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Module Essay

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Introduction

Rapid advances in generative artificial intelligence (AI) are transforming creative disciplines – including architecture (Schneider et al., 2024). Technologies such as ChatGPT, DALL·E, Midjourney, and Stable Diffusion demonstrates remarkable capabilities in producing visual representations that mimic human creativity (Stanford HAI, 2023). These developments are reshaping architecture, a discipline deeply connected to visual representation, spatial reasoning, and conceptual ideation (C. Li et al., 2025). While earlier AI applications focused on optimisation, performance, and spatial accuracy, recent generative AI models engage more directly with aesthetics, conceptual exploration, and stylistic interpretation (Zhong et al., 2024). This shift calls for reassessment of AI's role beyond purely technical functionalities. This essay explores selected generative AI tools – DALL·E 3, LookX AI, DreamStudio, and Stable Diffusion Online – focusing on their text-to-image and image-to-image capabilities within architectural conceptions. Firstly, it will introduce selected tools and their functions. Then apply them to two personal design projects in Nigeria. Consequently, drawing on theoretical insights from Walter Benjamin, Emily Bender, Dan McQuillan, and Kate Crawford, it critically examine broader implications of applying generative AI in architectural design concepts. Finally, it explores responsible use of generative AI in architectural design. The essay proposes the concept of an "algorithmic aura", a reinterpretation of Benjamin's framework. Unlike Benjamin's aura, which is lost through mechanical reproduction, algorithmic aura emerges through human-AI collaboration. It reflects not the uniqueness of the artefact but the iterative authorship behind its creation. Ultimately, the essay argues that while generative AI enhances architectural ideation and visualisation, substantial human oversight remains essential to ensure coherence, cultural sensitivity, and ethical responsibility.

Some Generative AI Tools in Architecture

Generative AI tools like DALL·E 3, LookX AI, DreamStudio, and Stable Diffusion Online offer distinct functionalities suitable for a range of architectural tasks, (Thampanichwat et al., 2025) especially in conceptual designs. DALL·E 3 is recognised for its advanced text-to-image generation, producing detailed representations aligned with input prompts. LookX AI, tailored specifically for architecture, transforms sketches into photorealistic outputs and applies stylistic modifications from references, aiding in massing and presentation workflows (ToolsForHumans, 2025). DreamStudio and Stable Diffusion Online, web-based interfaces for Stable Diffusion, enable both text-to-image and image-to-image generation, often incorporating tools like ControlNet for spatial coherence. (Zhang et al., 2023). These tools are particularly valuable in early design phases, where designers can quickly explore variations in form, materiality, and mood. Hence, it's popularity amongst online design communities in showcasing their workflows for façade studies and conceptual development (Sphilippou, 2025). However, differences in architecture, datasets, and platform training approaches result in significant variability (Ploennigs & Berger, 2023). Figure 1 below shows model architecture and image generation process for some generative AI models. Understanding these distinctions is essential for evaluating both the potential and limitations of generative AI tools—further explored through case studies.

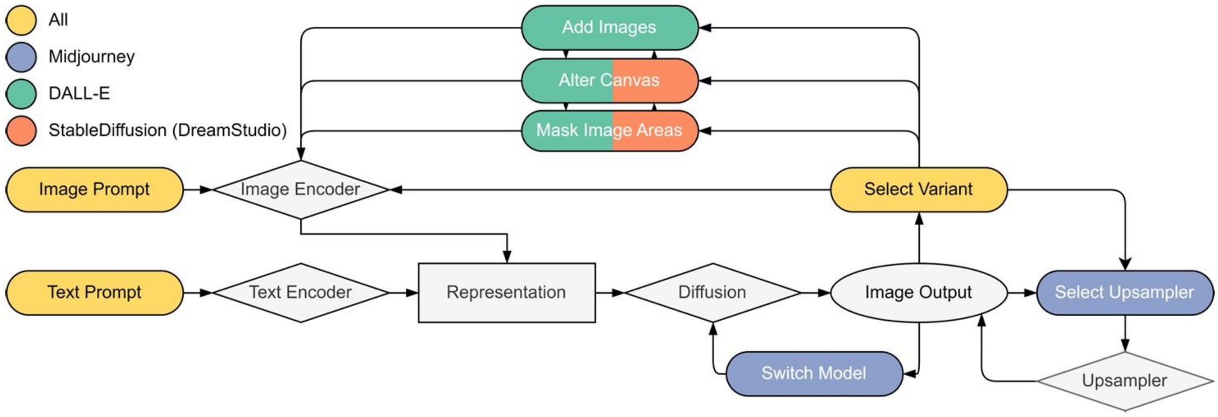

Figure 1: Generative AI model architectures and image generation processes, highlighting common steps (gray) and user interaction points (color) (Ploennigs & Berger, 2023).

Practical Exploration: Case Study in Nigeria

To investigate these tools in practice, a structured visual analysis was conducted using two of my own architectural designs from previous projects located in Nigeria: a residential building and a private home cinema. The goal was to assess how generative AI interprets and reimagines architectural intent across different input types.

- **Test 1 (Text-to-Image):** The first test used text-to-image generation, where I crafted descriptive textual prompts capturing the project's intended form, spatial experience, material expression, and atmosphere. These prompts were submitted to DALL-E 3, LookX AI, Stable Diffusion online and DreamStudio to assess how well each tool transformed text into meaningful and visually compelling representations. Figure 2 below shows the resulting output image generated for the residential building concept. Similarly, Figure 3 presents the resulting output image for the private home cinema.

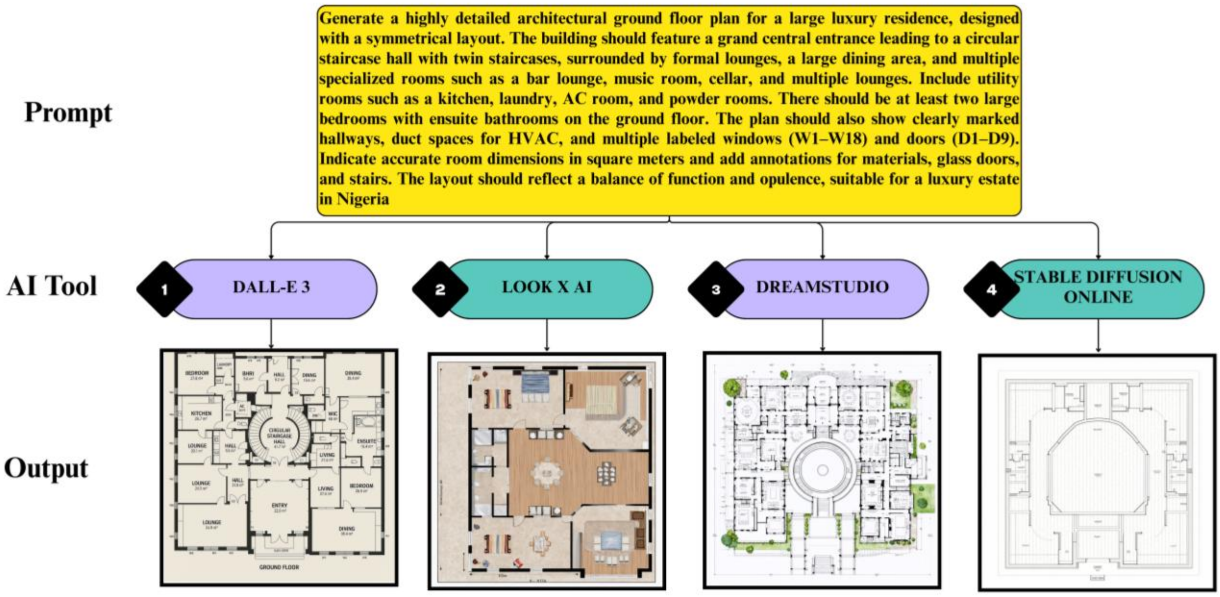

Figure 2: Residential floor plans generated by selected AI models via text-to-image synthesis.

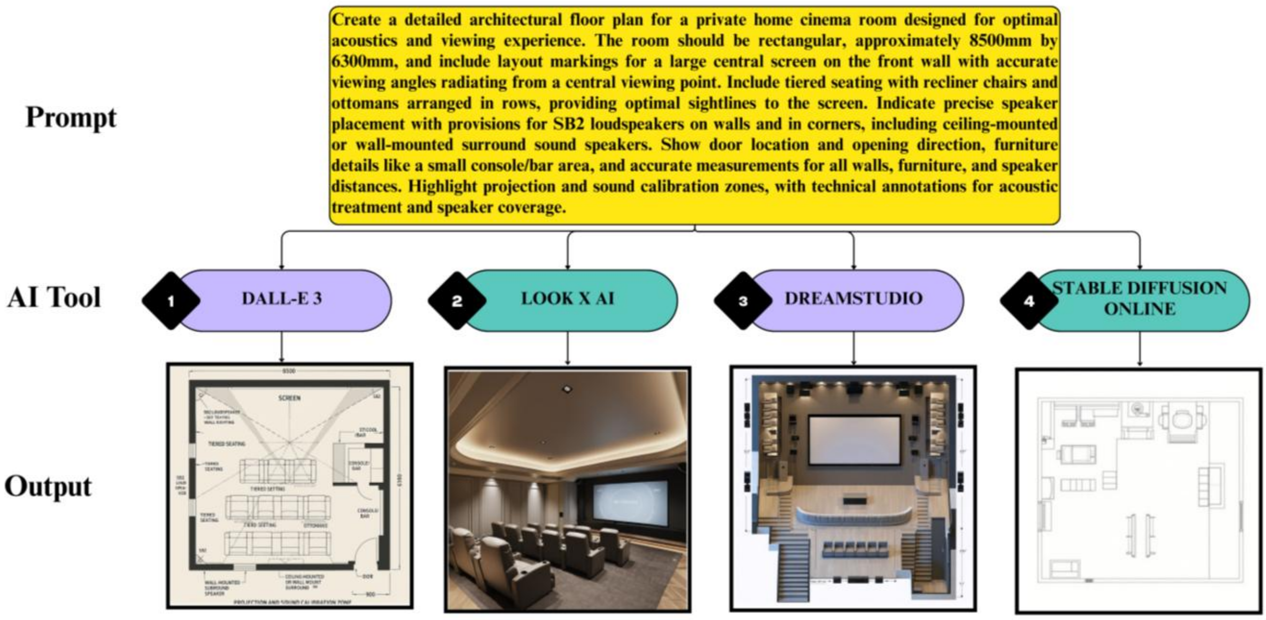

Figure 3: Private cinema room floor plans generated via text-to-image synthesis.

- **Test 2 (Image-to-Image from Plans):** In the second test, I used image-to-image generation with my architectural floor plans as inputs. This involved uploading the floor plans to these platforms, observing the extent to which coherent and contextually appropriate 3D renderings were produced. Figure 4 and Figure 5 below shows the resulting output images for a living room floor plan and the private home cinema room respectively.

