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DESIGNING WITH NON-HUMAN THINGS:

The Impact of Text-to-Image Generative AI on Human Roles in the Conceptual Stage of Interior Design

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Abstract

This paper examines how text-to-image Artificial Intelligence (AI) reshapes the conceptual stage of interior design by reconfiguring relations between humans and non-human technologies. Interior design is framed as an inherently image-based, interdisciplinary practice in which sketches and visualisations mediate between designers and clients. Building on philosophical accounts of humans, artefacts, and media, the paper argues that text-to-image AI should be understood not as a neutral tool but as a non-human generative collaborator that both extends and reorganises human creative capacities. Drawing on literature from design and AI, as well as practice-based experiments with AI platforms, the study traces how these systems expand design imagination through non-human perspectives while simultaneously embedding biases, probabilistic homogenisation, etc. The paper shows that text-to-image AI shifts image-making from direct manipulation in specialised software to a language-driven process in which text prompts become a primary site of design labour. This transition intensifies the linguistic demands placed on designers, who must negotiate meaning, specificity, and spatial intention with an opaque generative system. The central argument is that co-designing with non-humans does not replace human designers; instead, it repositions them as critical mediators whose interpretive, ethical, and contextual judgment remains indispensable to meaningful interior design practice.

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Introduction

Interior design occupies a distinctive position within the broader design disciplines as both a spatial and image-based practice (Rice 2006; Hollis 2017). It operates across functional, aesthetic, technical, and experiential dimensions, relying on images not merely to represent ideas but to think through space itself. Consequently, shifts in image-making technologies directly influence how interior designers imagine, communicate, and construct design intentions, particularly during the conceptual stage, where sketches and visual explorations support early spatial reasoning and client engagement (Bettaieb and Attiah 2022).

In the dimension of technology, philosophical accounts emphasise that technologies are actively human extensions (Colomina and Wigley 2016; McLuhan and Gordon 2023). and reveal the nature of technology (Heidegger 1977). Contemporary AI extends this trajectory and is increasingly framed not as a neutral instrument but as a transformative technological condition and creative interlocutor (Witt 2024; Sreenivasan and Suresh 2024).

Within interior design, text-to-image generative AI intensifies this shift by introducing a language-driven mode of early design exploration. By translating textual prompts into images, these systems bypass the technical complexity of conventional software and enable rapid visualisation suitable for individual and co-creative client contexts (Ploennigs and Berger 2023). However, AI-generated images remain constrained by contextual understanding and linguistic mediation, etc. (Shneiderman 2021; Sukkar et al. 2024). As Hicks et al. (2024) note, AI is not concerned with truth but produces truth-like outputs, reinforcing the need to treat such systems as supplements rather than substitutes for established design practices.

Against this background, this paper examines how text-to-image AI repositions the interior designer within the conceptual stage. Drawing on philosophical, disciplinary, and technical perspectives, and supported by controlled sketch-based explorations, it argues that designing with non-human things neither replaces human creativity nor preserves the designer's role unchanged. Instead, it reconfigures the designer as a critical mediator who negotiates intention, meaning, and spatial possibility with a non-human generative system.

Humans and Non-humans

Humans

From a biological perspective, human brains and bodies provide the intellectual and physical basics for design and invention. Human brains build a capacity for language and reasoning, and a distinctly upright human bodies free their hands to use tools (Encyclopaedia Britannica 2025). Both enable humans to learn, create and invent, and to achieve their intentions. In this case, humans are an essential and key condition for inventing all things surrounding them. As stated by Fuller (1938), a human is not only a body and a brain but also an extension of technology or a first tool that can be modified. This view stands in tension with the arguments of Colomina and Wigley (2016) as well as McLuhan and Gordon (2023), who offer competing accounts of the relations between humans and non-humans. Therefore, it is necessary to consider non-humans in the world while humans place themselves at the centre.

Non-human Technology

Non-humans include not only creatures but also inanimate items, such as artefacts (Björgvinsson et al. 2012). Artefacts refer to human-designed and made objects. In this research, non-human artefacts focus on technology and technological objects that include physical (e.g., interior space) and non-physical (e.g., AI platform) objects. Although it is hard to define whether technology is human-designed or human-founded, this is based on human desires. This section analyses technology and the relations between human and non-human technology or technological artefacts.

Heidegger (1977) suggests that technology is a way of revealing. For example, a concrete dam reveals that rivers can store and release energy as a resource. The technology allowed things to emerge from hiddenness into presence (Heidegger 1977). In the dimension of interior design, the technology of stonecutting reveals the chance of home layouts. This results in the chimney stacks being constructed, enabling the fireplace to be moved from the central position to the wall (Hollis and Stone 2022).

Furthermore, when humans use technology to design and invent technological objects or artefacts (e.g., mobile phones, AI platforms), these are human extensions, based on the views of Colomina and Wigley (2016) and McLuhan and Gordon's (2023) views. For example, wheelchairs aid mobility; social software provides remote interaction (Giacomin 2014; Coulton and Lindley 2019). Therefore, the artefacts enhance human capacity.

Technology has negative impacts on humans. Modern technologies, as a Gestell (Enframing), can turn everything (e.g., humans) into resources (Heidegger 1977). This could hide the essence, such as humans turned into a war resource by war machines. This also supports Colomina and Wigley's (2016) view that humans threaten themselves. However,

Martin Heidegger's (1977) view should depend on the specific situation and context. In the dimension of home, domestic technologies (e.g., washing machines) become human hands or extensions to wash clothes rather than making humans a resource.

Moreover, humans can no longer adequately understand technology from the view of individual technological devices (Böhme 2012). This presents the complexity of technological objects. For example, text-to-image AI is built in the intersection of multiple technologies (e.g., Information Technology, display and hardware manufacturing). When we try to understand AI, multiple technologies must be accessed. This impossible separation and complexity reduce the complexity of interaction between users and AI, such as text and voice, bridging humans and non-human AI.

