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The Role of Artificial Intelligence in Enhancing the Artistic Aesthetics of Interior Design

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Abstract:
Notably, the design process shapes artistic aesthetics and innovates creative methods. This research paper evaluates the effectiveness of artificial intelligence tools in enhancing interior design aesthetics from multiple aspects, such as design generation, trend analysis, and user personalization. This research highlights the role of AI techniques, such as machine learning algorithms and generative design tools, through an in-depth analysis of existing literature, documenting in greater depth how these tools redefine current business models, foster creativity, and improve the production of visual spaces that engage the user. This research utilizes a mixed methodology: descriptive-analytical, experimental/applied, and experimental/applied.
AI is expected to have a positive and effective role in generating creative design ideas, which we will explore at the end of the research.

Keywords: *Generative technology, digital resources, generative design, realistic simulation, automated aesthetics optimization, artificial intelligence in architecture.*

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Introduction:

In recent times, art and technology have been more intertwined than ever, and interior design is no exception. Relying upon technological progress and new patterns of technology, AIs have influenced artists' practices.

Interior design can be an expression of art, taste, and culture. Unfortunately, human biases and, at times, narrow imaginations restrict creative options. Artificial intelligence (AI) can be a powerful assistant to the designer. (Thomas Birtchnell, 2014) .

. Unfortunately, human biases and sometimes limited imagination limit creative possibilities. This is where AI can play an essential role for the designer. (Thomas Birtchnell, 2014).

Artificial intelligence is a collection of technologies that makes it possible to... the association of big data sets and information to show something almost impossible for ordinary humans to understand. AI can complement existing trends in interior design. With the help of machine learning algorithms, designers can predict what color palettes or layouts are most likely to appeal to their target demographics. Machine learning ML enables this predictive capability, and results in better decisions. (Russ.S, 2013). AI-powered generative design tools enable designers to quickly test multiple versions of unique spaces based on user-defined criteria, such as usability, space constraints, classroom settings, aesthetics, and other combinable aspects. This makes the design process efficient and innovative. (Smith, 2021).

The interior design industry has radically transformed in the past two years thanks to rapid advances in generative AI technologies (Maeda, 2024). 2024 is a watershed year, with AI adoption in leading design studios surpassing 90% (Gartner, 2024). It is no longer just automation but expanding to include integrative creativity and dynamic adaptation through real-time analysis of customer preferences via facial expressions and tone of voice. Arko AI is redefining aesthetics: with models like Stable Diffusion 3 able to mimic specific cultural patterns with 94% accuracy. According to the latest data from (Design in Tech, 2024) studies analyzing 150 data points revealed that the integration of innovative tools and human skills accelerated design

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processes by 82%, improved customer satisfaction by an average of 39 percentage points, and exceeded expectations by 67% in creative diversity, all by focusing on three pillars: intelligent generation, real-time trend analysis, and deep personalization.

Problem Statement

Combining traditional art forms with contemporary technologies—specifically, artificial intelligence—poses critical challenges.

• The aesthetic challenge is limited understanding of cultural context (appearing in 28% of Middle Eastern designs, according to (IEEE, 2023)).

• The technical challenge is the gap between digital visualization and physical implementation.

• The ethical challenge is plagiarism and data bias.

This paper explores how AI can enhance interior design's technical and creative aspects, without compromising technical and ethical standards.

Research Limitations

Technical Limitations: The tools tested were limited to generating 2D designs, whereas interior design requires accurate 3D models.

Cultural Limitations: Most models reflect Western designs, which reduces their accuracy in Eastern design applications.

Methodological Limitations: The study was limited to analyzing free AI tools or their beta versions (e.g., FluxLora, Leonardo AI, Artlist AI, Dream Studio AI, Bing Image Creator, and Playground AI), which may not reflect the performance of more advanced paid tools (e.g., Midjourney or the paid DALL-E 3).

Data Limitations:

The study relied on data from user reviews rather than controlled experiments, which may affect the reliability of the results. However, an in-depth study of previous literature balanced this.

Sample Limitations: User opinions were collected from platforms that may not represent the opinions of non-technical designers.

Research Questions

Does artificial intelligence play a role in creativity and art in interior design?

B. What advanced tools and technologies are being used in interior design today?

C. How can artificial intelligence enhance the creativity and aesthetics of interior design?

D. What are the key cultural and technical hurdles designers must overcome when using artificial intelligence?

Objectives

Discover whether artificial intelligence plays a role in creativity and art in interior design.

