World Journal of Information Technology
Print ISSN: 2959-9903
Online ISSN: 2959-9911
DOI: https://doi.org/10.61784/wjit3120

THE APPLICATION OF AIGC TECHNOLOGY THROUGHOUT THE ENTIRE HOME INTERIOR DESIGN PROCESS

XinSu Mo[1], XiaoXue Yi[1], ShaoKai Yang[2], Chen Pan[1*]
[1]*Architecture and Civil Engineering Institute, Guangdong University of Petrochemical Technology, Maoming 525000, Guangdong, China.*
[2]*Faculty of Business, City University of Macau, Macau Region 999078, China.*
[*]*Corresponding Author: Chen Pan*

Abstract: The rapid development of generative artificial intelligence (AIGC) technology presents profound opportunities for transformation within the residential interior design industry. This paper systematically explores the integration pathways and application methods of AIGC technology throughout the entire residential interior design process.The study first analyses the efficiency bottlenecks faced in traditional residential interior design at stages such as inspiration gathering, scheme revision and compliance review; it then elaborates on the specific application methods of AIGC technology in key stages—including design requirement analysis, creative conceptualisation, scheme generation and fine-tuning—from the perspectives of core technological dimensions such as natural language processing, image recognition and generation, and controlled generation and local redrawing;Building on this, a five-stage human-machine collaborative design workflow was established, comprising ‘requirement analysis—creative inspiration—scheme generation—detail optimisation—compliance review’. The research indicates that: (1) AIGC technology can significantly enhance design efficiency and scheme quality; (2) however, challenges such as emotional expression, technical barriers and copyright ethics still require attention. This paper provides a theoretical framework and methodological guidance for the intelligent transformation of the residential interior design industry.
Keywords: AIGC; Home and interior design; Human-computer collaboration; Proposal generation; Design efficiency

1 INTRODUCTION

1.1 Research Background

Against the backdrop of the digital advancement and ever-increasing demand for personalised consumption, the home interior design industry is undergoing a critical transition from being experience-driven to data- and intelligence-driven. In traditional design processes, designers often spend a considerable amount of time on repetitive tasks such as material collection, style exploration and scheme revisions, whilst design inspiration is easily constrained by the limitations of personal experience and cognition.At the same time, the rise of Generative Artificial Intelligence (AIGC) technology offers a potential solution to these challenges. Leveraging deep learning architectures and vast amounts of training data, AIGC is capable of simulating human creative output to a certain extent, generating content that combines diversity with aesthetic expressiveness. From text generation and image synthesis to style transfer and even 3D modelling, this technology has demonstrated significant auxiliary value in the fields of visual arts, industrial design and architecture.
In recent years, research into the application of AIGC technology in the field of home design has become increasingly extensive. A review by Shuangyang Tan and Shasha Chen systematically examined the methods and roles of generative AI in the creation of interior design renderings, highlighting that image consistency is a key factor in the design generation process.Wang Jiayi proposed a human-machine collaborative interior design method based on generative AI, constructing a collaborative workflow that integrates the language model DeepSeek with the image generation model Stable Diffusion, and establishing a correspondence between semantic control and image quality through the CLIP semantic similarity scoring mechanism.Xiaofei Zhou et al. proposed a domain-specific optimisation framework for the Stable Diffusion XL model; through automated semantic cleaning and hyperparameter optimisation strategies, they significantly improved structural consistency and aesthetic fidelity in AI-assisted interior design. Zijin Qiu et al. proposed a Stable Diffusion-based cross-modal residential layout generation method, utilising natural language as design constraints and introducing ControlNet to achieve controllable layout generation.

1.2 Problem Statement and Research Significance

Although AIGC has achieved preliminary success in the field of home design, most research remains focused on exploring the application of individual technologies, lacking systematic integration across the entire design process.How to elevate AIGC technology from fragmented auxiliary tools to a systematic capability spanning the entire design process, and how to establish a scientific, efficient and replicable human-machine collaboration model, are the core issues that urgently need to be addressed. Therefore, this study aims to answer the following questions: ① How can a systematic AIGC application framework covering the entire home interior design process be constructed? ② How can this framework achieve the organic integration of technology and design practice at different design stages?

At the theoretical level, this study overcomes the limitations of existing literature—which often focuses on isolated technological applications—by constructing a five-stage human-machine collaboration framework covering the entire home interior design process; at the practical level, it provides design firms and individual designers with an actionable methodological reference for AIGC application.