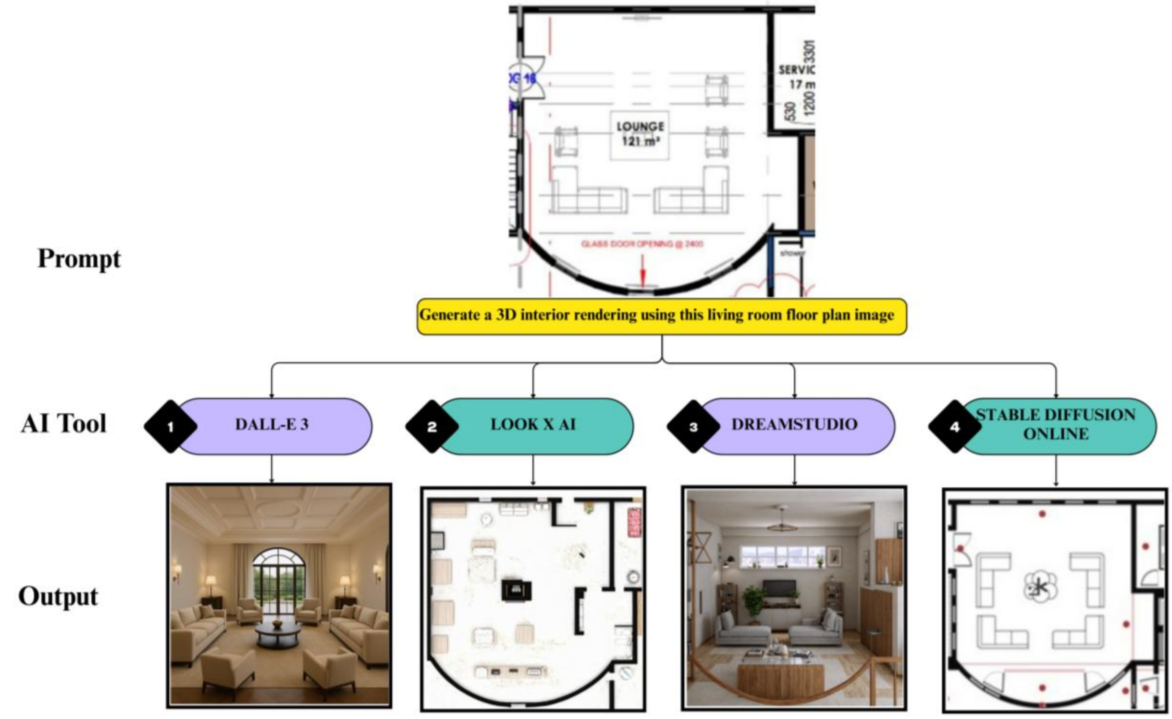

Figure 4: AI-generated living room interior visualizations from image-to-image floor plan input.

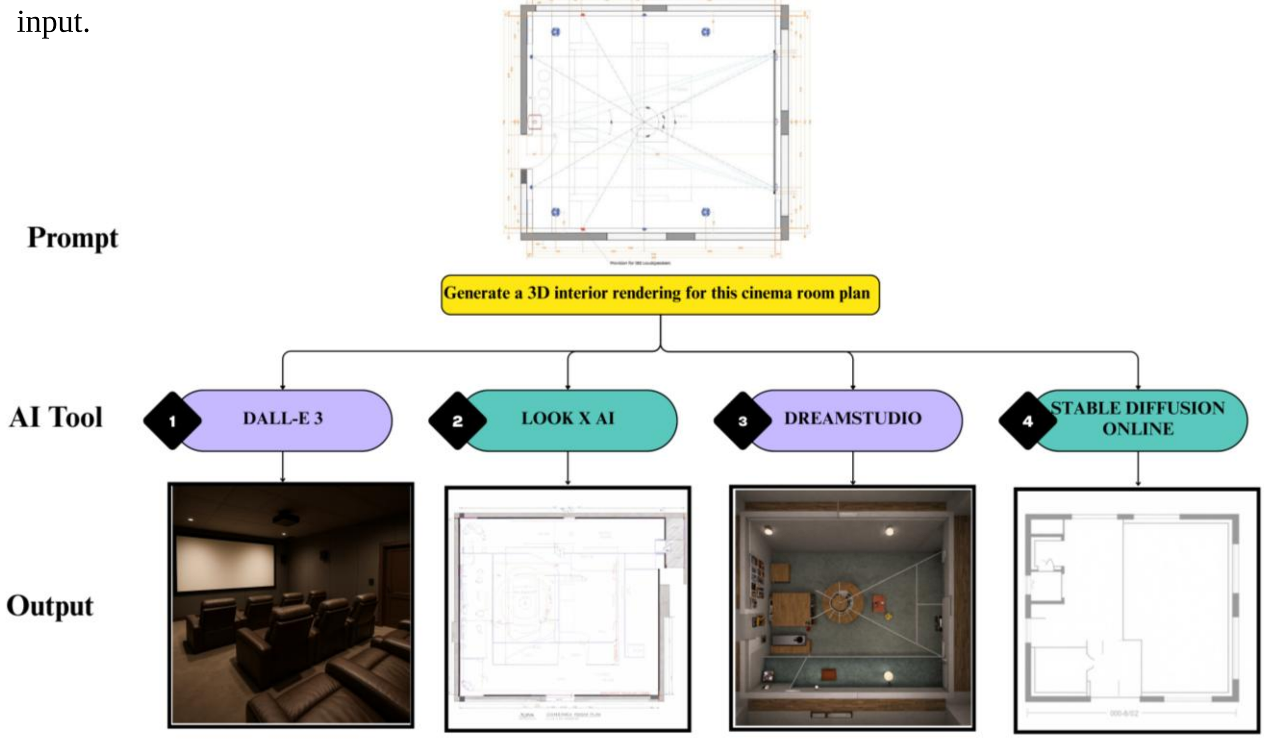

Figure 5: AI-generated private cinema interior visualizations from image-to-image floor plan input.

- **Test 3 (Image-to-Image from 3D Renders):** Lastly, I explored how the tools responded to my existing 3D visualisations produced using traditional modelling software. These images were input into AI tools to generate stylistic reinterpretations, experementing with variations in materials, lighting, and visual atmosphere. This process assessed the models' abilities to reinterpret spatial intent while maintaining coherence. Figure 6 displays the original 3D render and the resulting AI-generated output for the residential project, and Figure 7 shows equivalent outputs for the cinema room.

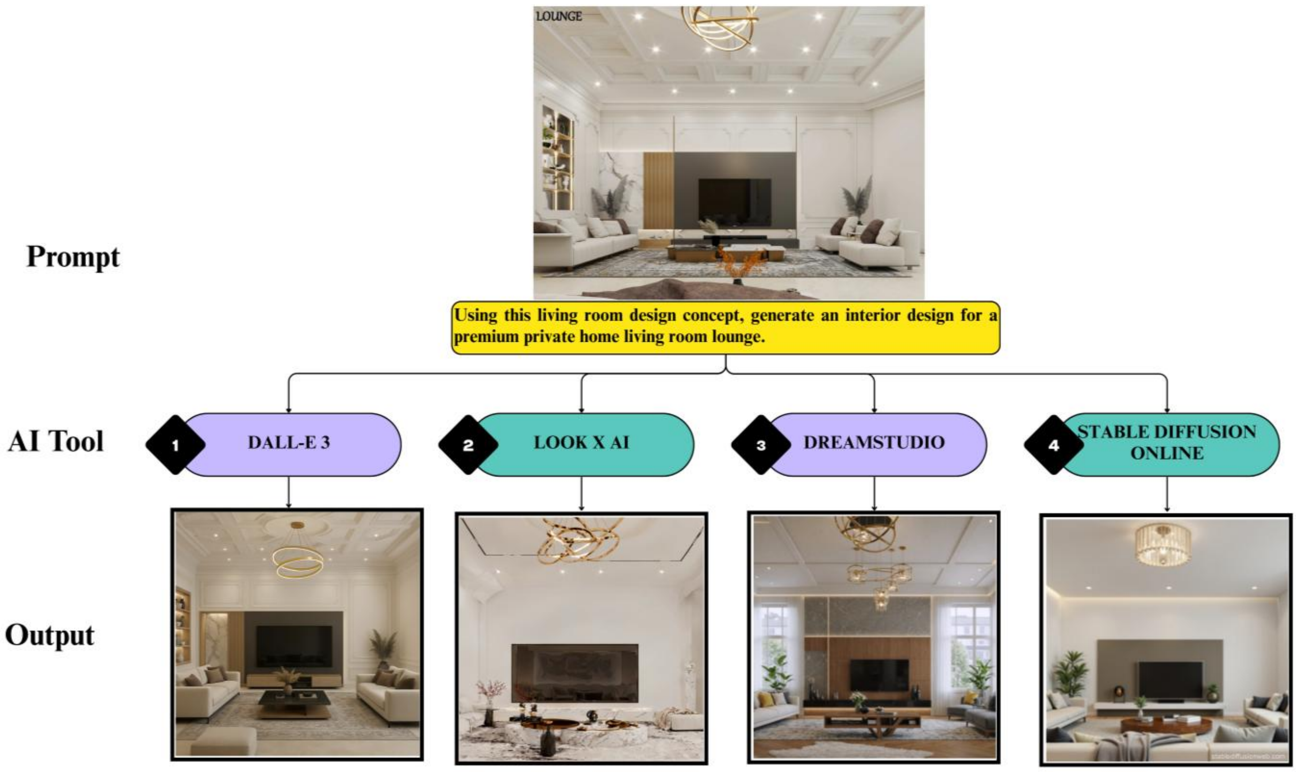

Figure 6: AI-generated residential interior reinterpretations from image-to-image 3D concept design input.