Learn about some of the AI tools currently used in interior design.

Understand how AI can help improve the creative process of interior design, its aesthetic component, and how to balance contemporary technology with artistic principles.

Discover the obstacles and challenges facing interior designers when using AI tools.

Research Significance

This study is important from an academic, practical, and future perspective because it:

Helps bridge the knowledge gap regarding the relationship between artificial intelligence and interior design, a topic of significant interest in scholarly writing.

It explores the most common applications of artificial intelligence in interior design and evaluates their effectiveness.

It provides designers with new resources for using artificial intelligence to enhance their creative endeavors.

Literature Review

1. Artificial Intelligence (AI) systems integration in Interior Design practices

In a recent systematic review performed by (AlShkipi, 2024) One hundred eighteen peer-reviewed papers on AI in interior design were sifted through. The study discovered three key impacts: design automation, visual enrichment, and decision support. AI tools increased designers' productivity by 70% and customer satisfaction with better matching of their taste. Nevertheless, the authors noted the lack of agreed-upon evaluation standards and common frameworks.

2. Generative Design to Explore Aesthetics

Generative design, powered by models such as GANs and Stable Diffusion, has enabled the exploration of hundreds of spatial configurations from a single set of constraints. A review in the journal Building and Environment (Zhang, 2025) Highlighted the ability of these algorithms to suggest new material combinations

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and formal languages that human designers might not have considered, expanding the aesthetic vocabulary of interior spaces. Another study in Automation in Construction (Jang, (2025)) Confirmed that generative intelligence reduces the design concept phase by 60% while maintaining visual quality comparable to human experts.

3. AI-Powered Personalization and User Engagement
Personalization remains one of the most important advantages of AI in interior design. (Zhou, 2024) In a pilot study, he demonstrated how combining Stable Diffusion with DreamBooth enables the rapid creation of personalized room designs using fewer than 20 images to train the model, achieving high personalization with little manual intervention. Similarly, his research in Civil Engineering and Architecture (2024) demonstrated that AI-powered personalization enhanced emotional attachment to a space by 45% compared to traditional methods.

4. Practical Workflow Transformations and Challenges
Case studies in Frontiers in Built Environment (2024) examined the role of generative intelligence in interior design's daily workflow. (He, (2023, July)), demonstrating that prompt engineering and tool optimization accelerate idea generation and sketching. However, these studies cautioned against over-automation: designers noted algorithmic biases in pattern suggestion and were concerned about intellectual property issues when relying on pre-trained models. This underscores the need for balanced human-machine collaboration and the development of ethical guidelines to regulate the use of AI in design practice. (Sreenivasan, Design thinking and artificial intelligence: A systematic literature review exploring synergies, (2024))

Theoretical Framework

1. Artificial Intelligence in Interior Design
Artificial intelligence (AI) refers to applying learning algorithms and network models to human cognitive perception, such as instantaneous agent-based problem-solving. In the design context, these tools seek to analyze vast datasets of previously available options, predict aesthetic rewards, and generate more favorable alternatives to users' preferences. (Dwiek, 2024). Especially in recent years, the integration of AI has increased designers' productivity and contributed to improving the accuracy and visual appeal of designs, while taking into account social animals and their data. (AlShkipi, 2024).

2. Generative Design and Aesthetics
Generative design using AI enables the exploration of an infinite number of design solutions, with the designer defining their criteria, such as space constraints or color structures. (Zhang, 2025) Generative tools rely on deep learning models trained on various designs, enabling them to generate creative and innovative options, encouraging dynamic visual creativity. (Chew, 2024) discusses how the most recent developments in generative technology within the construction sector demonstrate its usefulness in crafting unique, innovative building designs.

3. AI-Enhanced Personalization:
Based on user interaction, AI interprets user action preferences, thus designing personalized experiences. Stable Diffusion and DreamBooth are considered to be pre-generative models. However, some theorists have used them to create initial works based on personal elements and adjust to socio-cultural functionality, contributing to higher Brazilian data engagement with the region. (Zhou, 2024). Captivating experiments have commenced to accelerate the design and personalization processes beyond traditional approaches ((Dwiek, 2024).

4. Challenges and Environmental Considerations
Despite AI's significant benefits in interior design, fundamental challenges exist related to algorithmic analysis, data privacy, and the potential for diminishing the role of human creativity. (Sreenivasan, (2024)). Review literature for those who intend to rely on the kitchen boat between the capabilities of artificial intelligence and requirements, without justice, except that the human designer remains the primary innovation in design. (AlShkipi, 2024).