Interior Design

Interior and Design

The term interior design can be divided into interior and design. The interior is integral to buildings, which provides a border between the interior and exterior (Rice 2006; Brooker and Stone 2010). It includes the context surrounding the structure (Hollis and Stone 2022). Additionally, Interior also refers to image (Hollis 2017). Here, the interior can record before and plan the future. This is evidence of domestic life and recalls the existing things, such as a painting recording human life (Rice 2006; Hollis 2017). Therefore, interior design is inevitably endowed with the characteristic of a 2D image and is built on the image.

Design refers to a range from conceptualisation to practice (Giacomin 2014); aims to invent something (Colomina and Wigley 2016). Both views lay the foundation that interior design is practice-based. This practice is achieved through connection among designers, clients and constructors, design tools (e.g., software) and construction; and during the process, images are a major way to present the designer's concept. Therefore, interior design is an image and practice-based discipline. This research focuses on interior design based on images as well.

Interior Design

Interior design is a distinct discipline that differs from graphic, fashion, and industrial design (Brooker and Stone 2010; Brooker and Scarpa 2007), despite the shared reliance on images across all design fields. Unlike the narrower focus of industrial and graphic design, interior design engages a broader set of concerns, including spatial planning, decoration, functionality, engineering, and safety, and serves a more diverse and context-specific user base, from individuals in domestic settings to larger communities in commercial environments, whereas industrial and graphic design typically target mass markets and common consumer preferences.

Interior design is inherently interdisciplinary, drawing on product, industrial, furniture, graphic, and fabric design (Brooker and Stone 2010), while also integrating architecture, urban design, conservation, and psychology (Hollis and Stone 2022). Collaboration is central to this practice, with interior designers often working alongside specialists such as furniture designers (Brooker and Stone 2010). Additionally, extensive collaboration with technical teams, including structural and electrical engineers, is also integral to the design process (Brooker and Stone 2010; Hollis and Stone 2022; Hassan Hashim et al. 2023). Such dependencies illustrate why Brooker and Stone (2010) and Brooker and Scarpa (2007) distinguish interior

design from other disciplines, noting that graphic designers, for instance, rarely engage with technical engineers.

Traditionally and presently, interior design encompasses all interior projects, from decoration to renovation within buildings (Brooker and Stone 2010; Brooker and Scarpa 2007), and is widely understood as a space-making discipline (Bettaieb and Attiah 2022; Al-Farran 2019). It provides spatial solutions through a linear workflow extending from pre-design to construction (The American Institute of Architects 2007). In integrated and non-integrated workflows, the early research stages, pre-design and conceptualisation remain consistent (The American Institute of Architects 2007). Similarly, the Royal Institute of British Architects (2020) positions this research phase between strategic definition and conceptual design. The design team must develop initial concepts while addressing cost, engineering strategies, and project risks (Royal Institute of British Architects 2020).

Today, the conceptual stage is increasingly shaped by text-to-image AI tools. Although the strengths, weaknesses, reliability, and accuracy of AI-generated images require further scrutiny (Fareed et al. 2024), such images can visualise designers' ideas within seconds and are already viable for both individual use and co-creative client sessions (Ploennigs and Berger 2023). Accordingly, this paper adopts an interior designer's perspective and focuses on the conceptual phase as the central site of investigation.

Concept Stage of Interior Design

During the concept stage, designers interpret client requirements, including the initial budget and intended functions, and examine relevant precedents, professional expertise, etc., to envision what the client needs. Designers commonly communicate these preliminary ideas through hand-drawn sketch layouts and spatial plans, which support the formation of early design proposals (Bettaieb and Attiah 2022). In some cases, designers also develop sketch renderings or conceptual visualisations to articulate materials, atmospheres, stylistic directions, and other experiential qualities.

Notably, this stage varies across practice, because each designer, design team or firm conducts this according to their own workflow, organisational scale, etc. The role of the image in interior design is crucial, though the variability of the designer workflow, etc., is unavoidable. Images are not visual explorations based on sketches or design software. Their purpose is to pioneer design possibilities, broaden the designer's perspective, and facilitate communication with clients throughout the design process. The image, as a tool, operates both within design processes and as an element within text-to-image AI systems. The following sections, therefore, connect interior design and text-to-image AI by examining the role of the image.

Non-human Technology in Interior Design

With the advances in computer technology, image production and modes of visual communication have been transformed. Interior image is generated not only through traditional media (e.g., drawing and painting), but also computational tools (e.g., Adobe Photoshop and Rhino). Such tools have markedly increased productivity and enabled greater complexity from computational tools to parametric design (Kudless 2024). Yet the growing capabilities of these systems also introduce steep learning requirements and more elaborate image-making

processes, distancing designers from the immediacy of their own imagination. By contrast, sketches retain the advantages of speed and productive ambiguity: "sketches thrive on ambiguity and speed" (Kudless 2024, 93); therefore, this provides a direct bridge between mental images and visual expression. Meanwhile, many computational tool applications remain oriented toward production and technical workflows rather than exploratory design (Kudless 2024), prompting renewed reflection on how emerging technologies may reshape design thinking itself.

With the leap of text-to-image AI tools, AI have begun to support early-stage exploration. Text-to-Image AI have seen a notable rise in solving design problems (Pena et al. 2021). These can rapidly generate and iterate visual concepts (Gür et al. 2024) and, despite being constrained by their training data (Kudless 2024), can broaden designers' conceptual horizons. During the process, Text-to-Image AI transforms abstract ideas of humans into visual form, making complex information more comprehensible through visualisation (Bankar and Ket 2021).