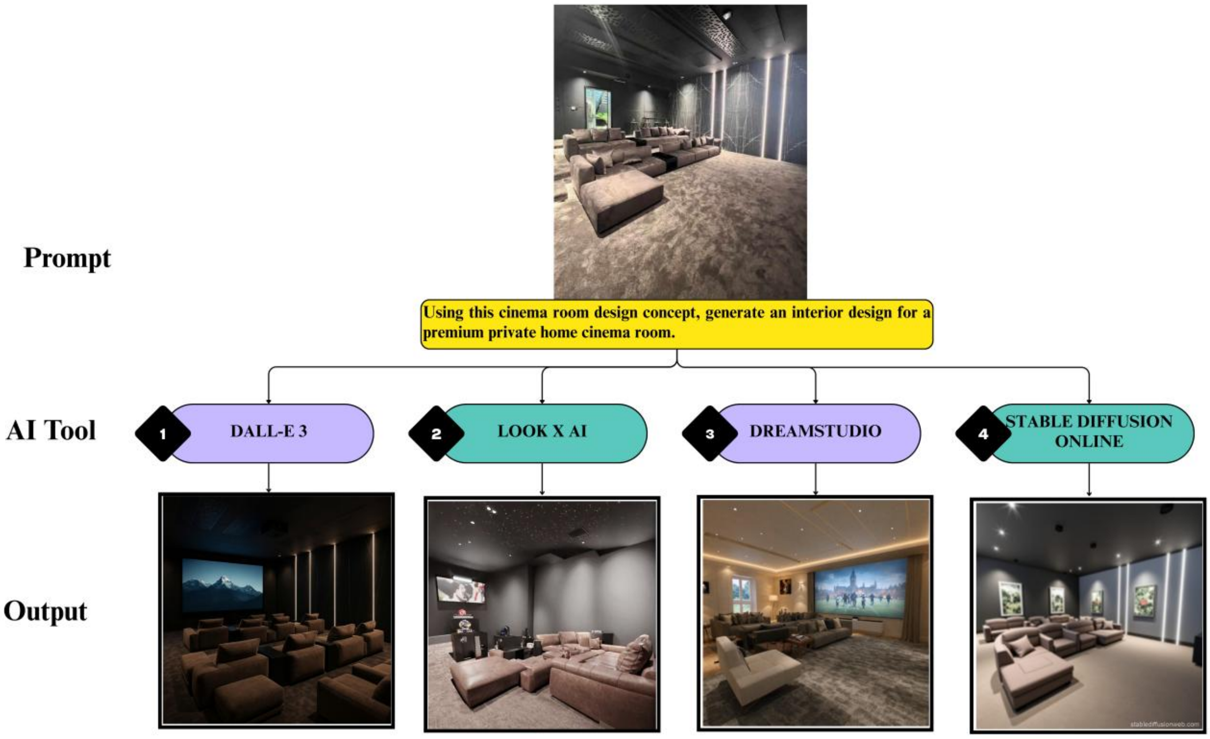

Figure 7: AI-generated private cinema interior reinterpretations from image-to-image 3D concept design input.

- **Analysis of Outcomes**

The experiments conducted, with results illustrated in Figures 2 to 7, reveal key insights into the use of generative AI tools for architectural design concepts. In the first test, where text prompts were used, the models generated spatial compositions reflecting the described atmosphere and functional intentions. However, some limitations were noted. For example, the generated plans often included inaccuracies, such as misplaced bathroom fixtures and stairs. This type of errors highlight a potential gap in AI's understanding of architectural adjacencies and functional requirements, necessitating human especially for technical designs. Additionally, in the cinema room case, LookX AI and DreamStudio produced three-dimensional visualisations despite prompts explicitly requesting floor plans. This suggests that while the tools effectively respond to general intent, they may struggle to precisely interpret functional constraints. However, iterative prompt refinement could improve results over successive generations (better explored with paid version of these models). Likewise in the second test, where floor plans were submitted as input images, only DALL·E produced 3D-like renderings, while other models returned plan views. This behaviour suggests limited depth interpretation in some models. By contrast, in the third test using full 3D design concepts, all tools showed improved visual fidelity. Outputs demonstrated improved spatial consistency and stylistic coherence, though some errors persisted (such as awkward furniture placement or unrealistic screen positioning). These observations indicate that while generative AI tools effectively support visualisation of architectural concepts, they require critical human interpretation. Architects should apply design logic to refine prompts and adjust AI-generated outputs, ensuring functional and contextual accuracy (see appendices for prompts used).

Critical Perspectives on Generative AI in Architecture

While generative AI offers efficiency and conceptual support, its application in architecture is complicated by persistent challenges, including dataset bias, spatial limitations, ethical opacity, and labour implications (Gupta et al., 2025). For instance, AI models are frequently trained on Western-centric datasets, generalising global design norms while neglecting regional specificity (Abbas, 2025), thereby exhibiting Bender et al.'s (2021) concept of "stochastic parrots" by replicating dominant aesthetic patterns without deep contextual understanding. In the Nigerian case studies, generated representations defaulted to international concepts – glossy materials, generic forms, Eurocentric interior layouts, etc. This reflects not just visual mismatch but a form of epistemic erasure, where culturally situated designs are overwritten by what the model *knows*, potentially resulting in designs that feel disconnected or inappropriate for the communities they intend to serve (Mollema, 2025). Similarly, spatial inaccuracies such as illogical adjacencies or awkward scaling also expose the limitations of AI's architectural reasoning. These flaws are more than cosmetic; they show that generative AI might lack embedded spatial logic (potentially due to model or data limitations), reinforcing the need for architects to remain active interpreters rather than passive adopters of AI-generated representations. Also, ethical issues of authorship and accountability arise, where AI models remix from vast and often uncited data sources, raising questions around intellectual property, creative ownership, and model transparency (Chesterman, 2025). Proponents argue the goal is not to reproduce the original works but to train a system to recognise patterns and generate new novel outputs. According to the Association of Research Libraries (2024), AI models function as new tools, distinct from the expressive purpose of the training data. Nonetheless, McQuillan (2022) contends that generative AI is not a neutral tool but a socio-political actor capable of reinforcing dominant ideologies, supporting Stark & Crawford's (2019) call for greater scrutiny of the "black box" nature of training pipelines. Likewise, concerns on labour impact also emerge. Entry-level tasks like rendering are increasingly automated, threatening foundational learning opportunities vital for junior architects' development of architectural literacy (Tschang, 2020). Infact, a 2024 Royal Institute of British Architects (RIBA) report noted over 36% of architects surveyed view AI as a threat to the profession, highlighting the risk of diminishing the profession’s knowledge pipeline. Not only that, over-reliance on generative tools may recode architectural creativity itself. By prioritising stylistic variation over conceptual originality, AI risks reinforcing dominant aesthetics and marginalising radical or speculative approaches (Zhou & Lee, 2024). Consequently, these concerns poses a challenge not only to innovation but to the idea of authorship. Walter Benjamin’s notion of the “aura” is particularly relevant here. While he argues that the aura is diminished through mechanical reproduction, in AI-generated architecture, one might contend that the aura is not lost, but reconstituted through the designer’s interaction with the generative process. The concept of algorithmic aura captures this shift. It is not attached to the final artefact, but to the architect's iterative, interpretive labour of co-creation, especially visible in processes like prompt refinement, aesthetic curation, and critical filtering of outputs. As a result, different tools produced variations not only in style but in how much authorship was required to shape usable results (Fritz, 2025) – suggesting that algorithmic aura is relational and depends on the intensity and complexity of human-AI exchange. This concept positions AI-human interaction as a site of creative authorship rather than a loss of originality. Although, "algorithmic aura" risk becoming a metaphor for aesthetic novelty, masking the embedded biases of the tools (Donnarumma, 2022). However, its theoretical value lies in acknowledging this tension, therefore making visible the often-invisible labour architects perform when working critically with AI – a collaboration that could be of greater benefit when used responsibly.

Toward Responsible AI Integration in Architecture

Responsible AI integration requires more than adopting new tools; it demands a rethinking of the relationship between designer and machine, from passive automation to active augmentation (Miller, 2019). One possiblity is developing custom-trained models using culturally attuned or locally sourced datasets (Wei, 2025). For instance, fine-tuning models on datasets featuring specific regional typologies is being explored as a way to produce outputs more aligned with situated aesthetics and expectations (P. Li et al., 2024). Also, some design platforms are gradually reflecting how architects could collaborate with AI. For instance, Planner 5D retains user control in AI-assisted configurations. Similarly, designers are pioneering workflows where AI acts as a sketch partner – amplifying ideation while preserving authorship (Cousins, 2024). These examples demonstrate a growing recognition that AI should extend, not replace, architectural creativity. Still, the vision of collaborative AI is not without barriers. Critics argue that unequal access to training resources risks entrenching existing hierarchies (Timcke, 2025). Smaller firms or those in the poorer regions may lack the infrastructure to fine-tune models, raising concerns about equity (B. Li & Mostafavi, 2024). However, open-source platforms like Hugging Face and AfricanSpaces show that decentralised, community-led efforts can democratise access to AI customisation (AWS Editorial Team, 2025). Also, there are concerns that localising AI models does not automatically eliminate bias (Salmani & Lewis, 2024), and if datasets are curated through narrow lenses, they risk perpetuating exclusion (Belenguer, 2022). However, scholars have argued that such complexities are not inherently a flaw but a design variable – one that can be mitigated through pluralist curation and reflexive governance (Bratton, 2022). This reframes bias as a challenge to be worked with, rather than avoided. Furthermore, to ensure generative AI enhances rather than undermines architectural concepts, three core conditions should be considered. First, explainable AI (XAI) should become standard. Tools that clarify how representations are generated empower users to critique and refine outputs (Bryan-Kinns et al., 2025). This aligns with accountability frameworks, similar concept promoted by researchers like Stark and Crawford (Rasaq, 2025). Also, developers such as Anthropic are advancing interpretability methods that could be adapted to architectural contexts (Kahn, 2025). Second, training datasets must be diversified across geography, typology, and history (Palmini & Cetinic, 2024). Without this, AI risks reinforcing uniform, Western-style minimalism. Research has shown that incorporating cultural diversity enhances both model versatility and design innovation (Fabrique, n.d.). Third, architectural education must evolve. AI literacy should be incorporated and extend beyond software proficiency to encompass data ethics, algorithmic critique, and theoretical fluency. Students must learn to see AI as a sociotechnical system – one that reflects human values and power structures – supporting McQuillan's (2022) call for dismantling the myth of technological neutrality in design education. Similarly, studies have shown that when employed appropriately, generative tools foster speculative and interdisciplinary thinking (Leach, 2022). While some might argue that AI may erode creative agency (Wade, 2024), others see hybrid workflows as a route to reclaim it (Anantrasirichai & Bull, 2022). Human expertise – cultural, ethical, and spatial – combined with AI's speed and variability, could yield not just efficiency, but novel design methodologies (Mandvikar & Dave, 2023). The key is ensuring that collaboration enriches rather than homogenises imagination. Ultimately, generative AI use in architecture should be equally accessible, more generalised and contextually aware.

Conclusion

This essay has examined the opportunities and limitations of generative AI in architectural workflows through direct experimentation and theoretical reflection. It argues that while generative AI tools can enhance early-stage visualisation, they cannot replace the human architect. Their outputs often lack contextual awareness, spatial precision, and ethical clarity, underscoring the continuous importance of human judgement in shaping architectural representation. Through practical engagement, I now view generative AI not as an autonomous designer, but as a responsive collaborator, a stance which continues to shape my evolving approach to designing with these tools. Also, the proposed concept of algorithmic aura seeks to capture the distinct form of authorship that emerges from these hybrid processes – redefining, rather than erasing, creative agency. Future research directions include training AI on localised datasets and studying the long-term impact of AI adoption on early-career development. Lastly, AI's role in architecture must be guided by human values, not merely data patterns. With the right frameworks, generative models can enrich the discipline without displacing its core. While I acknowledge that with rising investments in AI and AGI by companies such as OpenAI, Deepseek, and even Governments (GOV.UK, 2025; OpenAI, 2025; South China Morning Post, 2025), these limitations may not be permanent and my views might shift, for now, such tools must remain supervised by human architects. As these technologies evolve, we must examine not only what they generate, but also what they may ultimately redefine. The future of architecture will be co-authored, not automated.