1.3 Research Methods and Structural Organisation

This study employs a combined approach of literature review and theoretical analysis. It begins by outlining the core technical principles of AIGC and its current applications in the field of home design, proceeds to systematically discuss specific application methods and tools for each stage, and concludes with a discussion of technical challenges and future development directions. The full text is divided into seven sections: Introduction, Analysis of Bottlenecks in Traditional Design Processes, Foundations of Core AIGC Technologies, Full-Process Application Methods, Construction of Human-Machine Collaborative Workflows, Challenges and Outlook, and Conclusion.

2 BOTTLENECKS IN TRADITIONAL HOME INTERIOR DESIGN PROCESSES

2.1 Low Efficiency in Gathering Inspiration

In traditional home interior design, designers primarily rely on personal experience and intuition to identify creative directions, with the pace of innovation constrained by individual knowledge reserves and cognitive limitations. Faced with clients' personalised requirements, designers often need to sift through vast collections of design case studies, specialist magazines and online resources, taking several days to formulate a preliminary design concept. This method of gathering inspiration, which relies on manual research, is not only inefficient but also prone to creative blockages.As highlighted by relevant research, traditional interior design requires designers to invest a great deal of time and effort in conceptualisation, drafting and revisions.

2.2 High Costs of Design Revisions

Home design proposals typically undergo multiple rounds of revisions from concept to finalisation. Each revision involves tasks such as adjusting floor plans, redrawing visualisations and substituting materials, requiring a significant amount of manual redrawing and adjustment.In the traditional design process, the production and revision of visualisations are particularly time-consuming—from 3D modelling, texture mapping and lighting setup to rendering output, a single revision often takes several days. This high-cost iterative model not only prolongs the project cycle but also limits designers' ability to explore alternative solutions.

2.3 Heavy Burden of Compliance Checks

Residential interior design must comply with numerous national standards and industry regulations, including the 'Code for Design of Residential Buildings' (GB 50096), the 'Code for Fire Protection Design of Buildings' (GB 50016) and the 'Code for Accessibility Design' (GB 50763).During the scheme development process, designers must repeatedly consult relevant regulatory documents and manually verify whether various design parameters—such as clear corridor width, stair tread dimensions and socket heights—comply with regulations. This process is time-consuming and prone to errors. Particularly for projects involving floor plan alterations, the review of compliance issues such as structural safety and fire compartmentation is even more complex (Figure 1).

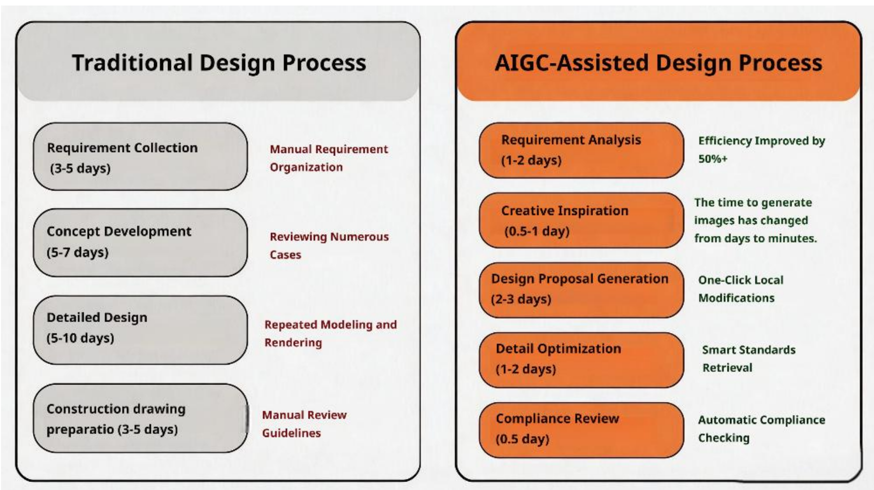

Figure 1 Comparison of Traditional Home Design Workflow Versus AIGC-Assisted Design Workflow