AI and Text-to-Image AI

AI has increasingly been framed as a transformative technological condition within creative and design contexts, comparable to the material shift represented by iron in the Iron Age (Schmidt 2020); and is now characterised not merely as an instrument but as an interlocutor capable of engaging in creative relations with humans, machines, and architectural environments (Witt 2024). Parallel perspectives propose that software is perceived as intelligent when experienced as human-like (Tanugraha 2024); and describe AI as exhibiting abilities associated with human cognition (e.g., problem-solving) (Sreenivasan and Suresh 2024). Despite emerging from distinct research traditions, these views converge in aligning AI with earlier definitions that relate it to human intellectual capacities.

Text-to-image AI has surpassed human capabilities and exerted a profound influence on the design field (Coelho and Labrune 2024). It works by describing the subject, shape, and purpose to generate images (Gür et al. 2024). Text refers to textual descriptions entered by users via typing or voice input, and image refers to 2D AI-generated sketch images that are produced by data training and algorithms. In image-reliant disciplines (e.g., art and graphic design), human language inputs become the primary variable shaping outcomes in addition to AI datasets. "sketch" here differs from pencil or pen sketches, is an inherent quality designers embrace during the design process (Kudless 2024). Therefore, a more detailed text generates more precise image results. For example, the average length of text inputs is 27.16 words in Midjourney (Xie et al. 2023), even if prompt length alone does not determine fidelity (Paananen et al. 2024; Lan et al. 2025).

In the dimension of human-non-human technology interaction, text-to-image AI can be understood as a translator between the human mind and images. Users can communicate with things that can talk back or with other things (Coelho and Labrune 2024). This transition reshapes the role of interior designers, foregrounding their linguistic articulation of spatial and aesthetic intentions. AI-assisted tools can enhance workflow efficiency and support decision-making, thereby generating more creative and efficient design solutions (Sreenivasan and Suresh 2024); and enhance the efficiency of design workflows, with these technologies driving the

emergence of more innovative and creative designs (Şekerci et al. 2023). This could contribute to designers being replaced by AI in the industry, especially in areas where the final outcomes are images.

Overall, text-to-image AI reconfigures human–non-human interaction in design, shifting image-making from a human-directed activity toward collaborative production with an AI black box. This shift positions designers as both visual creators and linguistic mediators. Through Heidegger's concept of "revealing," such technologies open new possibilities for imagining and experiencing interior space. However, AI outputs remain predictive constructs shaped by datasets and linguistic precision; therefore, AI cannot reproduce the cultural, emotional, and interpretive dimensions essential to meaningful design.

Text-to-Image AI in Interior Design

While many computational tools have traditionally centred on production rather than creativity, text-to-image AI introduces a new capacity to expand imaginative reasoning within interior design (Kudless 2024). In this context, the images generated act as open-ended propositions, speculative prompts.

Text-to-image systems not only redefine the conceptual stage but also operate as creative sketch-generation tools (Gür et al. 2024), enabling designers to rapidly explore thousands of visual variations (Rafsanjani and Nabizadeh 2023; Hassan Hashim 2023); and subsequently produce realistic images suitable for communicating design concepts promptly (Paananen et al. 2024), offering a clearer presentation of conceptual ideas than traditional hand sketches, particularly where photorealistic images enhance shared understanding.

Text-to-image AI is not merely an additional representational tool but a non-human generative collaborator that intervenes in how designers imagine, articulate, and communicate spatial intentions. The following sections examine this transformation through the interrelated dimensions of text-to-image AI tools application.

Exploration A
Image Generation with Human Sketch

During the application in interior design practice, text-to-image AI involves modifying existing images (e.g., in-painting) and generating new images based on uploaded images. AI-driven in-painting is integrated into recent prompt-based image models (Benjamin et al. 2023). In in-painting, selected regions of an image are regenerated based on textual prompts, producing multiple alternatives for user selection (Ploennigs and Berger 2023).

In the image generation, designers input both images and text prompts, and the generator synthesises new image outputs by learning and recombining patterns embedded in the training data (Benjamin et al. 2023). Through this process, the style or specific elements of the reference images can be altered in response to textual input (Ploennigs and Berger 2023), making this approach suitable for translating sketches into realistic images.

In this exploration, colour and materials were deliberately excluded in order to focus on form and the relationships between interior elements. A black-and-white sketch was uploaded to ChatGPT 5.2 with an identical text prompt, and images were subsequently generated (Figure 1). The interior elements here encompass plane (wall, floor, ceiling), fixtures, furniture, and objects.

The resulting AI-generated image was able to broadly articulate the design intentions embedded in the hand-drawn sketch, despite its ambiguity. As shown in Figure 1, the generated image reflects key spatial and formal characteristics of the sketch, including the shapes and relative positions of the chair, sofa, desk, potted plant, charger, wall light, and the direction of both natural and artificial lighting. Although variations are evident, the overall spatial relationships and compositional structure remain recognisable.

Moreover, the densely hatched area of the author's sketch could not be accurately recognised by the AI system, and the recognition errors mainly focus on this area. For example, the table positioned close to the wall was omitted. From an image-analysis perspective, this might be because of the tonal contrast produced by the organisation of linework. Additionally, the area that directional flow and structural composition of line is translated to curtains and textures on the sofa and wall. These misrecognitions were partially corrected through prompt adjustment, such as re-inputting the instruction that "the back wall of the sofa is not a curtain but a wooden board."

These reveal the limitations in image recognition capabilities of text-to-image AI, and the personalised, expressive line treatment, such as hatching and line-based tonal contrast, can influence AI recognition processes, thereby affecting outputs. This may suggest that designers to adapt their drawing styles to accommodate AI recognition to improve the accuracy of translating conceptual sketches into generated images. However, it is questionable whether the hatching and line-based tonal contrast influence the above errors. For instance, the natural lighting direction in the sketch and the lighted wall light through the light-dark contrast are accurately depicted in the ChatGPT 5.2-generated image.