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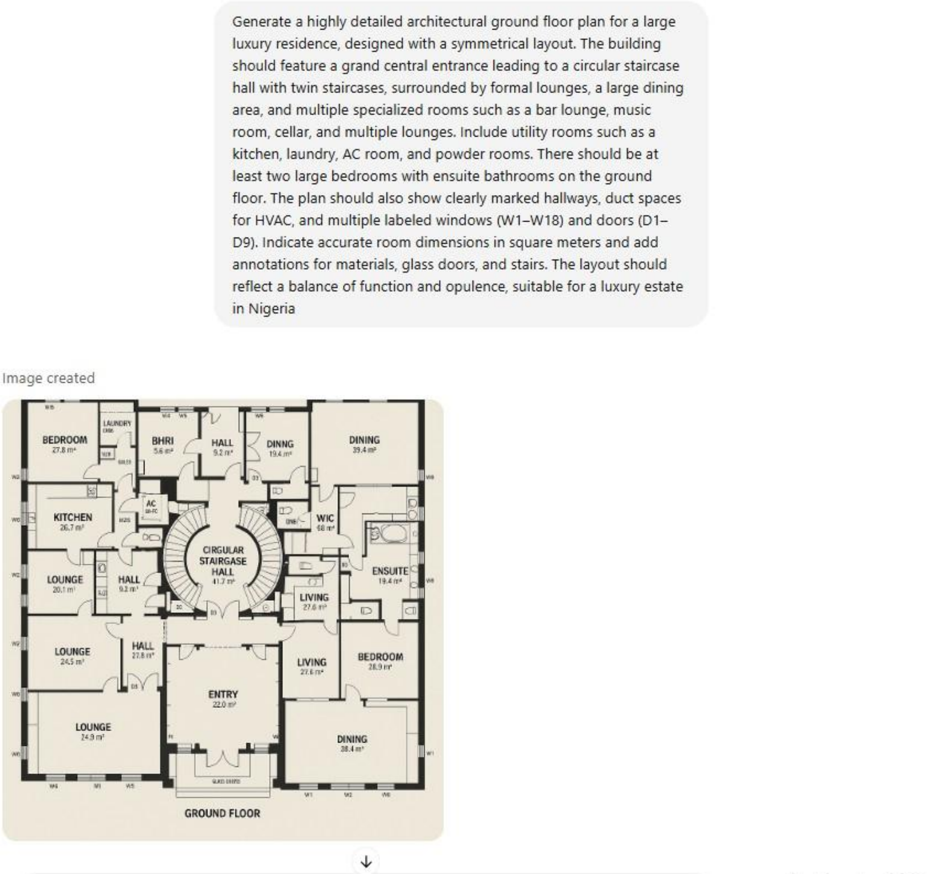
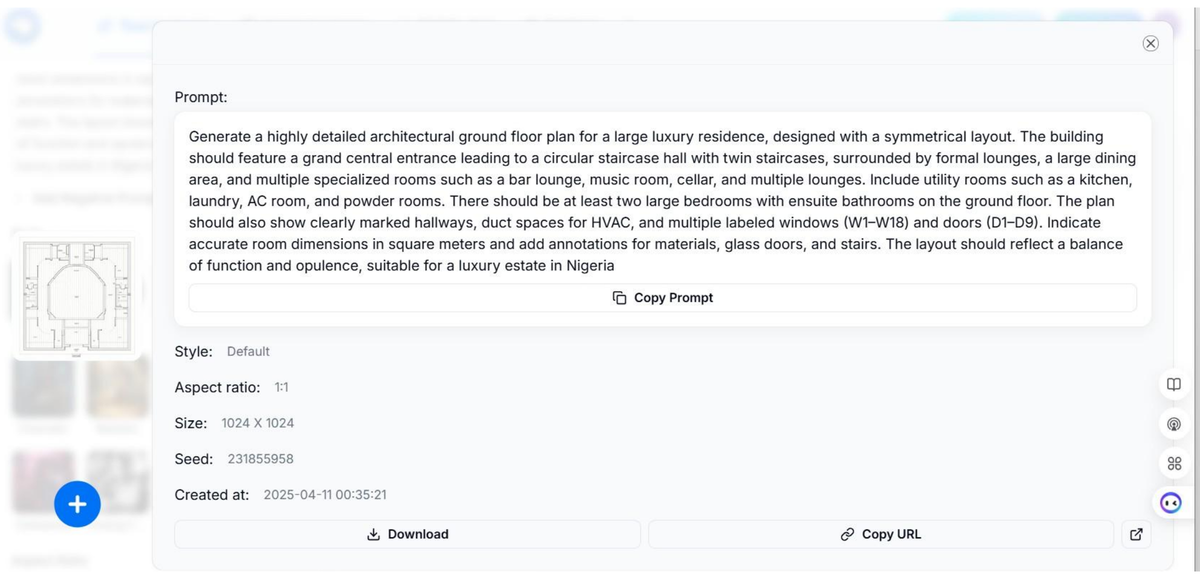
Appendices

Appendix 1: Prompts and Outputs for Residential Building Concept (Text-to-Image)