3 THE TECHNICAL FOUNDATIONS OF AIGC AND ITS SUITABILITY FOR HOME DESIGN

3.1 Overview of Core Technologies

AIGC (Artificial Intelligence Generated Content) refers to a technological framework that utilises generative artificial intelligence models to automatically or semi-automatically create content such as text, images and 3D models. In the field of interior design, the core technologies most closely related to design practice include:
(1) Natural language processing and large language models. Large language models (LLMs) based on the Transformer architecture are capable of understanding descriptions of design requirements, generating design briefs and retrieving provisions from specifications. Research indicates that LLMs can be systematically integrated into interior design workflows, assisting designers in completing design tasks through structured prompts. LLM-based frameworks can transform diverse and ambiguous natural language user requirements into precise two-dimensional design proposals.
(2) Diffusion models and image generation. Text-to-image generation technology based on diffusion models can generate high-quality design concept art and renderings based on textual descriptions. Representative models include Stable Diffusion and Midjourney. With advances in generative artificial intelligence, AI-generated imaging methods have undergone rapid development in the field of interior design visualisation, enabling the rapid generation of creative interior design renderings.
(3) Controllable generation technology. Plugins such as ControlNet enhance spatial controllability over the image generation process by introducing additional control signals (e.g. edge maps, depth maps, floor plans, etc.). Research indicates that ControlNet can effectively control object positioning, IP-Adapter can adjust stylistic preferences, LoRA excels in customising styles, whilst SAM is suitable for fine-tuning specific local areas.
(4) Model fine-tuning and style customisation. LoRA (Low-Rank Adaptation) technology uses low-rank matrices to perform lightweight fine-tuning on large pre-trained models, enabling them to generate content in specific styles. Researchers can train LoRA models for specific styles using a small number of samples, thereby achieving batch generation with consistent stylistic coherence.

3.2 Functional Requirements for AIGC in Home Design

The entire process of home interior design presents differentiated functional requirements for AIGC technology. During the design requirements analysis stage, natural language understanding and the ability to structure requirements are required; during the creative conceptualisation stage, multi-style image generation and style transfer capabilities are needed; during the scheme generation stage, the ability to generate controlled floor plans and interior scenes is required; during the detail optimisation stage, the ability to redraw specific areas whilst maintaining stylistic consistency is essential; and during the compliance review stage, the ability to retrieve regulatory texts and compare parameters is required.

4 METHODS FOR APPLYING AIGC TECHNOLOGY THROUGHOUT THE HOME INTERIOR DESIGN PROCESS

4.1 Requirements Analysis Stage: Natural Language Processing-Driven Requirements Parsing

The starting point for home interior design is an accurate understanding of the client's requirements and preferences. Natural language processing (NLP) technology and large language models demonstrate unique advantages at this stage.
(1) Semantic Analysis and Requirement Extraction. After designers collect users' natural language descriptions, NLP technology can extract key design elements from unstructured conversational text through methods such as named entity recognition, sentiment analysis and keyword extraction, and convert them into quantifiable design parameters. Existing research has proposed LLM-based frameworks for automated and customised floor plan design, utilising syntactic trees for natural language parsing and automatic dataset augmentation.The ChatAssistDesign framework, meanwhile, supports iterative graphic design generation through natural language interaction, significantly lowering the barrier to entry for design.
(2) User profiling and structuring of requirements. Through semantic analysis of multi-round user dialogues, the system can automatically construct user profiles encompassing dimensions such as family structure, lifestyle habits and aesthetic preferences, and consolidate fragmented requirements into a structured list of design tasks. The CARD framework proposes a cross-modal agent-based approach that supports generative and editable residential design.
(3) Intelligent retrieval of codes and regulations. A code retrieval system built on Retrieval-Augmented Generation (RAG) technology is capable of rapidly retrieving and interpreting complex texts such as building codes and safety standards. The system supports natural language queries, shifting compliance reviews from 'post-hoc verification' to 'real-time guidance during the design process', thereby effectively reducing the workload for designers involved in poring over codes.

4.2 Conceptualisation Stage: Inspiration Driven by Image Generation Technology

Conceptualisation is the stage of home design that relies most heavily on human creativity, and AIGC's image generation technology is profoundly reshaping this process.
(1) Rapid generation of multi-style concept images. Using image generation tools such as Stable Diffusion, designers input prompts such as style preferences, space types and colour schemes, and the system can generate multiple concept images in different styles within seconds.Some studies have introduced a CLIP semantic similarity scoring mechanism to

select the most semantically appropriate proposal from images generated by multiple LoRA style models, thereby establishing a quantifiable correlation between semantic control and image quality.

(2) Style exploration and comparison. Designers can adjust the prompts based on the initial output, or use LoRA models to train specific styles, enabling them to rapidly evaluate and compare different design directions. This approach allows designers to explore a wide range of possibilities early in the project, rather than being limited to the scope of their personal experience.