Figure 01:
From user sketch to AI-generated image (ChatGPT 5.2).

Liu, 2025.

The author sketch

AI-generated image (ChatGPT 5.2)

User prompt:

This is a sketch regarding a study space, includes chair, desk, sofa, plant and wall light, generating this to be a realistic image, from interior designer perspective.

All generated elements/contents should be similar to the uploaded image, and do not change relations/proportions among the elements (furniture, fixtures, lighting).

Exploration B
Image Generation with AI 'Sketch'

Following the initial exploration, the author proposed that I recognition could also be presented through AI-generated textual outputs. To further investigate the identified limitations of AI, the interaction between text-to-image AI and humans in the sketch-to-image generation and the role of designers during this process, a second exploration was conducted (Figure2). To maintain continuity with the initial test, ChatGPT 5.2 remained the testing platform, and the same method regarding the author's sketch was also applied. The key variation was that the first AI output is not an image but a text, followed by image generation.

The findings indicate the limitations observed in the initial exploration. As illustrated in the transition from User: Sketch (B&W) to AI: Sketch (B&W), shown in left side of this figure, misrecognition is evident not only in AI-generated images but also in AI-generated text (e.g., errors of depicting the back wall). For example, the stylised horizontal lines on the doorframe (passing through the hanged clothes) were interpreted as a drying rack, and the floor was transformed into floor tiles, reflecting difficulties in recognising drawing techniques (e.g., dense hatching or layered linework). Drawing on an exploratory enquiry conducted by the author with ten randomly selected individuals, the same floor was perceived as wooden rather than tiled, highlighting a clear difference between humans and non-human AI.

Without modifications to the text prompts, these errors were carried into subsequent visualisation, AI: (Sketch B&W) in the centre of the image. Small or visually ambiguous objects were misidentified or omitted entirely (e.g., the pot handle and cooktop being replaced by a tap and sink, the disappearance of wall material textures and the power box). Additionally, inaccuracies in the proportions of fixtures were observed (e.g., the counter and the right-hand door).

By contrast, higher recognition accuracy and clarity were achieved in AI: sketch (B&W) to AI: image (Figure 2), compared with the AI recognition on a human's hand-drawn sketch (Figure 1). Based on the clear AI: Sketch B&W, ChatGPT 5.2 was able to transfer nearly all details (e.g., shape, position, and ratio) into the realistic image. This suggests that clearer images with fewer stylised or intersecting lines are more conducive to accurate AI image recognition than sketches that contain artistic techniques. Nevertheless, identification and generation errors remained, such as those related to ceiling lighting, indicating that AI performance remains imperfect even under improved conditions.

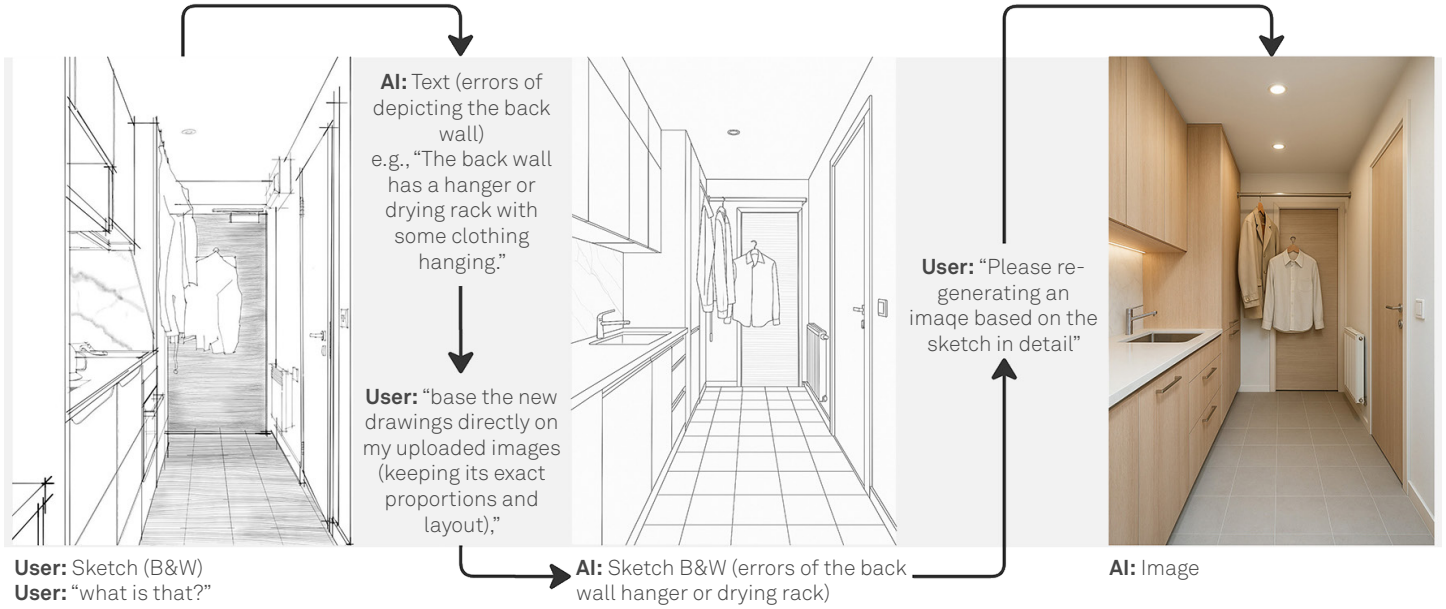
These findings suggest that designers may need to adjust sketch clarity or representational styles to support more accurate AI-assisted visualisation. For example, when a sketch without dense hatching areas and artistic techniques was input into ChatGPT 5.2, the AI-generated image was clearer and closer to the original sketch (Figure 3).