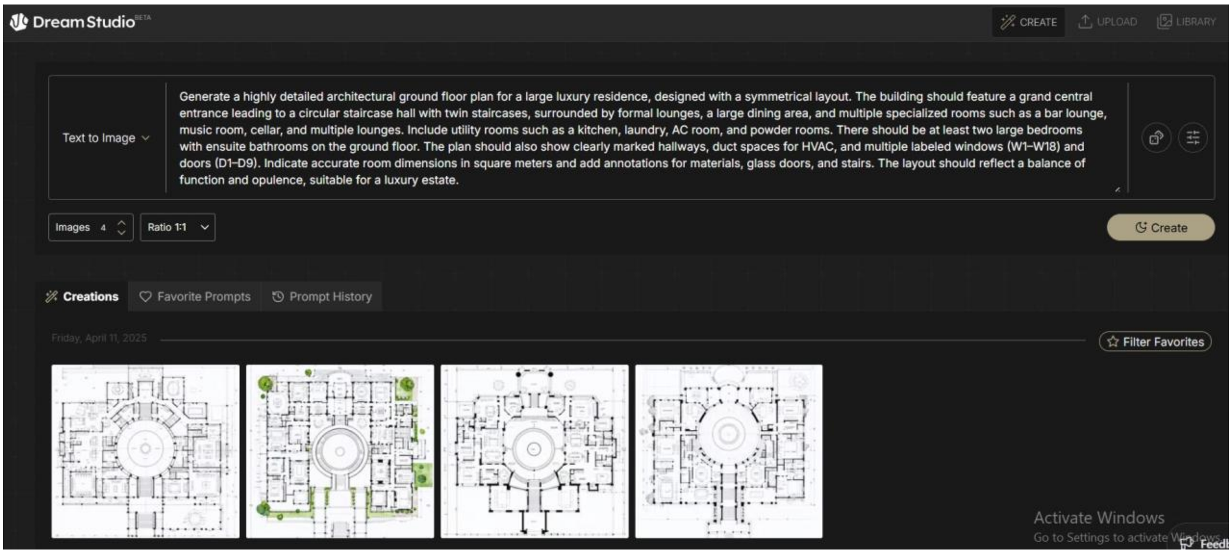


DALL E



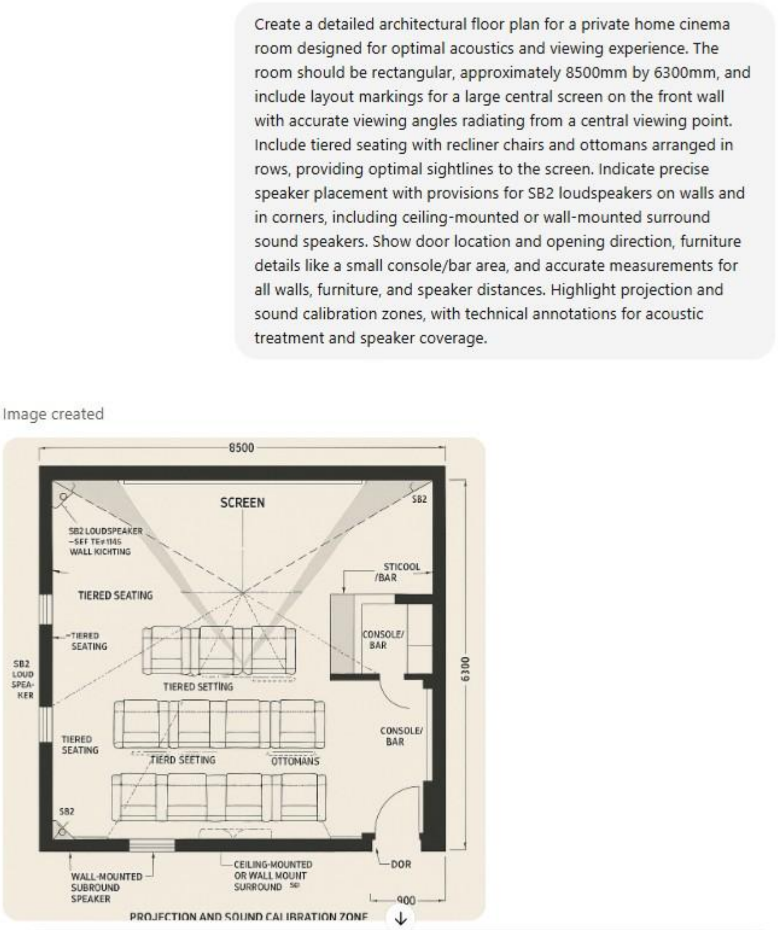
Stable Diffusion Online

Look X AI

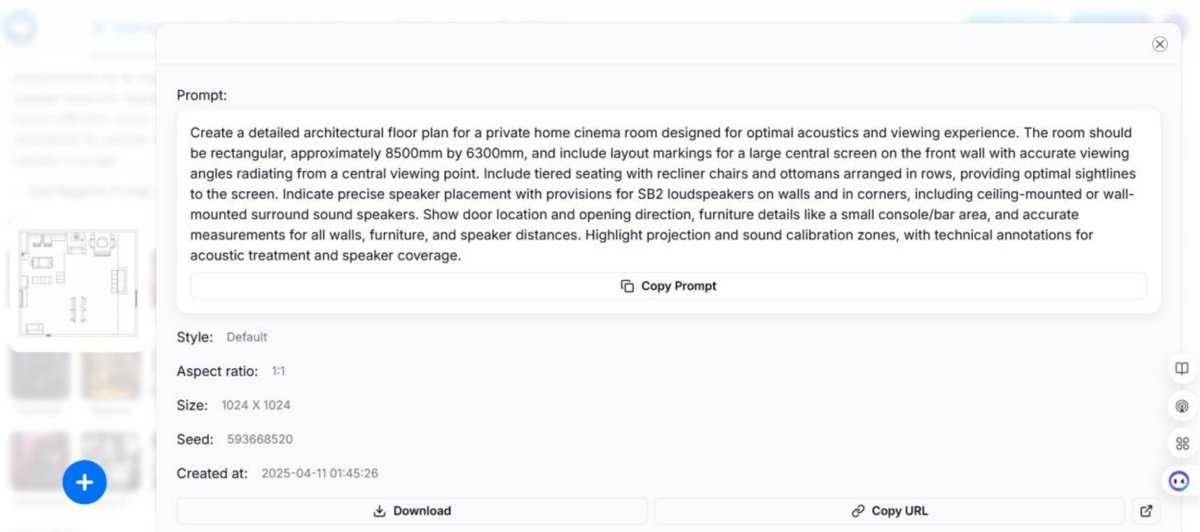


Dream Studio

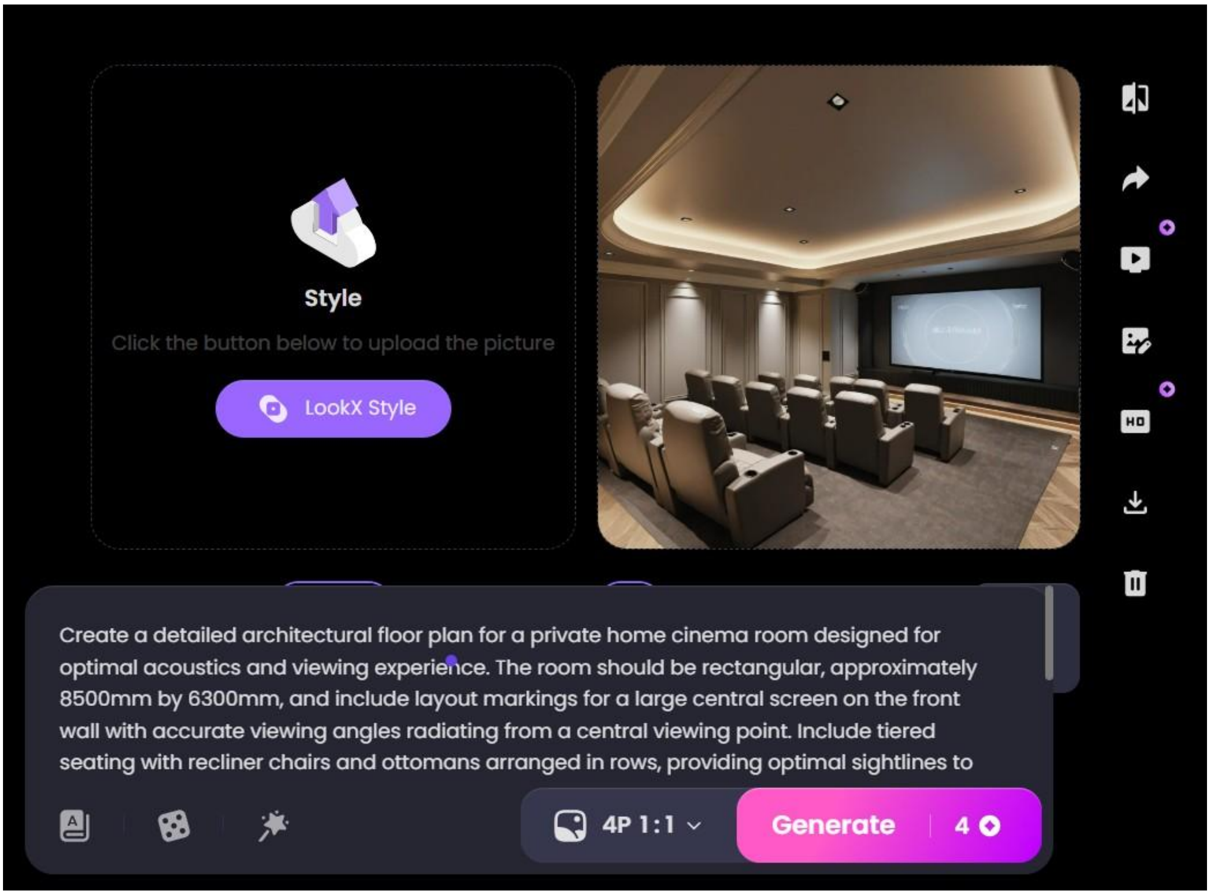
Appendix 2: Prompts and Outputs for Private Home Cinema Concept (Text-to-Image)



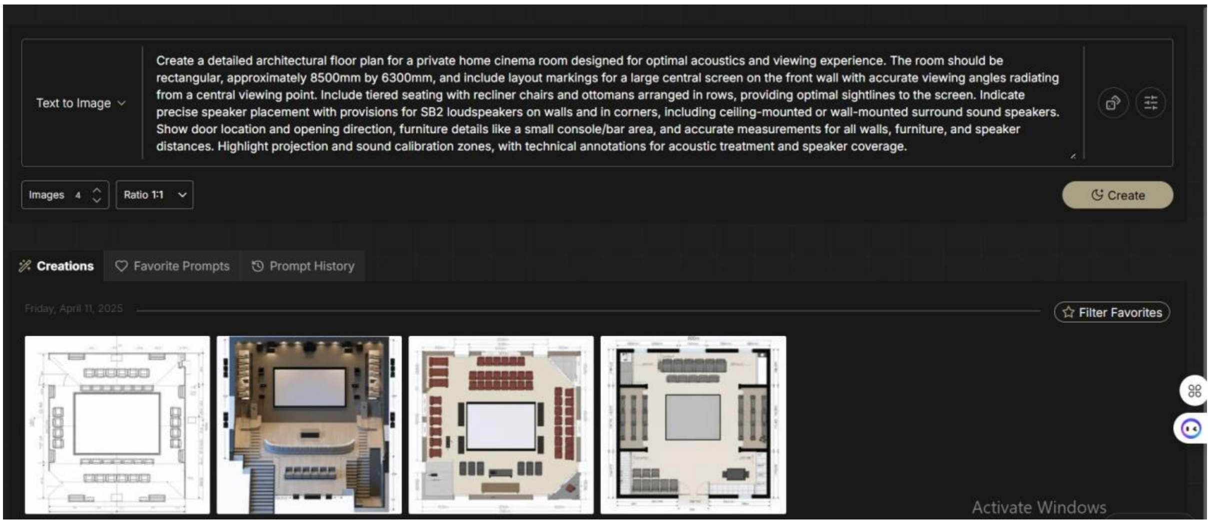
DALL E



Stable Diffusion Online

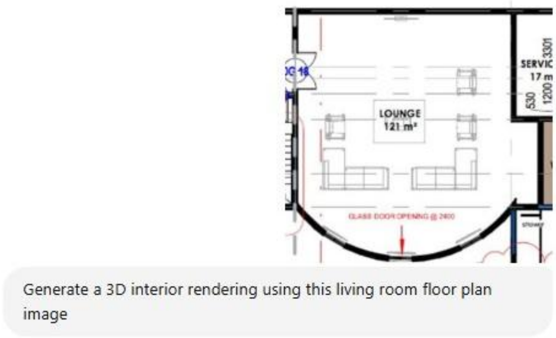


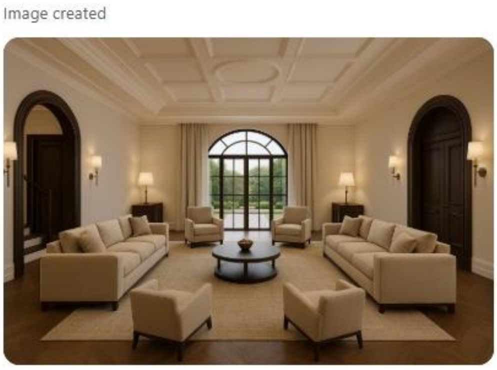
Look X AI



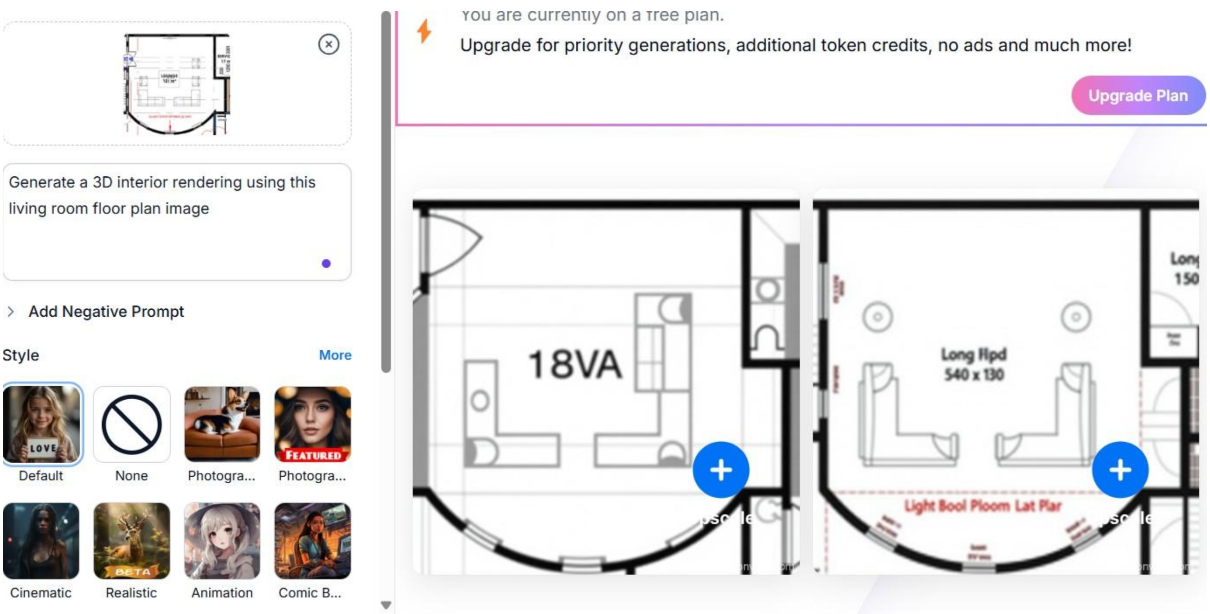
Dream Studio

Appendix 3: 3D Render Prompts for Living Room Section (Image-to-Image from Plans)