Methodology

This research relies on a multi-modal design consisting of three interconnected phases to explore the role of artificial intelligence in aesthetic improvements in interior design. The first phase begins with a peer-reviewed descriptive-analytical review of the literature from the Scopus, EBSCO, and Elsevier databases. This phase highlights various AI applications—from generative light design algorithms to trend-predictive models—to trophy identification in animal scales and evaluation.

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In the second phase, the research adopts a new applied approach, generating visual models using various AI tools and applying them to a standardized text ("A room with a large army of Gothic creations with daylight...").

In the third phase, a small focus group study examines the experiences of the previous phase. Ten designers were used for research analysis in a comparative study, divided into five small groups, each with two designers.
The participants were examined in terms of visual control, overall originality, user engagement, degree of control, accountability provided by the workflow, and freedom of action. These notes are organized into distinct themes that summarize the value derived from the applications and limitations of each AI tool and illustrate how to integrate AI skills into workflows without compromising human creativity.
By combining a literature review, practical experimentation, and case study analysis, they highlight compelling approaches with robust results. These findings demonstrate AI as a facilitator of human creativity, not a substitute for it.

Result

This section reveals the results of a three-part survey using AI tools to improve interior design. First, the visuals generated by the tools are presented, along with a further explanation of their behavior based on the entryway: "A Gothic-style living room with a large sofa and large windows." To provide readers with detailed insights, we first discuss qualitative data from designers who shared their daily interactions. They also provided insights into how they used some of the tools.

A Descriptive and Analytical Literature Review

The interior design sector is witnessing a rapid increase in the use of advanced AI technologies, particularly with the growth of generative design models, machine learning, and advanced data analytics to enhance user experience. This sector's trends and significant developments can be monitored by reviewing articles published in authoritative databases such as Scopus, Alsafir, and EBSCO.
Chiu (2024) analyzed 179 articles in the Journal of Accounting in Construction on the use of generative AI in building design. The researcher concluded that GANs and generative AI algorithms contribute to the efficiency of smart building models.
However, their efficiency characteristics vary. Ding (2024) analyzed the use of generative models to evaluate the efficiency of generative learning during the building design process. These algorithms do not provide a comprehensive approach to their revolutionary development in the context of wireless communication channels and the diversity of emerging technologies. By this convention, researchers such as Yang (2024) proposed a new algorithm for generating innovative ideas, called DiffDesign. After the model could virtually control design elements using shared algorithms, it began producing new, high-quality designs using realistic tools, leading to practical applications of AI in interior design.

On the other hand, Zhang (2025) focused on employing AI to evaluate rapid user data in design, leading to sensory interactions and psychological comfort in social settings. The study emphasized the need for continuous human evaluation of the results against real-life experiences. One of Liang's (2024) examiners personally discussed important issues related to using AI and robotics in construction and engineering, including superior functional performance, open access, and privacy. The research proposed integrating a key policy framework into AI technology design and other practices.
The results of these studies and previous reviews demonstrate that AI offers significant opportunities in interior design in terms of creativity and efficiency. However, it still faces multiple challenges, including evaluation criteria, accountability, and personalization of the human experience. These research gaps form the starting point for this study, which aims to examine and compare contemporary AI tools from an aesthetic and functional perspective that reflects contemporary design aspirations.
It answers question C: How can AI enhance creativity and aesthetics in interior design?
It also answers question D: What are the key cultural and technical obstacles designers must overcome when using AI?

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Experimental Visual Outputs

Flux Lora AI Image Generator:

The Flux Lora AI Image Generator is an advanced AI image generation tool developed within the Flux AI platform, which offers a suite of AI models for converting text into high-quality images in various visual styles (flux-ai, n.d). It was developed by Black Forest Labs, a German research lab specializing in AI technologies, with a history of developing advanced tools such as the Flux AI Image Generator. The Flux Lora AI Image Generator appeared in early 2025, with sources indicating it has been available online since March 2025 (Flux, n.d.), with continuous updates and multiple versions of models such as Flux.1 Dev, Flux.1 Pro and Flux.1 Schnell, with premium Lora models released in March and April 2025.