Figure 02:
Transformation from user sketch to AI-generated 'sketch' and realistic image (ChatGPT 5.2).

Liu, 2025.

Figure 03:
Transformation from user sketch to realistic image (ChatGPT 5.2).

Liu, 2025.



User: Sketch (B&W) = User inputs Sketch (B&W); User: "text" = User prompts "text"
AI: Sketch B&W (errors of the back wall) = AI outputs a sketch B&W with errors of the back wall; AI Text (confirmations) e.g., "Text". = AI generates text for confirmation, for example, "Text".

The author sketch

AI-generated image (ChatGPT 5.2)

Building on the above, *exploration A* and *B* indicate that text-to-image AI plays a productive yet constrained role in interior design practice. While such tools can effectively interpret clear spatial characteristics and accelerate early-stage design exploration, their performance diminishes when confronted with stylised drawing, intersecting line structures, or objects with limited visual salience. The results underscore the continued necessity of designer expertise in shaping input quality, interpreting outputs, and managing recurrent limitations in AI recognition. At the same time, interaction with AI systems may prompt designers to reconsider and adapt their sketching practices. It should be acknowledged that the explorations are limited by the text prompt variations, AI platforms, the number of experiments and samples.

Limitations

First, AI often struggles to align visual outputs with human intention due to linguistic ambiguity and contextual limitations (Shneiderman 2021;Sukkar et al. 2024). This issue was also revealed in the image modification experiment (Figure 4). ChatGPT 5.2 executed in-painting correctly only after repeated revisions of prompts, while similar attempts to modify lighting positions failed despite multiple inputs. Although longer prompts are generally associated with higher-quality images (Gür et al. 2024), lexical precision is equally critical. Paananen et al. (2024) suggested that effective image depends on accurate, context-specific vocabulary, with improvements achieved through alternative terms or adjusted word order.

User:
Uses 'in- painting' to refine the image.

"Make the selected area the same as that in the imaqe I uploaded before, do not change other things"

User:
Uses 'in- painting' to refine the image.

"cover the selected area with the white part in the selectea area. Do not change any other things"

User: Image (photographed and uploaded by the author)

AI: Image (partly adjusted)

AI: Image

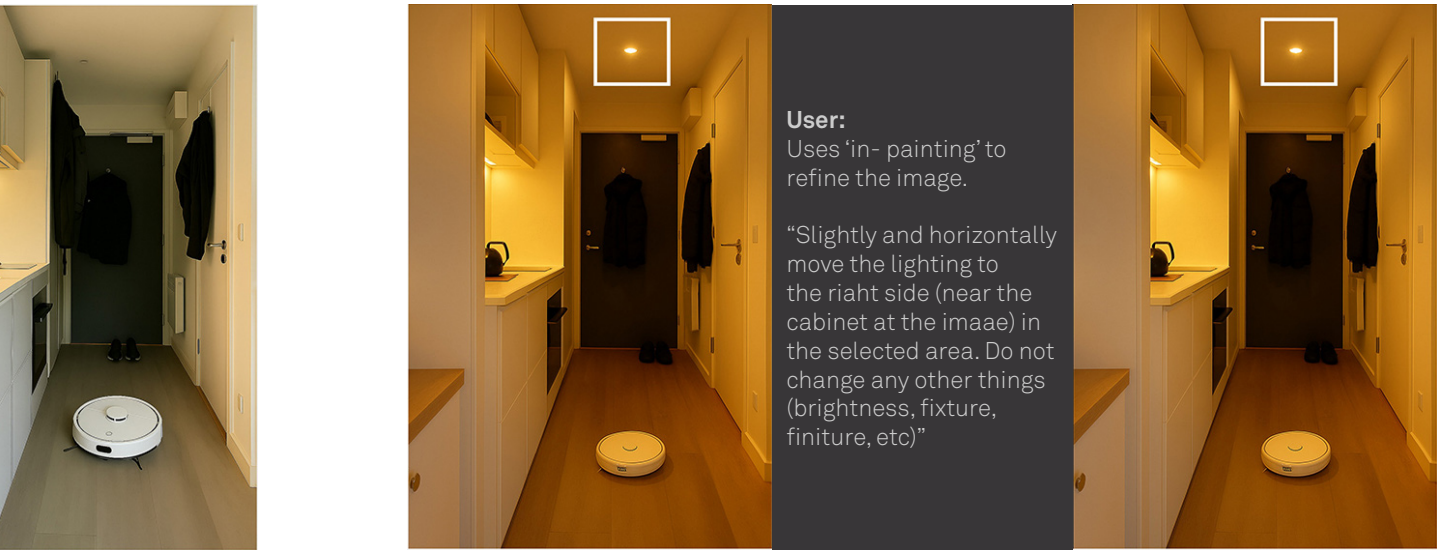
User: Sketch (B&W) = User inputs Sketch (B&W)
User: "text" = User prompts "text"
User: Text = User used 'Text' in this generation
AI: Sketch B&W (errors of the back wall) = AI outputs a sketch B&W with errors of the back wall
AI: Text (confirmations) e.g., "Text". = AI generates text for confirmation, for example, "Text"

These highlight the complexity and uncertainty of human–text-to-image AI interaction in design practice and reveal a gap between human and AI interpretation. Text-to-image AI cannot replace image-editing tools (e.g., Adobe Photoshop) or the central role of human designers. Instead, designers remain essential as active mediators who guide and coordinate AI-generated outputs through discipline-specific terms or expert vocabulary.