(3) Rapid conversion from sketches to renderings. Designers' hand-drawn sketches can be rapidly converted into photorealistic renderings using AIGC tools combined with ControlNet's Scribble mode, enabling an efficient transition from conceptual ideas to visual representations. This capability significantly shortens the design communication cycle.

4.3 Proposal Generation Stage: Layout and Visualisation Generation Supported by Controllable Generation Technology

Moving from creative concepts to concrete proposals requires addressing specific design issues such as spatial layout, furniture arrangement and material selection. Controllable generation technologies such as ControlNet provide the technical foundation for this.

(1) Floor-plan-driven layout generation. Controllable generation methods based on the Stable Diffusion model can utilise natural language as design constraints to achieve controllable residential layout generation via ControlNet.The method proposed by Zijin Qiu et al. supports multiple input types, allowing users to specify boundaries and layouts, whilst encapsulating design expertise within a knowledge graph and converting it into natural language, thereby providing an interpretable representation of design knowledge. Research indicates that this method offers greater flexibility and controllability under multimodal constraints compared to the current state-of-the-art models.

(2) Layout control via natural language constraints. Researchers have proposed a controllable multimodal residential layout generation method that utilises natural language as a design constraint, employing ControlNet to generate layouts via two distinct pathways. The comprehensibility of natural language and the diversity of input options enable both professionals and non-professionals to directly express design requirements, providing a flexible and controllable design approach.

(3) Parallel generation and comparison of multiple proposals. AIGC supports the simultaneous generation of multiple differentiated proposals for designers and clients to choose from. Designers can rapidly adjust generation parameters based on feedback, enabling rapid iteration and optimisation of proposals (Figure 2).

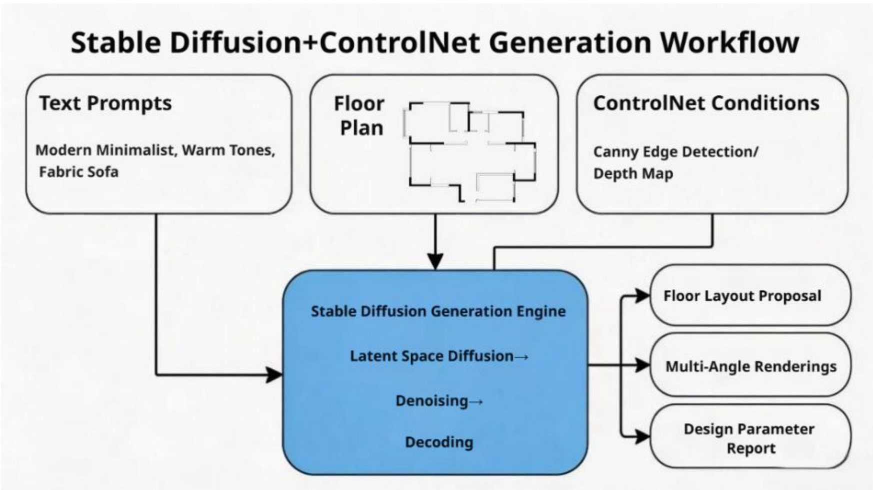

Figure 2 Schematic Diagram of the Stable Diffusion + ControlNet Scheme Generation Technology

4.4 Detail Optimisation Phase: Local Redrawing and Fine-Tuning

Once a preliminary design proposal has been generated, it is often necessary to make fine-tuning adjustments to specific areas. Local redrawing techniques provide an efficient solution for this.

(1) Localised material and colour replacement. Designers can use masks to select specific areas within the visualisation, input descriptions of new materials or colours, and the system will redraw only that area whilst leaving the rest unchanged. Tools such as SAM (Segment Anything Model) enable precise modifications to localised areas.

(2) Rapid placement of furniture and soft furnishings. AIGC supports the intelligent synthesis of realistic furniture and soft furnishings within existing spatial scenes, allowing designers to quickly experiment with different combinations without the need for remodelling. Technologies such as IP-Adapter can adjust the stylistic features of an image to ensure that newly placed elements harmonise with the overall environment.

(3) Style consistency control. Through LoRA model training, designers can establish bespoke style models to ensure that schemes adjusted locally remain consistent with the overall style. Optimisation studies on the SDXL model indicate that, through the system's semantic cleaning pipeline and structural regularisation strategies, the geometric fidelity of generated

images can be significantly improved (Figure 3).