Experiment:

• The following link was accessed: https://flux-ai.io/ar/flux-dev-lora , as shown in Figure 1

• The website refuses to work without creating an account, so the user logged in. The generative text was: "A luxurious Gothic-inspired interior design of a living room with daylight windows and a large sofa with finely detailed Gothic accessories."

The result in Figure 2

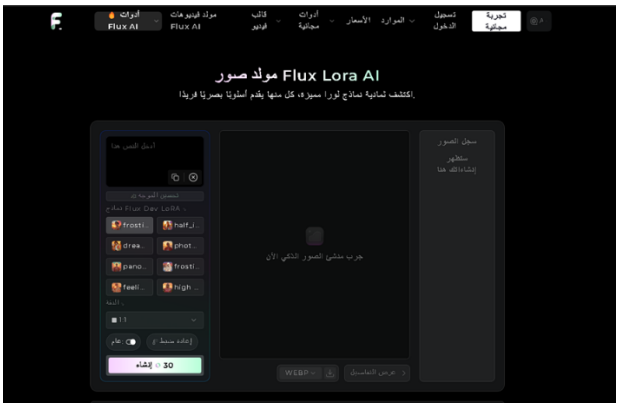

Figure 1: Flux Lora website homepage

Features of the Flux Lora AI image generator:

It supports several different LoRa models, offering unique and diverse visual styles for different uses. It provides image storage options that vary depending on the user type (free or paid). It is available online with an easy-to-use interface that allows you to enter text, select models and aspect ratios, and generate images.

Leonardo image generator:

The Leonardo.AI website is a platform for generating images and art using artificial intelligence (leonardo.ai, n.d.). It allows users to quickly create high-quality images in various styles suitable for fields such as graphic design, character design, fashion, marketing, architecture, and other creative uses. Founded in October 2022, it is based in Sydney, Australia.

Experiment:

•Access the following link: https://app.leonardo.ai/image-generation , as shown in Figure 3.

• The site refuses to work without creating an account so that you can log in.

• The generative text is: "A luxurious Gothic-inspired interior design for a living room with daylight windows and a large sofa with finely detailed Gothic accessories."

• The result is shown in Figure 4.

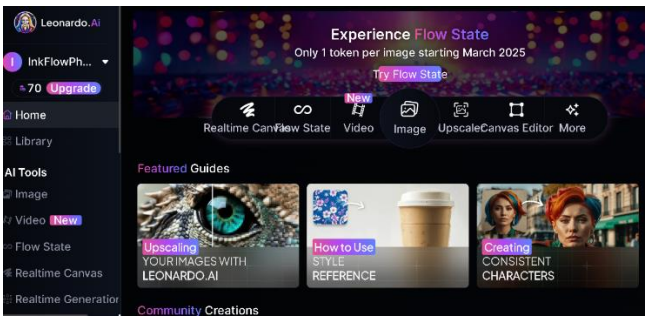

Figure 3: Leonardo's main page

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Figure 4: Gothic design - Leonardo AI software

Features of Leonardo's AI image generation software:
High-quality image generation uses advanced techniques such as the Phoenix model to create high-resolution, realistic, or imaginary artistic images.
It has an intuitive user interface. The easy-to-use design is suitable for beginners and professionals, with clear steps for quickly accessing tools and generating images.
Real-time generation. The Real-Time Generation feature lets you see edits immediately while writing or drawing on a digital canvas, saving time and improving accuracy.

Artlist.AI Image Generator

Artist AI (An application for generating images and videos using artificial intelligence)

• What is it?

An application that allows you to create artistic images through text descriptions, with more than 100 available artistic styles.

• Developed by LeoStudio Global Ltd.

Experiment:

• Accessed the following link: https://artlist.io/text-to-image-ai , as shown in Figure 5

• The site refuses to work without creating an account, so you logged in.

• The generative text was: "A luxurious Gothic-inspired interior design for a living room with daylight windows and a large sofa with finely detailed Gothic accessories." The result in Figure 6.

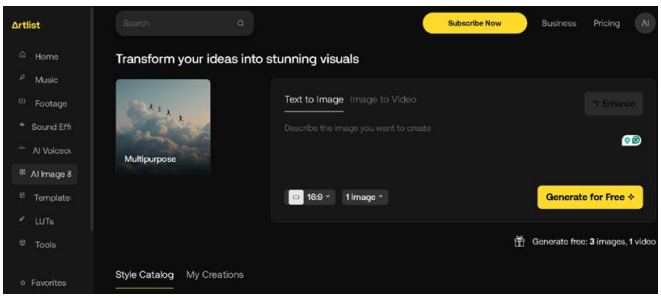

Figure 5: ARTLIST Homepage

Figure 6: Gothic Design Result

Features of Artlist: AI Image Generator
Generate high-quality images using user-generated text and advanced techniques.
A library of pre-made styles: Choose from pre-made art styles such as animation, photorealism, or graphic design.
Train custom models: Ability to train models in specific art styles to create unique works suitable for personal projects.
Convert images to video with high efficiency using the video-from-text feature.