Second, reliance on a single AI platform (ChatGPT 5.2) is insufficient to substantiate the findings. When the same text and image were input into ChatGPT 5.2, GenAI Adobe Photoshop and DALL-E 4o, the diversity of AI-image generations was observed (Figure 5). The images differed substantially in style and interpretation, even if basic elements in the author's sketch remained, such as desk, chair, light and sofa. Among them, the image generated by ChatGPT 5.2 most closely aligned with the original sketch, which is why the same AI platform was applied in the above explorations to control the variations. Moreover, this also revealed that the diversity of AI platforms may contribute to diverse functions. For example, in-painting with GenAI Photoshop demonstrates potential for extending human creativity.

Figure 04:
AI-mediated execution of human textual prompts in ChatGPT 5.2.

Liu, 2025.



User: Image (AI-generation based on the author's photograph)

AI: Image (unchanged)

The author sketch

AI-generated image (ChatGPT 5.2)

AI-gene

User prompt: This is a sketch regarding a study space, includes chair, desk, sofa, plant and wall light, generating this to be a realistic image, from an interior designer perspective. All generated elements/contents should be similar to the uploaded image, and do not change the relations/positions among the elements(furniture, fixtures, lighting).

erated image (GenAI Adobe Photoshop)

AI-generated image (DALL-E 4o)

Figure 05:
Comparison of AI-generated images across ChatGPT 5.2, GenAI and DALL-E 4o.

Liu, 2025.

Non-human Extension

Non-human Extensions of Human Creativity

The generative process and non-human perspective of text-to-image AI extend users' creativity. Creativity, as an original idea, shifts how humans see, understand, and interact with their surroundings (Csikszentmihalyi and Jeanne 2014). In this study, greater attention is paid to personal creativity. "Personal creativity refers to the novel ideas or experiences that any person can have..." (Csikszentmihalyi and Jeanne 2014, 239). In this context, users' creativity is grounded in human experiences. User interaction with text-to-image AI constitutes a novel experience, characterised by bidirectional and diverse AI responses shaped through iterative training on AI datasets.

In addition to creativity, AI expands designers' imaginative capacity by introducing emergent possibilities that broaden design horizons (Paananen et al. 2024; Sreenivasan and Suresh 2024; Kudless 2024). Operating through non-human data-driven inference, text-to-image systems generate outputs that often diverge from expected logic, producing novel results (Bankar and Ket 2021; Fareed et al. 2024). Such outputs function as productive disruptions. As Kudless (2024, 93) argues, "maintaining a balance between coherence and nonsense is crucial for harnessing AI as a tool for exploration, speculation, and architectural imagination", which is also supported by Fareed et al. (2024).

Nevertheless, AI is limited in stimulating human creativity, particularly at the level of interaction. While early encounters with AI may disrupt established routines and prompt creative engagement (Csikszentmihalyi 2014), AI-generated images remain predictive constructs shaped by datasets and linguistic inputs rather than human art (Kudless 2024). Moreover, AI outputs are constrained by their generative processes and training data. This issue also stems from the structural biases inherent in existing image databases, which often overrepresent certain architectural styles and reproduce digital images derived from photographic conventions (Sukkar et al. 2024). Both benefits and limitations were revealed in the application of in-painting in sketches in GenAI Photoshop.

Exploration C
Extensions of Human Sketches

When textual prompts do not specify detailed requirements (e.g., specific colours or fixtures), the generative chains of AI are further disrupted. To explore the potential of AI extension under such conditions, the text prompts were deliberately constrained, and the variables included the difference in in-painted areas, ranging from small to large, object-specific regions to larger zones encompassing fixtures and furniture. This enables the possibility of changes in interior elements to be explored within the images. The same sketch produced by the author was input into two AI platforms (GenAI Photoshop and ChatGPT 5.2). GenAI Photoshop extended new data-driven content from the edge of unselected areas (the black area of the area for in-painting, Figure 6); ChatGPT 5.2 translated the content to realistic visuals, enabling clearer comparison across the entire image.

In addition to prompts, the results were strongly influenced by the size and geometry of the in-painted areas, with the edges of selected regions acting as key sites for AI-driven extension. Differences between human intention and non-human interpretation became evident: for example, a table lamp–shaped selection was recognised as a television, the second image of Image

(GenAI Photoshop) (Figure 6), while larger, square selections generated new furniture emerging from incomplete domestic boundaries, as presented in the third image of Image (Area for in-painting). In addition, both platforms produced incoherent or substitutive transformations, such as chairs replaced by a light-coloured sofa or a cabinet replaced by a television in the first and second images of Image (ChatGPT 5.2), respectively. Although such outcomes may disrupt established spatial hierarchies, such as the television disrupting the central role of the fireplace (Hollis 2013),

GenAI Photoshop, User: "This is a living room of a flat, giving your advices through visuals. ChatGPT 5.2, User: "this is a human sketch regarding a living room, convert this into a realistic image, based on the sketch in detail, as an interior designer. only change the different areas and remain the unchanged areas."

Figure 06:
Extension of creativity through GenAI to ChatGPT 5.2, Liu, 2025.

they can prompt designers to reconsider alternative spatial arrangements and design possibilities.

While this test does not fully demonstrate AI's capacity to extend human design imagination, such as the number and diversity of samples tested, the contingency of experiments and lack of participation from other practitioners, it identifies AI-generated images as non-human perspectives that can assist designers in reconsidering alternatives and imagining unfamiliar possibilities. When integrated into interior design practice, text-to-image AI functions as a dynamically responsive collaborator, producing visual outputs derived from large-scale datasets. The design process is thereby reconfigured as a human–non-human collaboration, in which non-human technologies occupy a responsive role, while designers increasingly engage as interpreters and evaluators who critically mediate AI-generated propositions.