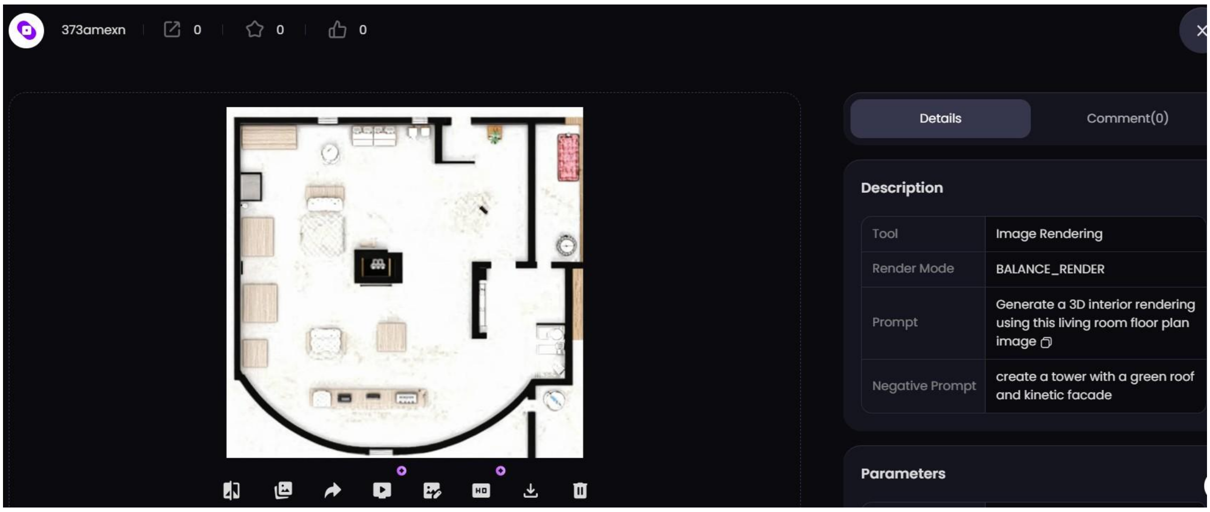




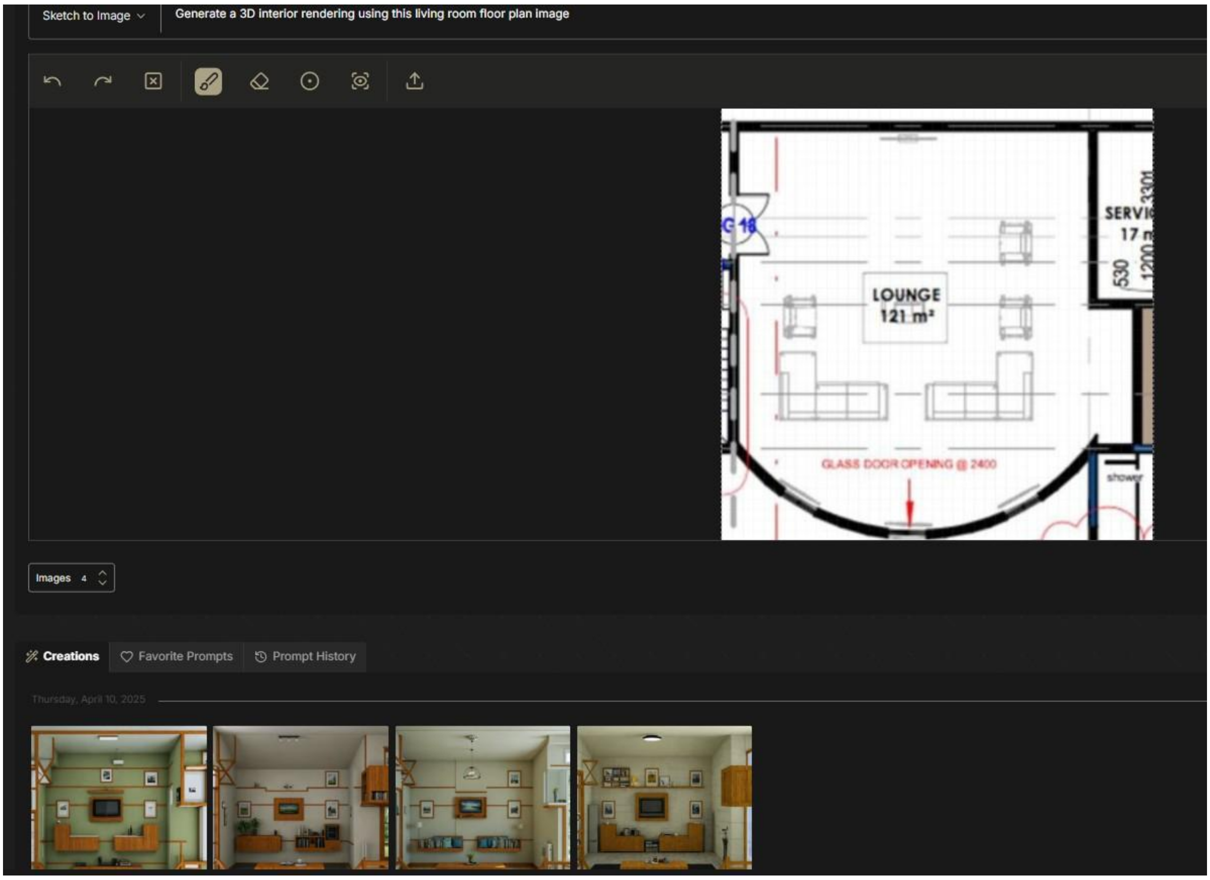
DALL E



Stable Diffusion

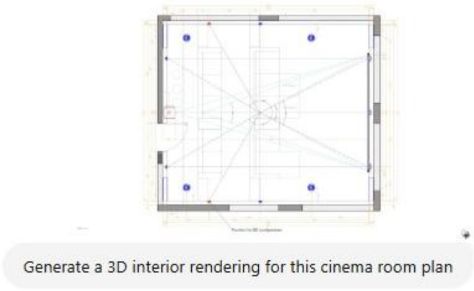


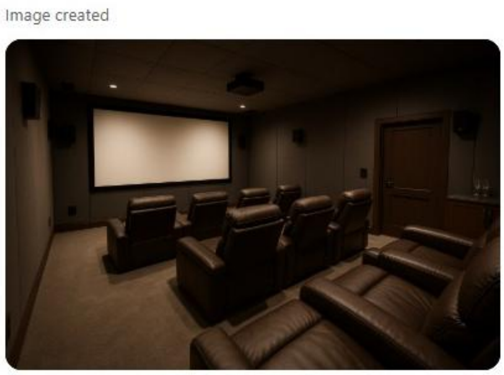
Look X AI



Dream Studio

Appendix 4: 3D Render Prompts for Home Cinema Room Section (Image-to-Image from Plans)





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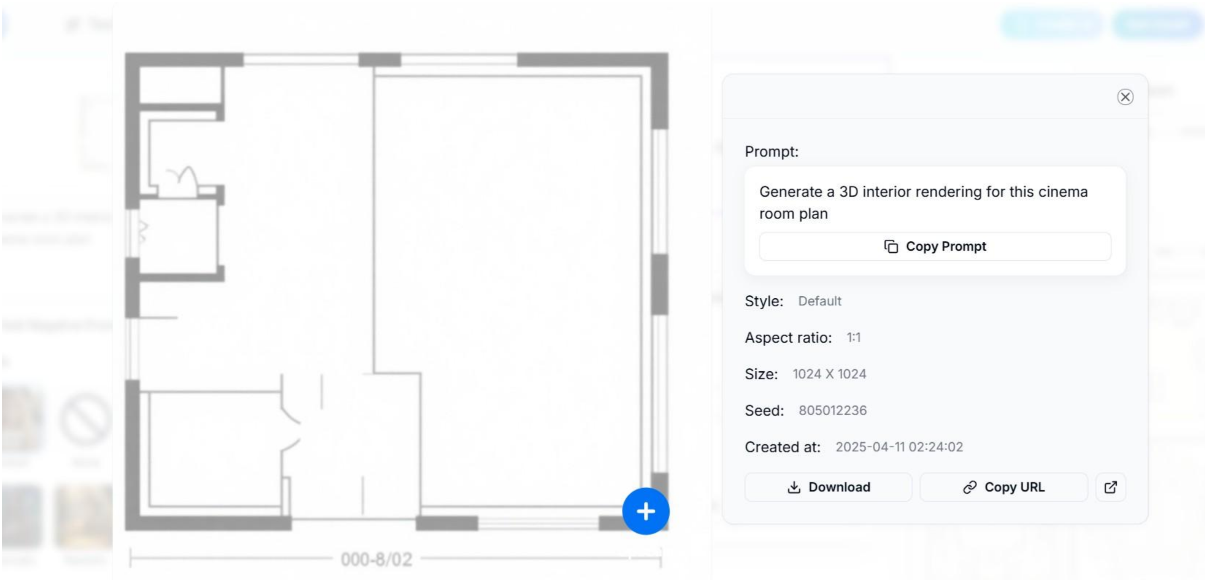
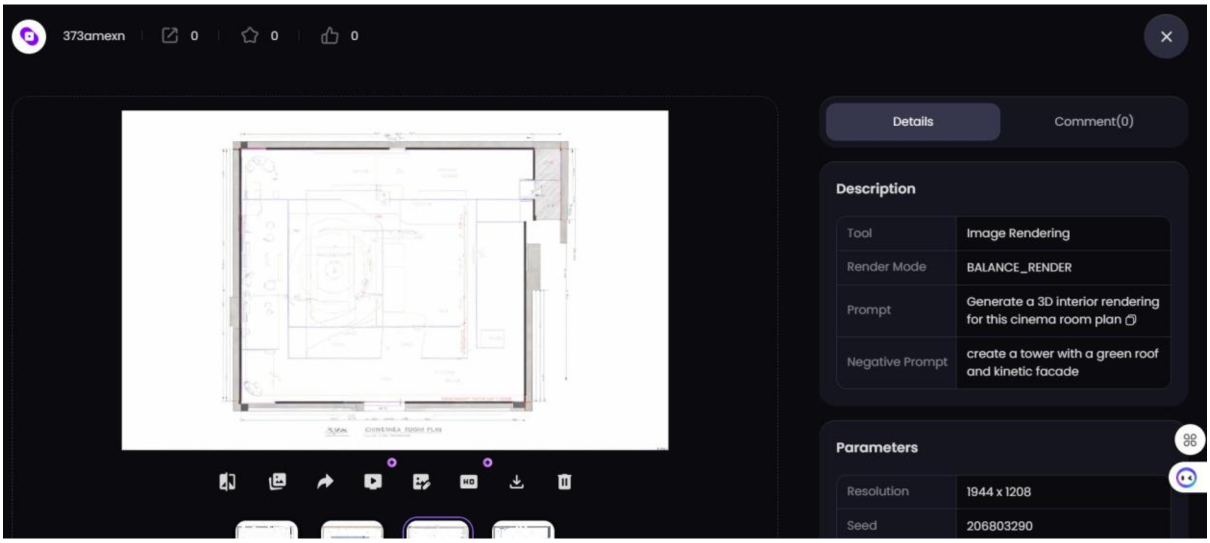
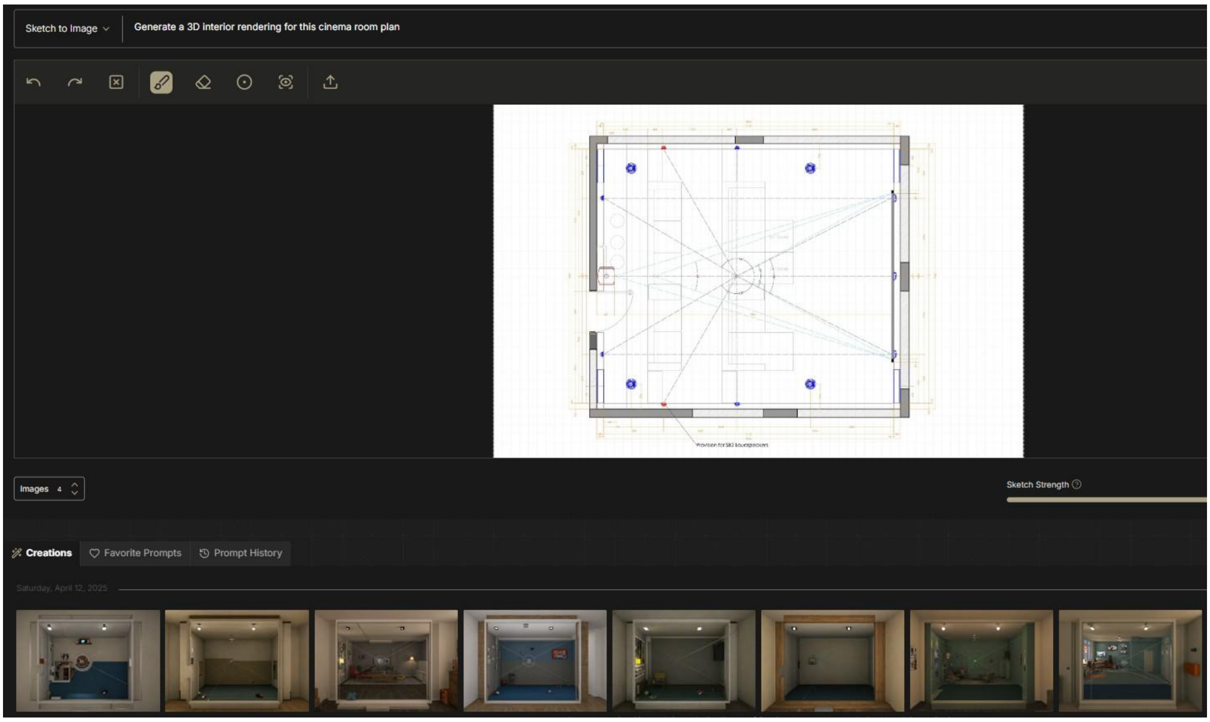