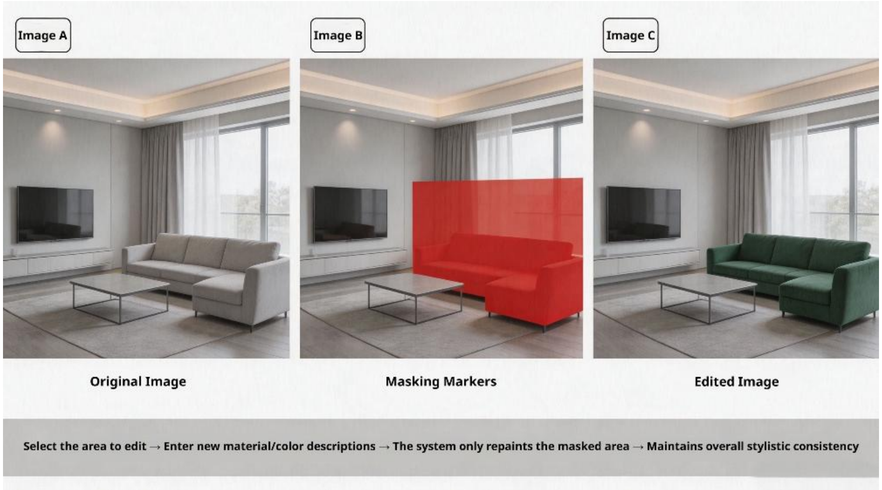

Figure 3 Schematic Diagram Illustrating Detailed Optimisation Operations for Local Inpainting

4.5 Compliance Review Stage: Intelligent Retrieval and Verification of Standards

Home design proposals must meet multiple architectural and safety regulations. AIGC-assisted compliance review plays a crucial role at this stage. LLM-based frameworks can parse complex natural language requirements and convert them into precise design constraints. The system automatically compares key parameters in the design proposal against regulatory requirements, generating a self-assessment report on compliance. It annotates potential non-compliance issues and provides rectification recommendations directly on floor plans, effectively reducing the risk of oversights in manual reviews (Figure 4).

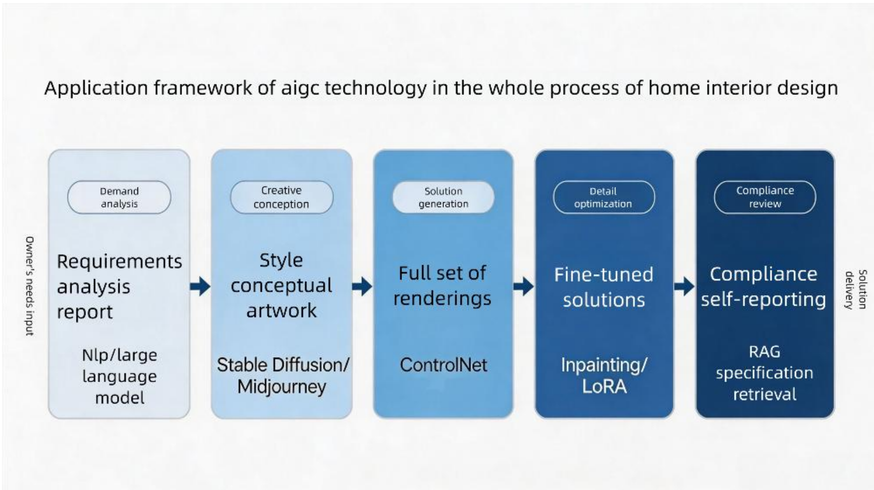

Figure 4 Framework Diagram Illustrating the Application of AIGC Technology Throughout the Entire Home Interior Design Process

5 ESTABLISHING A HUMAN-MACHINE COLLABORATIVE DESIGN WORKFLOW

5.1 Overall Framework of the Workflow

Based on the aforementioned five-stage application methodology, this paper proposes a human-machine collaborative home design workflow comprising 'Requirement Analysis – Creative Inspiration – Scheme Generation – Detail Optimisation – Compliance Review'. Centred on the core principle that 'AI is responsible for generation and execution, whilst humans are responsible for judgement and decision-making', this workflow integrates AIGC tools into designers' daily workflows.

Research indicates that integrating generative AI into traditional interior design workflows requires the establishment of a multi-tiered framework of objectives, including the integration of AI capabilities with design knowledge, the embedding of AI skills into workflows, the enhancement of user engagement, the promotion of human–machine collaboration, and the facilitation of a paradigm shift in design. The AIDED system proposed by Chen et al. demonstrates a practical approach to designer–AI collaborative design workflows, achieving a balance between client experience and professional control by integrating multimodal client data into the generative AI design process.

