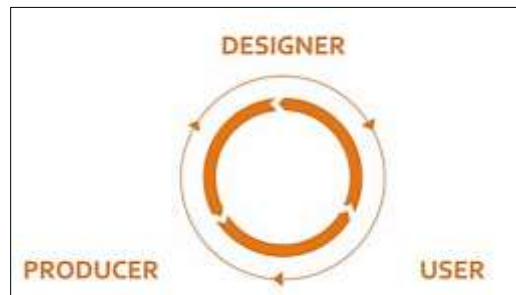


Fig. 8: Information and product dynamics in the design process.

compelling designs, to include creative forms and functions, to integrate shape, function, emotions, material, texture, and color, and to demonstrate a willingness to try out new ideas and take calculated risks. Though hard to measure precisely, creativity is a unique quality that both designers and viewers can appreciate in its works(18).

- The SEVEN types of AI in interior Architecture
 - 1- TEXT TO TEXT...(CHATGPT, CHATPDF, BING, BARD...ETC)
 - 2- TEXT TO IMAGE... (MIDJOURNEY, DALLE-2...ETC)
 - 3- TEXT TO BIM...(ARCHISTAR, ARCHITECTURES..ECT) 4. TEXT TO DXF...(SWAPP)
 - 4- IMAGE TO IMAGE (DALLEE-3, MIDJOURNEY, LOOKX...ETC)
 - 5- MODEL TO IMAGE (LOOKX, MIDJOURNEY, DALLE-2..ETC)
 - 6- SKETCH TO IMAGE (LOOKX, MNMAL...ETC)
 - 7- SKETCH To RENDER

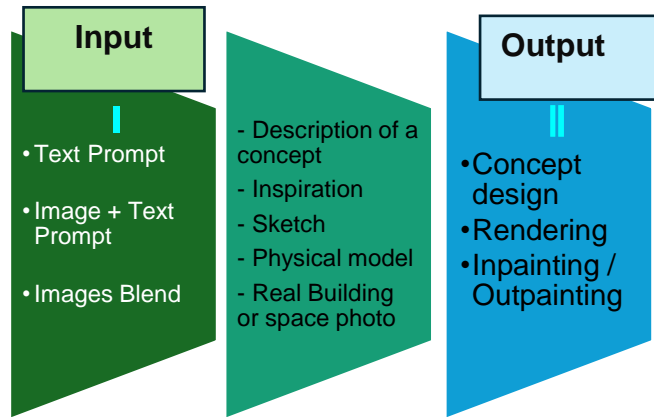


Fig.9: show the input and output in AI design process.

Energy efficiency and seamless integration with the surroundings are just two of the many aspects of living in this gorgeous home that have been improved using AI technology. Without the use of AI technology, the design process would not have been able to be as precise and detailed as it has been. The result is a home that is not only stunning to look at, but also very functional and efficient. All things considered, incorporating AI technology into the Talos at Lake Tahoe architectural project has been a genuinely positive experience that has led to the creation of a truly exceptional home “figure no. 10”, unnormal facades designs “figure no.11” and : Unexpected solutions in the interior design of a paint shop “figure no.12”.



Fig. 10 : Design solutions for a residential unit from the outside and the inside
<https://amazingarchitecture.com/futuristic/talos-ai-generated-house-by-gg-loop>



Fig. 11: Various alternatives of architectural solutions for facades
<https://www.azuremagazine.com/article/artificial-intelligence-architecture-renderings/>

Fig. 12: Unexpected solutions in the interior design of a paint shop reference. https://designmidjourney/p/CpAbs7rMJh4/?img_index=7

9. AI Platform Experience in Interior Architectural Design Process:

Large language models, neural networks, and AI-based tools have created a lot of buzz in the past year, with ChatGPT (GPT 3.5), which will be released at the end of 2022, being the apex. (19)

AI-powered platforms are widely available to assist designers in various tasks, including the creation of floor plans and 3D models and renderings. The majority of tools will automate a large number of laborious chores, freeing up your time to concentrate on more creative aspects of the work.