Stable Diffusion

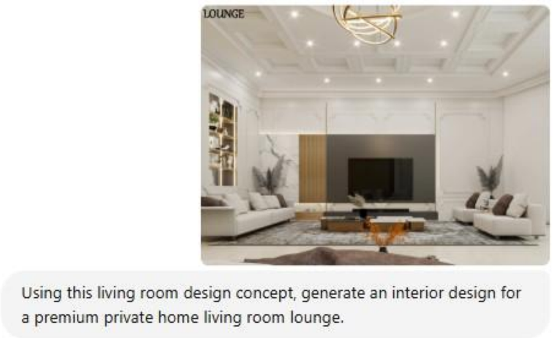


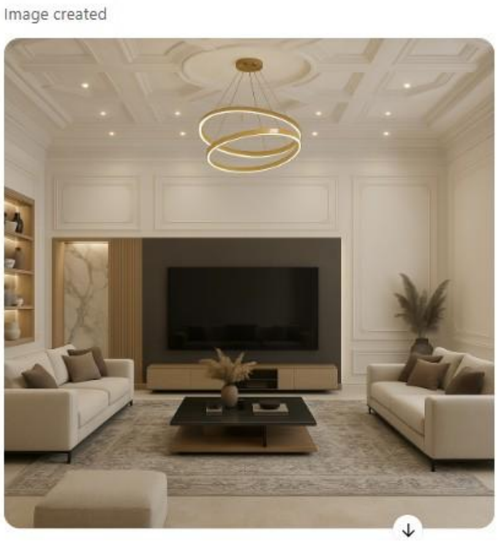
Look X AI



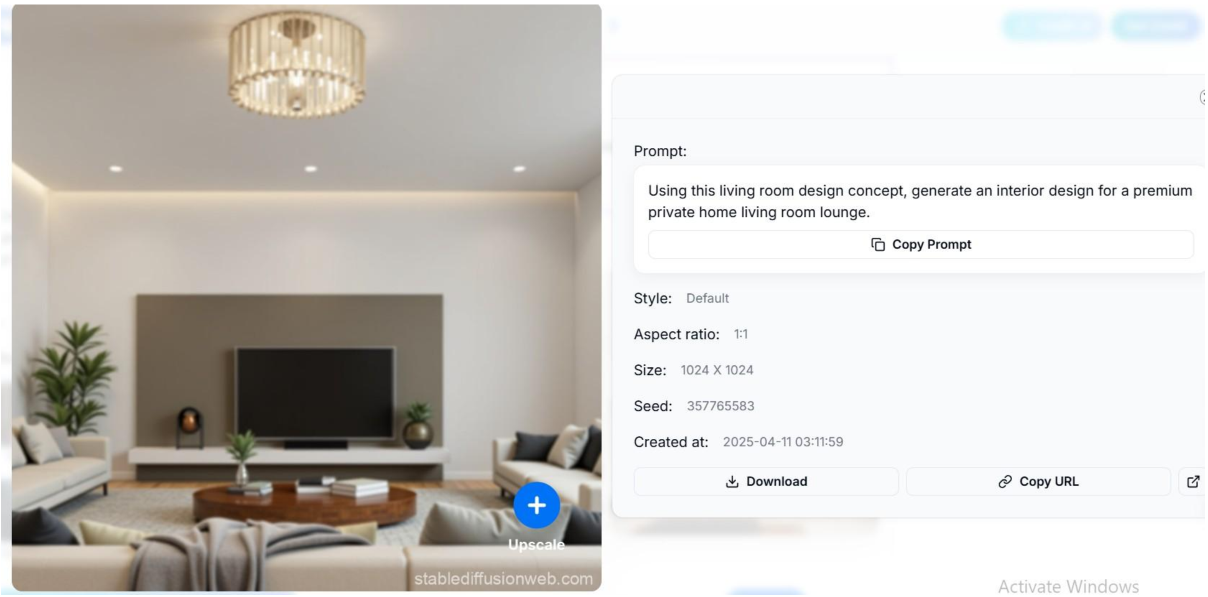
Dream Studio

Appendix 5: 3D Render Prompts for Living Room Section (Image-to-Image from 3D Renders)