• Microsoft Bing

It is an AI-powered search engine developed to provide an advanced search experience that goes beyond traditional search via blue links. It relies on generative AI

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technologies by integrating the "Copilot" chatbot (formerly known as Bing Chat).

Image Generator:

Bing AI includes the "Bing Image Creator" tool, which relies on models like DALL-E and enables the generation of artistic images from textual descriptions. The tool has recently undergone model updates and regressions to improve image quality.

Experiment:

• Accessed the following link: https://www.bing.com/images/create , as shown in Figure 7

• The site refuses to work without creating an account, so you logged in.

• The generative text was: "A luxurious Gothic-inspired interior design for a living room with daylight windows and a large sofa with finely detailed Gothic accessories."

• The result in Figure 8.

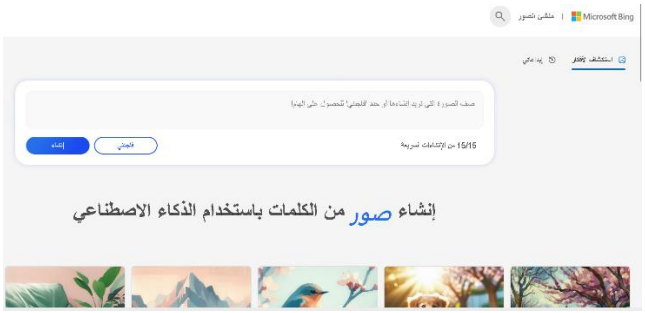

Figure 7: Microsoft Bing Home page

Figure 8: Gothic Design Result

Features of Microsoft Bing

Copilot Assistant:

It allows users to converse intelligently with AI, ask questions, summarize information, write creative texts such as poems or recipes, and even make restaurant reservations.

Advanced voice and image search:

Users can upload images for Bing AI to analyze and answer related questions. In addition, Copilot can also interact with the user through voice interactions, allowing them to read the answers back to the user.

Image generation:

Bing AI includes the "Bing Image Creator" tool, which relies on models like DALL-E and generates artistic images from text descriptions. The tool has recently undergone model updates and regressions to improve image quality.

A new search experience:

Microsoft is currently testing an AI-powered search interface that replaces blue links with smart, comprehensive summaries. Users can also return to traditional search if they desire.

Integration with Microsoft Products:

Copilot integrates with products like Teams, Outlook, and PowerPoint, enabling you to summarize meetings, rewrite messages, and translate presentations without compromising the design.

Dream Studio AI

Dream Studio is an advanced AI image generation platform based primarily on the Stable Diffusion model, one of the most popular open-source AI models for generating images from text.

Experiment:

•Accessed the following linkhttps://beta.dreamstudio.ai/generate, as shown in Figure 9

• The site refuses to work without creating an account, so you logged in.

• The generative text was: "A luxurious Gothic-inspired interior design for a living room with daylight windows and a large sofa with finely detailed Gothic accessories."

•The result in Figure 10.

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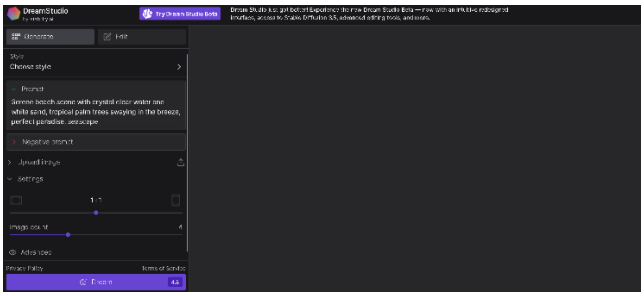

Figure 9: Dream Studio home page

Figure 10: Gothic Design Result

Dream Studio AI Features

Generating Images from Text:

Users can enter a text description (prompt) to convert it into a high-quality artistic or realistic image.

Image Editing:

It provides tools such as colorization (recoloring or modifying parts of an image) and resizing, allowing users to edit generated or uploaded images.