Interior designers can use AI Platform like Midjourney. Like the next experiment they using some Midjourney prompts to help us come up with creative interior designs from an alternative viewpoint. Imagine a cutting-edge, multipurpose room that maximizes area and incorporates cutting-edge technology. The room includes a sleek, floating desk with integrated wireless charging, a small, wall-mounted smart bed that can be controlled via an app, and a smart glass window that changes color depending on the time of day. Style is defined by monochromatic color



Figure 13: Mid journey Experiment to design Modern bedroom
<https://www.shiksha.com/online-courses/articles/midjourney-prompts-for-interior-design-innovation/>

schemes, ultramodern, high-tech furniture, and smart lighting that adjusts to your sleep schedule. The wide-angle shot composition makes effective use of both technology and available space. high-resolution, hyper-realistic, and highly detailed photos (13).

Now from text to image we can make a design varieties which is may be not accepted as a final design, but it will be like a brainstorming methodology for the designer, maybe at the beginning of their experiment which mention in figure (14) which I tried by DALL from text to Image “3d interior Spaces for Pharaonic ancient Egyptian Style.



Figure 14: DALL - E Experiment for Interior design in Ancient Egyptian Style by the Author

Regarding artificial intelligence techniques in developing sketches from manual performance to final rendering, perhaps several years ago it was a dream for designers, who are considered professional designers in designing sketches for interior design, and I was wondering whether a simple sketch could be turned into a render, even a preliminary one, to explain ideas to clients. And sometimes for implementation on a small scale to clarify some ideas for the executive work team. Indeed, this has been achieved through artificial intelligence techniques by entering the initial or final sketch with the addition of some descriptions of the materials, lighting, and the number of faces required to be obtained. The result is that some results are satisfactory in principle, while others require adjustments or are more precise for sure it's coming very large Data base which contains more than 10 million images. In the following experiments, I entered the sketches for a chair and another one for simple free hand sketch through the applications and preliminary results appeared for the final render (Figure 15).