Conclusions

This paper has examined how text-to-image AI reconfigures human roles in the conceptual stage of interior design by positioning AI not merely as a representational instrument but as a non-human technological collaborator. By drawing together philosophical understandings of humans and non-human artefacts and the technical and epistemic specificities of AI image generation, the study demonstrates that such systems do not simply supplement existing workflows; they actively prompt designers to adapt AI platforms.

Within interior design, a discipline grounded in spatial practice, interdisciplinarity, and visual communication, the introduction of text-to-image AI marks a significant shift. Images have served as intermediary objects that enable designers to externalise ideas, test alternatives. AI-generated imagery inherits the communicative potential of sketches while altering its logic: instead of emerging through complex design software, images now materialise from linguistic articulation and algorithmic inference.

Through three explorations mainly using ChatGPT 5.2 and comparative tests across GenAI Photoshop, the study shows that text-to-image AI can rapidly translate sketches into plausible visualisations, accelerate iteration, and support early-stage of design by generating image-based propositions that expand designers' imaginative and speculative reasoning.

Moreover, the findings demonstrate persistent constraints. AI remains vulnerable to misrecognition when confronted with stylised drawing techniques, intersecting linework, or visually ambiguous objects. Image-editing tasks that require precise local control (e.g., in-painting execution and fixture relocation) expose the interpretive gap between human intention and AI response. More fundamentally, dataset bias and platform-specific behaviours delimit the range of visual outcomes, reinforcing dominant patterns and photographic conventions within training data.

Rather than displacing designers, these dynamics reposition them. Designers remain central as linguistic articulators, curators, and critical mediators who guide input quality, interpret AI outputs, and manage recurrent limitations within human–non-human workflows. Accordingly, the conceptual stage becomes a site where creativity emerges through negotiated interaction with non-human things, and where design is reconstituted as the capacity to translate and coordinate between technological capability and humans.

References

Al-Farran, Hani. 2019. "The Importance of the Role of Interior Design in Enhancing the Arab Cultural Identity of the Interior Space." *Journal of Architecture, Arts and Humanities* 4 (14): 599–616. https://doi.org/10.21608/mjaf.2019.25806.

Bettaieb, Donia M., and Douha Y. Attiah. 2022. "Inspiration in Interior Design: How Professionals Deal with Sources of Inspiration in the Design of Interior Spaces." *International Journal of Design Management and Professional Practice* 16 (2): 35–51. https://doi.org/10.18848/2325-162X/CGP/v16i02/35-51.

Benjamin, Jesse Josua, Heidi Biggs, Arne Berger, Julija Rukanskaitė, Michael B Heidt, Nick Merrill, James Pierce, and Joseph Lindley. "The Entoptic Field Camera as Metaphor-Driven Research-through-Design with AI Technologies." In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, edited by Tesh Goyal, Anicia Peters, Stefanie Mueller, Kaisa Väänänen, Per Ola Kristensson, Albrecht Schmidt, Julie R. Williamson, and Max L. Wilson. New York, NY, USA: ACM, 2023. https://doi.org/10.1145/3544548.3581175.

Björgvinsson, Erling, Pelle Ehn, and Per-Anders Hillgren. 2012. "Design Things and Design Thinking: Contemporary Participatory Design Challenges." *Design Issues* 28 (3): 101–117. https://doi.org/10.1162/DESI_a_00165.

Böhme, Gernot. 2012. *Invasive Technification: Critical Essays in the Philosophy of Technology*. 1st ed. Bloomsbury Academic.

Brooker, Graeme, and Sally Stone. 2010. *What Is Interior Design?* AVA/Academia.

Brooker, Graeme, and Carlo Scarpa. 2007. *Form + Structure: The Organisation of Interior Space*. AVA/Academia.

Csikszentmihalyi, Mihaly, and Jeanne Nakamura. "Creativity Through the Life Span from an Evolutionary Systems Perspective." In *The Systems Model of Creativity*, edited by Mihaly Csikszentmihalyi, 187–202. Dordrecht: Springer, 2014. https://doi.org/10.1007/978-94-017-9085-7_15.

Coelho, Marcelo, and Jean-Baptiste Labrune. "Large Language Objects: The Design of Physical AI and Generative Experiences." *Interactions* (New York, N.Y.), New York, NY, USA: ACM, 2024. https://doi.org/10.1145/3672534.

Colomina, Beatriz, and Mark Wigley. 2016. *Are We Human? Notes on an Archaeology of Design*.Lars Müller Publishers.

Coulton, Paul, and Joseph Galen Lindley. 2019. "More-Than Human Centred Design: Considering Other Things." *The Design Journal* 22 (4): 463–481. https://doi.org/10.1080/14606925.2019.1614320.

Fuller, R. Buckminster. 1938. *Nine Chains to the Moon*. Philadelphia: J. B. Lippincott.

Fareed, M. W., A. B. Nassif, and E. Nofal. 2024. "Exploring the Potentials of Artificial Intelligence Image Generators for Educating the History of Architecture." *Heritage* 7 (3): 1727–1753. https://doi.org/10.3390/heritage7030081.

Giacomin, Joseph. 2014. "What Is Human Centred Design?" *The Design Journal* 17 (4): 606–623. https://doi.org/10.2752/175630614X14056185480186.

Gür, Miray et al. 2024. "Communicating AI for Architectural and Interior Design: Reinterpreting Traditional Iznik Tile Compositions through AI Software for Contemporary Spaces." *Buildings* 14 (9): 2916. https://doi.org/10.3390/buildings14092916.

Hashim, Wisam Hassan, Osama Ghanem Nouri, and Riyad Hamid Marzouk. 2023. "Digital Modeling and Its Technical Variables in Contemporary Interior Design." *Al-ākādīmī:* 595–604. https://doi.org/10.35560/jcofarts1249.