Phase One: Requirements Analysis (Human–AI Collaboration). The designer conducts in-depth interviews with the client. The interview content is fed into a large language model system for semantic analysis, generating a structured design requirements document and user profiles. The designer reviews and supplements the system's output to ensure the accuracy of the requirements.
Phase Two: Creative Inspiration (AI-led). Based on the requirements document, the designer constructs prompts and inputs them into an image-generation system, which generates multiple sets of stylised concept images. The designer then selects, combines and refines these to form several creative directions for the client to choose from.
Phase Three: Proposal Generation (AI-led + Human Review). Once a creative direction has been selected, the system generates multiple floor plan layouts and visualisation proposals based on the floor plan and functional requirements. Designers conduct a professional review of the proposals, addressing issues such as functional rationality and ergonomics.
Stage Four: Detail Optimisation (Human-Machine Collaboration). Based on client feedback, designers use the partial redrawing function to make fine-tuning adjustments to the proposals. This stage is primarily driven by human decision-making, with AI providing efficient execution of modifications.
Stage 5: Compliance Review (AI-assisted). The system automatically checks the final proposal for compliance with regulations, flagging potential issues, whilst the designer carries out final confirmation and corrections (Figure 5).

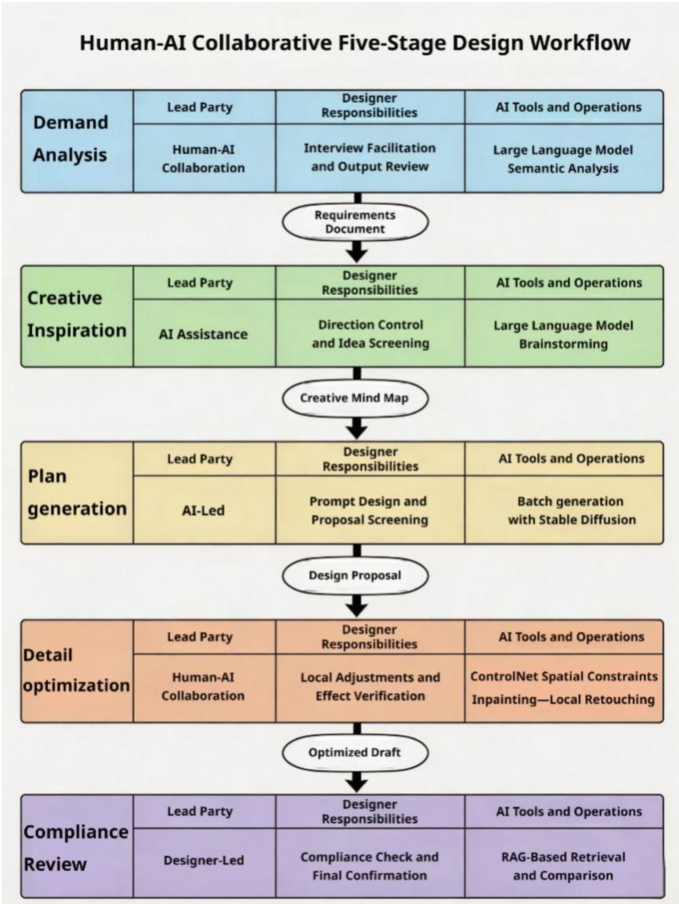

Figure 5 Detailed Diagram of the Five-Stage Human-AI Collaborative Design Workflow

5.2 Conditions for the Workflow's Applicability

The effective operation of this workflow requires the following conditions to be met: ① Designers possess basic proficiency in operating AIGC tools (prompt writing, ControlNet parameter adjustment, and LoRA usage);② Computing equipment meeting the operational requirements of Stable Diffusion must be available; ③ A critical eye must be maintained towards AIGC-generated content to avoid blind acceptance. It should also be noted that this workflow is suitable for residential interior design projects; for highly customised spatial types, the applicability of AIGC is relatively low, requiring greater human oversight.