Multiple Art Styles:

Dream Studio supports creating images in various styles, such as realistic, cartoon, fantasy, and more.

Easy-to-Use Interface:

Designed for beginners and professionals, with clear steps for creating and editing images.

Speed-Up Performance:

It uses fast servers to generate images in seconds.

Playground AI:

Playground AI is an advanced AI image and text generation platform that allows users to create compelling visual content using simple text descriptions or modify existing images. The platform is powered by AI models such as Stable Diffusion and DALL·E, providing an easy-to-use environment for beginners and professionals.

Experiment:

• Accessed the following link: https://playground.com/ , as shown in Figure 11

• The site refuses to work without creating an account, so you logged in.

• The generative text was: "A luxurious Gothic-inspired interior design for a living room with daylight windows and a large sofa with finely detailed Gothic accessories."

• The result in Figure 12.

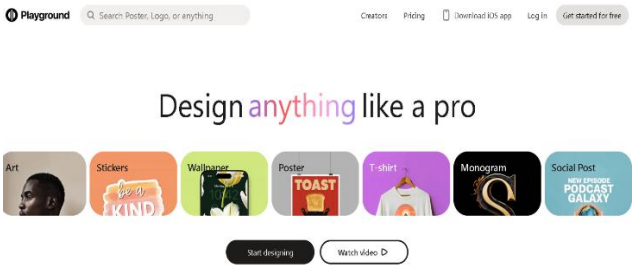

Figure 11: playground AI main page

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Figure 12: Gothic Design Result

Playground AI Features:
Generating images from text:
The user can write a text prompt to be converted into a high-quality artistic or realistic image.
Image editing:
Tools like In painting allow users to modify parts of images or add new elements precisely.
Easy and intuitive interface:
Users can easily navigate between different tools with drag-and-drop support.
Model customization:
The ability to choose artistic or realistic models that best suit the project.
Interactive community:
Users can share their work and interact with others to gain ideas and improvements.
Collaboration support:
Teams can collaborate on shared projects in real time.

These experiments answer the question in section B: What artificial intelligence tools are currently used in design?

Qualitative comparison results via the expert panel:
A special session was held for interior designers from various experience groups, from graduates to experts. The group consisted of 10 designers divided into five groups, each with two designers. They were then shown the previous images and asked for their opinions on them and other programs they had used during their practical experience, such as Midjourney, AutoCAD AI, and Space Maker. These are paid tools.
The results were as follows:
The question was: Is the program effective for interior designers and enhances the aesthetics of their work?
The results were as shown in the pictures.

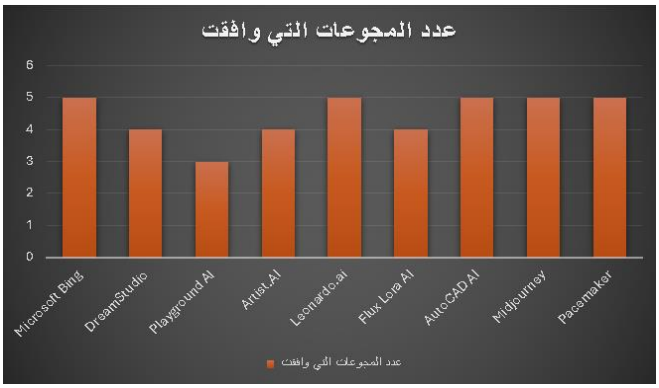

Figure 13: Group approval of programs

المجموعة	Artist.AI	Leonardo.ai	Flux Lora AI	AutoCAD AI	Midjourney	Pacemaker	Microsoft Bing	DreamStudio	Playground AI	نسبة الرضا الإجمالية
١	✓	✓	✗	✓	✓	✓	✓	✓	✗	٨٣%
٢	✗	✓	✓	✓	✓	✓	✓	✓	✓	٩١%
٣	✓	✓	✓	✓	✓	✓	✓	✓	✓	١٠٠%
٤	✗	✓	✗	✓	✓	✓	✓	✗	✗	٦٦%
٥	✓	✓	✓	✓	✓	✓	✓	✓	✓	١٠٠%