Heidegger, Martin. 1977. *The Question Concerning Technology, and Other Essays*. Translated by William Lovitt. New York: Harper & Row. (Originally published 1954.)

Hicks, Michael Townsen, James Humphries, and Joe Slater. "ChatGPT Is Bullshit." *Ethics and Information Technology* 26, no. 2 (2024). https://doi.org/10.1007/s10676-024-09775-5.

Hollis, Edward. "The Interior: Television, Gaming, and New Media." In *The Handbook of Interior Architecture and Design*, edited by Lois Weinthal and Graeme Brooker, 468–81. London: Bloomsbury Publishing Plc, 2013. https://doi.org/10.5040/9781474294096.ch-033.

Hollis, Edward. 2017. "What, or When, Is Interiors?" In *Inside Information: The Defining Concepts of Interior Design*, edited by Edward Hollis and Sally Stone, RIBA Publishing.

Hollis, Edward, and Sally Stone. 2022. *Inside Information: The Defining Concepts of Interior Design*. RIBA Publishing.

Kudless, Andrew. 2024. "Stop Making Sense: Complexity and Contradiction in AI and Architecture." *Architectural Design* 94 (3): 86–93. https://doi.org/10.1002/ad.3059.

Lan, Hai, Xiaofei Tang, Ming Fu, and Haoyu Peng. 2025. "Will Human Designers Be Replaced? Exploring Consumer Responses to AI Involvement in Interior Design." *Current Psychology*. https://doi.org/10.1007/s12144-025-07422-w.

McLuhan, Marshall, and W. Terrence Gordon. 2003. *Understanding Media: The Extensions of Man*. Critical ed. Gingko Press.

Paananen, Ville, Jonas Oppenlaender, and Aku Visuri. 2024. "Using Text-to-Image Generation for Architectural Design Ideation." *International Journal of Architectural Computing* 22 (3): 458–474. https://doi.org/10.1177/14780771231222783.

Pena, M. Luz, Adrián Carballal, Nereida Rodríguez-Fernández, Iria Santos, and Juan Romero. 2021. "Artificial Intelligence Applied to Conceptual Design: A Review of Its Use in Architecture." *Automation in Construction* 124: 103550. https://doi.org/10.1016/j.autcon.2021.103550.

Ploennigs, Joern, and Markus Berger. 2023. "AI Art in Architecture." *AI in Civil Engineering* 2 (1): 8. https://doi.org/10.1007/s43503-023-00018-y.

Rafsanjani, Hamed Nabizadeh, and Amir Hossein Nabizadeh. 2023. "Towards Human-Centered Artificial Intelligence (AI) in Architecture, Engineering, and Construction (AEC) Industry." C*omputers in Human Behavior Reports*. https://doi.org/10.1016/j.chbr.2023.100319.

Rice, Charles. 2006. *The Emergence of the Interior: Architecture, Modernity, Domesticity*. Routledge.

Royal Institute of British Architects. 2020. *RIBA Plan of Work 2020: Overview*. https://www.ribaplanofwork.com/.

Schmidt, Albrecht. "Interactive Human Centered Artificial Intelligence: A Definition and Research Challenges." In *Proceedings of the 2020 International Conference on Advanced Visual Interfaces*, edited by Marco Winckler, Giuliana Vitiello, and Genny Tortora, 1–4. New York, NY, USA: ACM, 2020. https://doi.org/10.1145/3399715.3400873.

Sreenivasan, Aswathy, and M. Suresh. 2024. "Design Thinking and Artificial Intelligence: A Systematic Literature Review Exploring Synergies." *International Journal of Innovation Studies*. https://doi.org/10.1016/j.ijis.2024.05.001.

Şekerci, Yaren, Mehmet Uğur Kahraman, and Müge Develier. "Enhancing Interior Design Education with Artificial Intelligence: A Multisensory Hotel Design." *Interiors: Design, Architecture, Culture* 13, no. 2–3 (2023): 195–229. https://doi.org/10.1080/20419112.2024.2409504.

Shneiderman, Ben. "Human-Centered AI." *Issues in Science and Technology* 37, no. 2 (2021): 56–61.

Sukkar, Ahmad W., Mohamed W. Fareed, Moohammed Wasim Yahia, Emad Mushtaha, and Sami Luigi De Giosa. 2024. "Artificial Intelligence Islamic Architecture (AIIA): What Is Islamic Architecture in the Age of Artificial Intelligence?" *Buildings* 14 (3): 781. https://doi.org/10.3390/buildings14030781.

The American Institute of Architects. 2007. *Integrated Project Delivery: A Guide*. https://www.aia.org/resource-center/integrated-project-delivery-guide/.

Tanugraha, Stephen. 2023. "Review Using Artificial Intelligence-Generating Images: Exploring Material Ideas from MidJourney to Improve Vernacular Designs." *Journal of Artificial Intelligence in Architecture*. https://doi.org/10.24002/jarina.v2i2.7537.

The Editors of Encyclopaedia Britannica. 2025. "Human Being." *Encyclopedia Britannica*, February 21. https://www.britannica.com/topic/human-being.

Witt, Andrew. 2024. "An A(i)lien Embassy: AI and Interspecies Communication." *Architectural Design* 94 (3): 54–61. https://doi.org/10.1002/ad.3055.

Xie, Yutong, Zhaoying Pan, Jinge Ma, Jie Luo, Qiaozhu Mei, Lora Aroyo, Geert-Jan Houben, et al. 2023. "A Prompt Log Analysis of Text-to-Image Generation Systems." In *Proceedings of the ACM Web Conference 2023*, 3892–3902. New York: ACM. https://doi.org/10.1145/3543507.3587430.

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