6 CHALLENGES AND OUTLOOK

6.1 The Core Value of AIGC in Empowering Home Design

(1) Significant improvements in efficiency. The most direct value that AIGC technology brings to home design is improved efficiency. AI systems can complete tasks within seconds to minutes that would take days using traditional methods, enabling designers to devote more energy to creative decision-making. Research indicates that generative AI

can efficiently generate diverse interior design proposals, fostering creative design and enhancing the efficiency of design and decision-making.
(2) Democratisation of creativity. AIGC lowers the barrier to design expression. Ordinary consumers can use AI platforms to generate interior design visualisations themselves, efficiently selecting their preferred styles and reducing the cost of trial and error. Designers, meanwhile, can utilise AI tools to explore a wide range of design possibilities, transcending the limitations of their individual experience.
(3) Precise realisation of personalisation. Through semantic analysis and user profiling technologies, AIGC can transform vague user requirements into precise design parameters, enabling the realisation of personalised, bespoke designs.

6.2 Technical Limitations and Potential Challenges

(1) Lack of emotional depth and spatial personality. Although AIGC-generated content is diverse, it struggles to fully understand and convey the emotional dimensions and spatial personality of human spaces. Home design is not merely about function and aesthetics; it also embodies the emotional memories and life narratives of the occupants—an area that current AI struggles to address. Some research also indicates that the subtleties of the client experience are often difficult for AI to capture accurately, requiring a trade-off between realism and interpretability.
(2) Technical barriers and risks of over-reliance. Designers must possess a certain level of proficiency in prompt engineering and model fine-tuning to utilise AIGC tools efficiently. At the same time, over-reliance on AI-generated content may lead to homogenisation of designs and undermine designers' capacity for independent thinking.
(3) Intellectual property and copyright ownership. The originality of AIGC-generated works, the ownership of copyright, and the demarcation between human and machine creative labour have yet to be clarified by law and industry standards. As training data may contain copyright-protected design works, the legality of the generated output remains contentious.
(4) Image consistency and quality control. The inherent uncertainty of AI-generated images poses a challenge to the professional standards required for interior design visualisations. Researchers have attempted to enhance consistency through various technical approaches, including prompt optimisation, image-to-image translation and ControlNet. Optimisation studies on the SDXL model indicate that systematic semantic cleansing and structural regularisation can reduce the FID metric by 51.1 per cent and significantly improve geometric fidelity; however, the issue has not yet been fundamentally resolved (Figure 6).

Figure 6 Framework Illustrating the Opportunities and Challenges of AIGC in Home Design

6.3 Future Prospects

AIGC technology holds vast potential for application in the field of home interior design. Future developments may be anticipated in the following areas:
(1) Intelligent upgrading of tools. Current AIGC tools still require a significant amount of manual intervention; in future, they will evolve towards being more intelligent and user-friendly. Natural language interaction will become the norm, with designers merely needing to describe their requirements in everyday language, whilst the system autonomously completes complex generation tasks.
(2) End-to-end integration and standardisation. The trend will be towards end-to-end AI integration across the entire workflow—from requirements gathering, scheme generation and rendering of visualisations to the drafting of construction drawings—forming an integrated intelligent design platform.
(3) Deepening of human-machine collaboration. Future collaboration will enter a deeper phase characterised by 'AI understanding intent, humans setting objectives, and joint exploration of solutions'. The role of the designer will evolve from that of an 'executor' to that of a 'curator'.
(4) Copyright protection and ethical governance. With the widespread adoption of AIGC, the industry will establish comprehensive digital copyright protection mechanisms and ethical governance frameworks to clarify the rules governing

the ownership of works co-created by humans and machines.

7 CONCLUSION

The deep integration of AIGC technology into the field of home and interior design is significantly transforming design efficiency, quality and innovation models. Through a systematic analysis of the bottlenecks in traditional home design processes, this paper proposes an AIGC application framework encompassing five stages: requirements analysis, creative conceptualisation, solution generation, detail optimisation and compliance review, thereby establishing a human-machine collaborative design workflow comprising ‘requirements analysis—creative inspiration—solution generation—detail optimisation—compliance review’.Research indicates that AIGC offers significant advantages in enhancing design efficiency and enriching creative expression; however, it also faces unavoidable challenges in areas such as emotional communication, technical barriers and copyright ethics.

Future research should focus on developing smarter and more user-friendly AIGC tools, refining mechanisms for the protection of design copyright, and continuously optimising human-machine collaboration models. For designers, a more rational approach might be to actively embrace technological change and view AIGC as a tool to enhance their own creativity, rather than as a shortcut to replace professional judgement.Only by striking an appropriate balance between technological innovation and humanistic values can the home and interior design industry move steadily towards greater efficiency, a more human-centred approach and greater sustainability.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

FUNDING

The project was supported by 2025 Annual Guangdong Provincial Ordinary Higher Education Institutions Young Innovative Talent Project (2025SCG205); Educational and Teaching Reform Project of Guangdong University of Petrochemical Technology (ZLGC202548); 2026-National Innovative Training Programor College-Students (S202611656129); 2025-National Innovative Training Programor College-Students (25C262, 25C265).