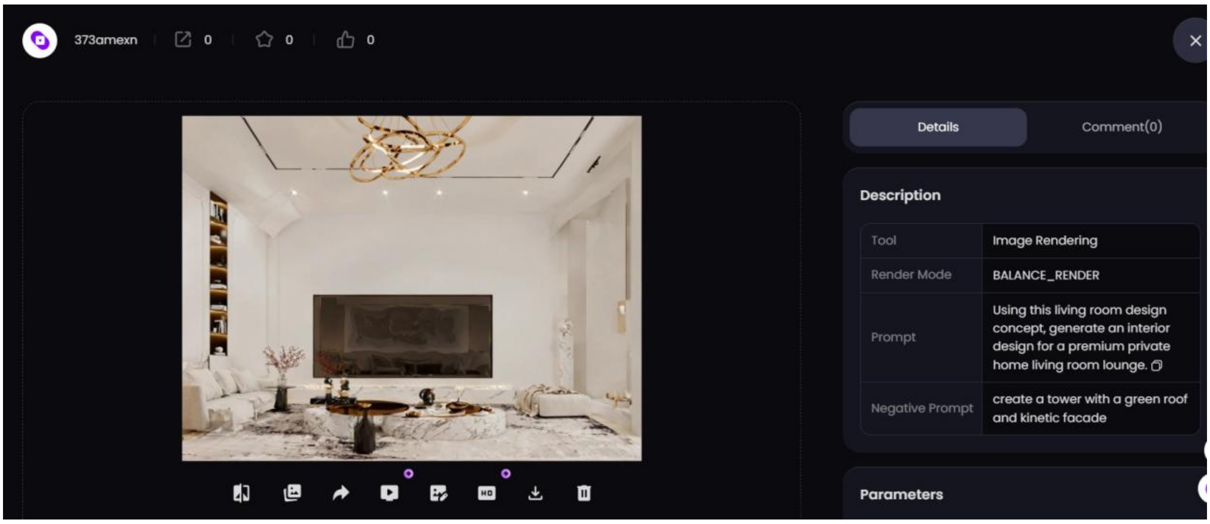




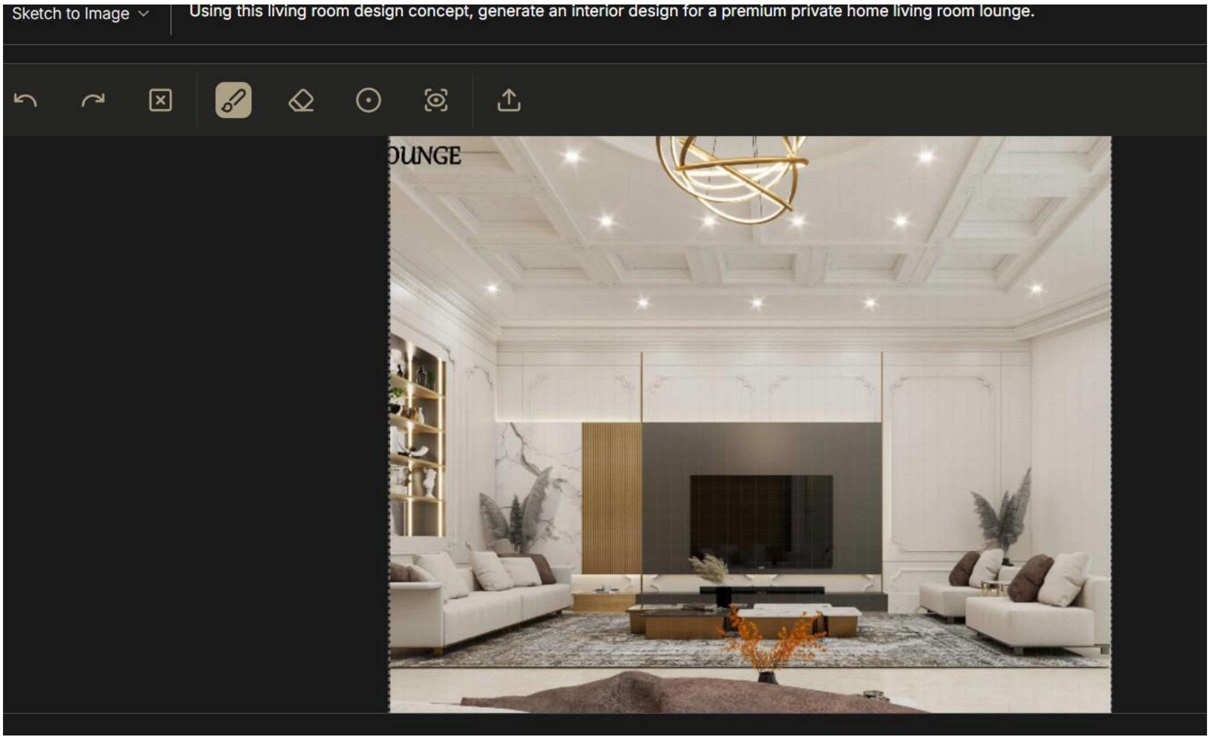
DALL E



Stable Diffusion

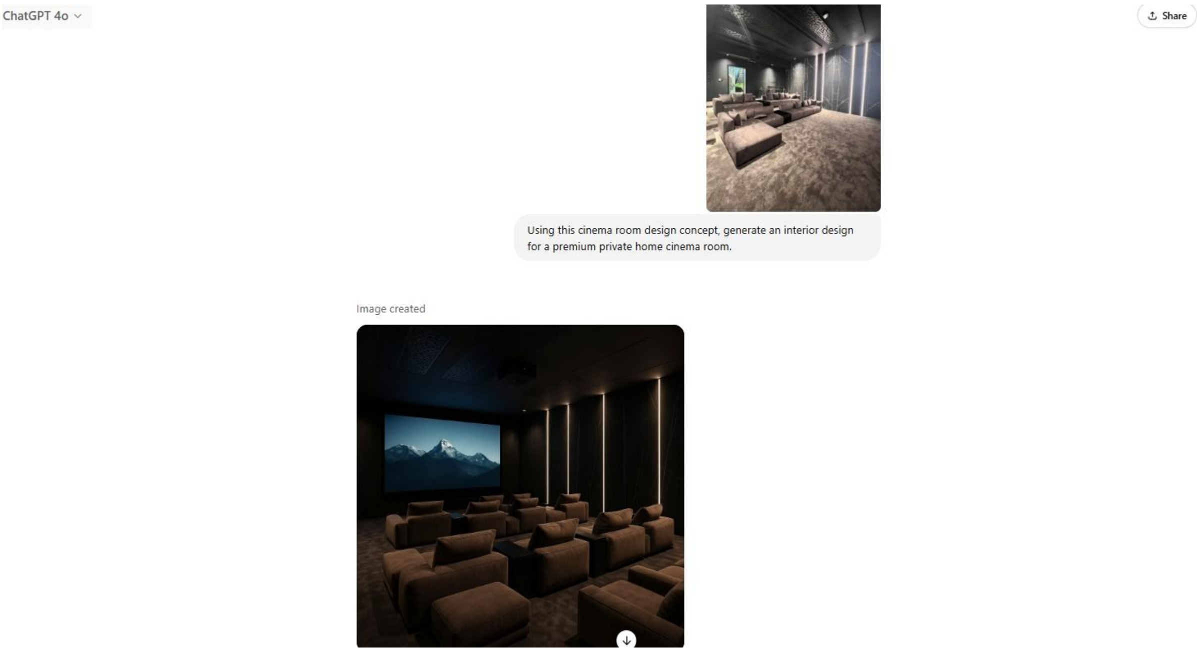


Look X AI

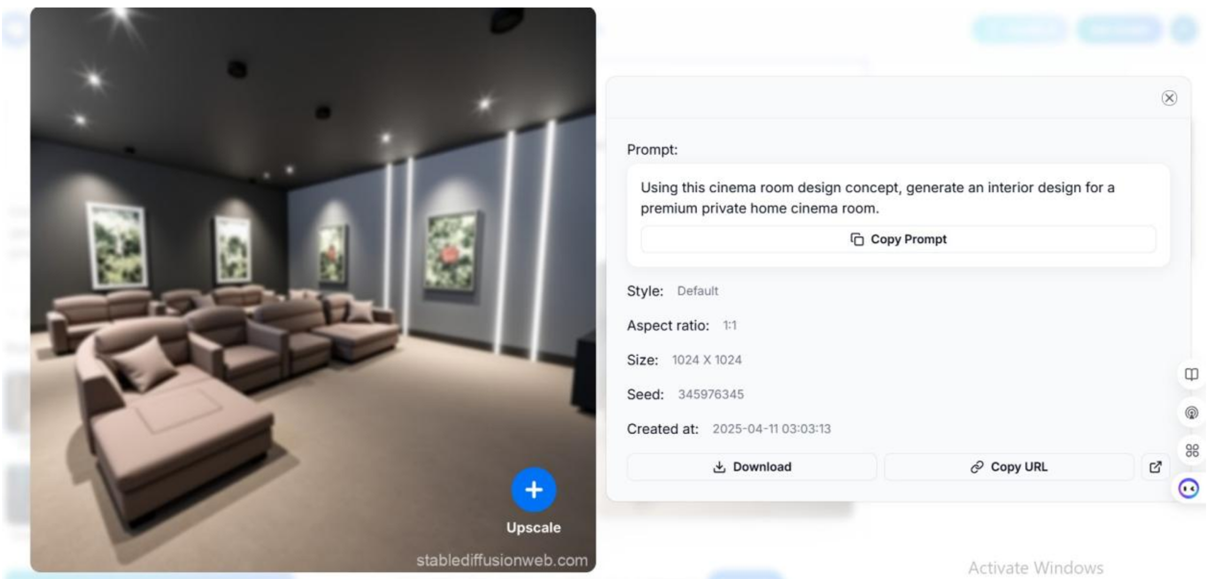


Dream Studio

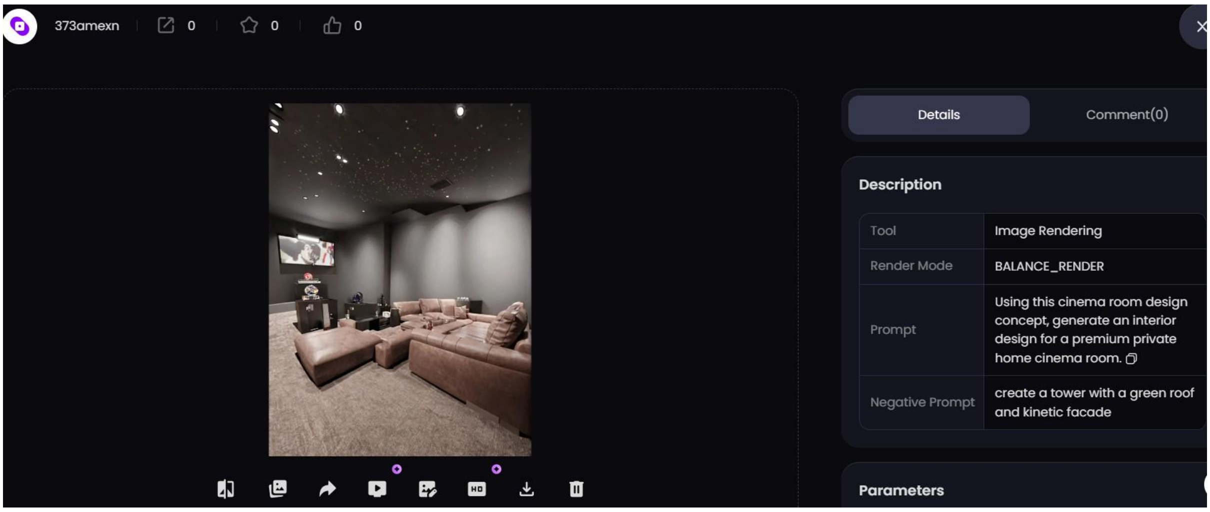
Appendix 5: 3D Render Prompts for Home Cinema Project (Image-to-Image from 3D Renders)



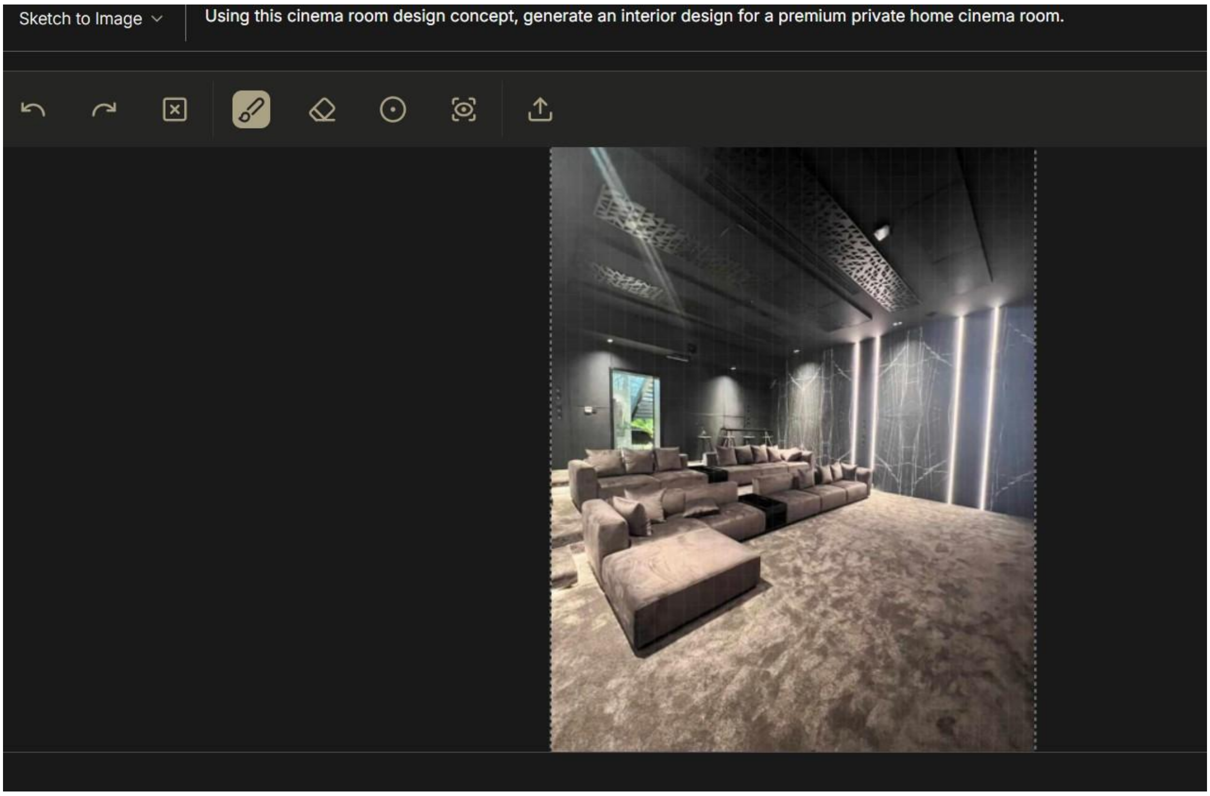
DALL E



Stable Diffusion



Look X AI



Dream Studio