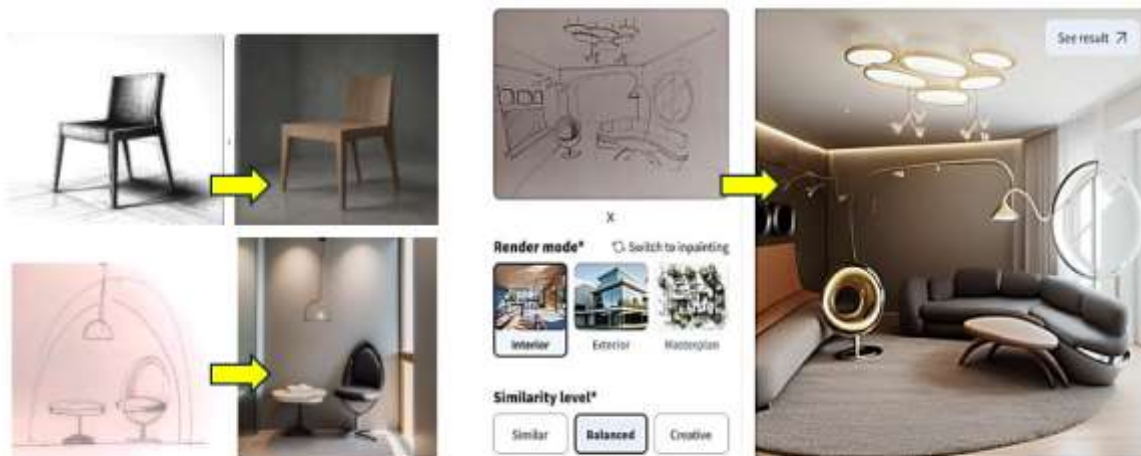


Figure 15: Sketching to Rendering with AI

10. Advantages and disadvantages of AI In Interior design:

The main benefits of AI in interior design are that it can automate a lot of the labor-intensive processes involved in the field, like making floor plans, 3D models, and renderings. This leads to increased efficiency. This allows designers to concentrate on more artistic facets of their work, like concept development and material selection. Although these tools—from sophisticated 3D imagery to conventional CAD—are currently only as good as the data provided to them, the introduction of reasonably priced, laser scanners, and rangefinders has begun to pave the way for more rapid and precise planning. (i) Enhanced personalization: Designers can produce more customized designs for their clients with the aid of AI. AI-powered technologies can produce design concepts that are customized for each client by evaluating data about their needs, preferences, and lifestyle—provided, of course, that the appropriate data is provided (21). (ii) Increased creativity: AI may be able to assist designers in coming up with concepts and options. AI can be used, for instance, to produce design options that might be difficult or impractical to create by hand, or that might not have even occurred to the user. Mood boards that would normally take a long time to put together could be swiftly explored by an interior designer (22). This might inspire more original and imaginative designs(iii). Lower expenses: AI can assist in bringing down the price of interior design services. AI has the potential to lower the cost of interior design for a larger range of clients by automating tasks and streamlining the design process.

The use of AI in interior design: Unfortunately, as with many "achievements" made by humans, there are downsides to many of the advantages. For instance. (i) deficiency in creativity: While AI can be a helpful tool in the creation of design concepts, it is important to remember that AI will not completely replace human creativity. AI cannot produce original designs; instead, it can only produce derivative or unoriginal designs on occasion because AI relies on collective knowledge from past experiences to function. In order to ensure that AI-generated designs accurately represent the client's vision and are unique, designers should thoroughly review and edit the designs(ii). Bias: AI programs pick up knowledge from data, and if that data is biased, the AI will also be biased. It can be inferred that AI-generated designs might be biased by the training data. The main goal of artificial intelligence is to collect new data and combine it with old data to improve results. This can be a very useful resource for learning about the newest styles and trends, but it can also be a significant obstacle to anything novel. (iii) Loss of control: Designers who use AI in their work might think they have less said over the finished item. This is brought on by the occasionally complex nature of AI algorithms. To maintain authority over the design process, designers need to understand how the AI tools they utilize work(iv). Lack of emotion: The tone of a design, the tastes of a client, and the way a space interacts with its surroundings area. But whose know may be after a few times this disadvantage will be solved soon.

CONCLUSION

- Artificial intelligence in the modern era was able to eliminate 700 jobs, not including architect or interior designer, because these jobs require accurate studies over the years, and the human sense must be involved in the design of spaces. The interior design is like

a large cell that contains a lot of work centers, all of which are subject to thought, function and beauty, and all of them come together to produce a work that is characterized by beauty, functionality and comfort, and in modern times there is a lot of luxury as well. It is necessary to keep pace with the huge technological progress that we are making, due to the difference and change of many tools around us, and if it used to take tens of years to develop, it is now developing within days and hours.

- Artificial intelligence in the field of architecture and interior design still depends on the human mind in the quality of inputs and the accuracy of data. Interior design is a study, not just a hobby. AI is a powerful tool, but only as good as the information it's trained on. Feeding it with flawed data leads to unreliable results. While caution against overreliance is wise, don't shy away from using AI altogether. Remember, a healthy approach involves both utilizing AI and acknowledging its boundaries. Artificial intelligence works to develop the performance of the interior designer, not cancel his role.
- The interior designer must keep pace with the use of modern tools of computer programs and artificial intelligence tools in developing design thinking and the design process. Studying the interface areas that serve the interior design has become a necessity for the designer in case of keeping up with the development this will add value to the curriculum of design courses in educational areas. During the interior design process, it is necessary to adhere to the design methodology from an idea, then a distinctive and different design, and then think about how to implement it. Many of the ideas of artificial intelligence look great but is it possible to live in them and interact with them and can it be implemented in practice.
- In the teaching and learning filed the Professors, students and interior designers must keep pace with the use of modern tools of computer programs and artificial intelligence tools in developing design thinking and the design process. Teaching and learning the interface areas that serve interior design has become a necessity for the designer and for the student before in case of keeping up with the development this will add value to the curriculum of design courses in educational areas. During the interior design process, it is necessary to adhere to the design methodology from an idea, then a distinctive and different design, and then think about how to implement it. Many of the ideas of artificial intelligence look great but is it possible to live in them and interact with them and can it be implemented in practice.

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