REFERENCES

[1] Shuangyang Tan, Shasha Chen. A review on the consistency of AI-generated images for interior design rendering. WIREs Data Mining and Knowledge Discovery, 2026.
[2] Xiaofei Zhou, Soohong Kim, Yan Chen. SDXL model-based optimisation for interior design: Data-driven and deep learning methods. PLoS One, 2026, 21(2): e0342258.
[3] Zijin Qiu, Jiepeng Liu, Yi Xia, et al. From text semantics to flexible design: A residential layout generation method based on the Stable Diffusion model. arXiv:2501.09279, 2025.
[4] Zijin Qiu, Jiepeng Liu, Yi Xia, et al. From text semantics to controllable design: A residential layout generation method based on the Stable Diffusion model. Developments in the Built Environment, 2026: 100935.
[5] Xiaomei Li, Lei Xia, Ziming He, et al. Enhancing interior design education through the integration of AIGC tools: A novel “Creator-Thon” approach//2024 IEEE Frontiers in Education Conference (FIE). Washington, DC: IEEE, 2024.
[6] Yang Chen Lin, Chen-Ying Chien, Kai-Hsin Hou, et al. AIDED: Augmenting interior design with human experience data for designer–AI co-design // Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems (CHI’26). Barcelona, 2026.
[7] Zijin Qiu, Jiepeng Liu, Yantao Wu, et al. LLM-based framework for automated and customised floor plan design. ScienceDirect, 2025.
[8] Luping Li, Xing Su, Han Lin, et al. ChatAssistDesign: A language-interactive framework for iterative vector floor plan generation via conditional diffusion. ScienceDirect, 2025.
[9] Pengyu Zeng, Jun Yin, Miao Zhang, et al. CARD: Cross-modal agent framework for generative and editable residential design // Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing. Suzhou, 2025: 9304–9319.
[10] Yi Fu, Liyan Shang. Spatial environment intelligent design system based on generative AI. IEEE, 2026.
[11] Gabrielle Littlefair, Niladri Shekhar Dutt, Niloy J Mitra. FlairGPT: Repurposing large language models (LLMs) for interior design. arXiv, 2025.
[12] Haolan Zhang, Ruichuan Zhang. Generative artificial intelligence (AI) in built environment design and planning—A state-of-the-art review. Progress in Engineering Science, 2025, 2(1): 100040.
[13] Wang Jiayi. A Study on Interior Design Based on Generative AI-Enabled Human-Machine Collaboration: A Case Study of DeepSee and Stable Diffusion. China Residential Facilities, 2025(10): 62–64.
[14] Zou Zhijuan, Chen Sijie. A Study on Furniture Design Based on AI Image Generation Technology. Forest Products Industry, 2024, 61(11): 62–67.
[15] Ministry of Housing and Urban-Rural Development. Code for Residential Design: GB 50096-2011. Beijing: China Architecture & Building Press, 2012.

[16] Ministry of Housing and Urban-Rural Development. Code for Fire Protection Design of Buildings: GB 50016-2014 (2018 Edition). Beijing: China Planning Press, 2018.

[17] Zhang Chengyu, Shi Zhenyu, Zhang Xin. A Study on Methods for Optimising Interior Design Workflows Using AIGC Technology: A Case Study of Stable Diffusion and Vega AI. Journal of Jiangsu Institute of Education (Social Sciences Edition), 2024(2): 45–52.

[18] Chen Sijie, Zou Zhijuan. Practical Exploration of Generative AI-Assisted Interior Design Workflows. Interior Design and Decoration, 2024(8): 112–117.

[19] Liu Wenbo, Zhao Xue. A Study on the Application of AIGC Technology in the Iteration of Interior Design Proposals. China Architecture Decoration & Renovation, 2025(3): 78–83.

[20] Yang Zihan, Wu Liang. Exploring the Application of Image-Generating AI in Interior Design: A Case Study of Stable Diffusion//Proceedings of the 2024 China Interior Design Academic Annual Conference. Beijing: China Architecture & Building Press, 2024: 156–163.