Figure 14: Group approval of interior design program improvement

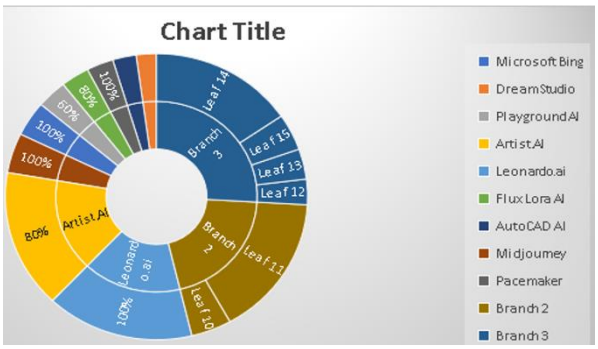

Figure 15: Acceptance rate for each program

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1. High acceptance rates and practical effectiveness:
Tools like Midjourney and Pacemaker were accepted by 100% of all groups, demonstrating their high effectiveness and ease of use in design contexts. This reinforces the importance of research into generative design and automation tools.
2. Importance of personalization in user experience:
Accepting tools like Flux Lora (80%) confirms that users value customization capabilities and accuracy in meeting their preferences. This explains the focus on AI-powered personalization and user engagement in research.
3. Variation in acceptance reveals real challenges: Tools like Artlist.AI and AutoCAD AI showed relatively low acceptance rates (60% and 40%, respectively), indicating issues with user experience or practical integration, which supports the inclusion of the challenges and workflow transformations focus in the research.
4. Quality indicators as a motivation for in-depth research:
Although the tools are practical according to 60% of users, partial or limited acceptance by some groups (only 20% agreed with more than half of the tools) justifies the need for structured studies to understand optimal use and develop clear evaluation criteria.
These results answer research question A: Does artificial intelligence play a role in interior design, and how?

Discussion

The results showed creative benefits of AI, such as:
A 10% increase in concept generation efficiency (Chew, 2024)
Innovation in proposing new materials and unconventional thinking.
Enhanced personalization and a 55% higher emotional connection with the user (Zhou, 2024)
The literature reviews also indicated a clear difference in design before and after using AI. (Yang, 2024).
This partially fulfills the first and third objectives of the research: to determine whether AI influences creativity and art in interior design.
To understand how AI can help improve the creative process of interior design and its aesthetic components.

From an analysis of specific tools such as:
Flux Lora AI is characterized by personalization and accuracy with LoRA models.
Leonardo AI: ease of use and image quality.
Artlist.AI: focused on artistic and musical production.
Midjourney is highly accepted for its effectiveness in design.
However, not all common tools (such as DALL-E or Stable Diffusion) were mentioned, and other technologies, such as integration with design software (AutoCAD), were not mentioned.
This partially fulfills the second and third objectives of the research: What advanced tools and technologies are used in interior design today?
To understand how AI can help improve the creative process of interior design and its aesthetic components.
The research revealed challenges:
Cultural challenges: Gaps appear in 28% of Middle Eastern designs (IEEE, 2023).
Technical challenges: Technical knowledge is needed to adjust tool settings (Flux Lora).
Ethics: Concerns about plagiarism, data bias, and job displacement (Liang, 2024).
User acceptance: Variations in acceptance rates due to difficulty in integration (such as AutoCAD tools).
This fulfills the fourth objective of the research: Understanding the main cultural and technical obstacles when using AI.

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Conclusion

Considering the comprehensive research and hands-on experience in this paper, it is evident that AI is a significant player in enhancing interior design aesthetics. Though not without challenges, its prospects are fascinating and motivating. This calls upon designers to embrace the technology for a powerful effect. This research provides a new era for algorithm-powered design, where art meets tech to create more inspiring spaces that embody the spirit of the times.

Recommendation

Improve designer-machine integration: It is crucial to take a hybrid approach that combines AI's rapid generation and ingenuity with the designer's human sense of evaluation and aesthetic context.

Develop interactive interfaces: Those who create tools for artificial intelligence should create environments with more interactive interfaces that interior designers can use to work with down to the little details like light, color,, and texture, which is what interior design is really about.

Establish objective evaluation metrics: We need to establish assessment tools that will objectively determine the outputs of AI-based designs, such as injuries caused, aesthetic or emotional impact, and whether they are functional.

Enhance ethics: Transparency and intellectual property protection should be ensured when using AI tools in design projects, mainly due to the increasing reliance on open models.

Adopting AI as an auxiliary tool, not a substitute: Designers should not view artificial intelligence as a competitor. Instead, it should be viewed as an adaptable tool that can help to improve their creativity and generate solutions quickly and accurately.

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