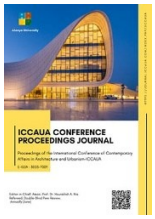

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AI and Louis Kahn's Exeter Library: Reimagining Monumentality, Materiality, and Human Experience through Generative Design

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A b s t r a c t

This research paper explores a central and timely question: Can artificial intelligence understand architectural meaning? Using Louis Kahn's theory of "served" and "servant" spaces as a philosophical framework, the study investigates how AI interprets architecture beyond formal simulation into the realms of ethics, atmosphere, and symbolic structure. As one of Kahn's most iconic works, the Exeter Library exemplifies monumental form, human-centred space, and material spirituality. By generating visual outputs using MidJourney and evaluating them through five analytical categories—monumentality, spatial order, light, material, and semiotics—this research examines whether AI can approximate meaningful architecture's emotional and metaphysical essence. While AI tools offer impressive capabilities regarding efficiency, environmental responsiveness, and form generation, they often struggle to grasp the humanistic, symbolic, and moral dimensions embedded in architecture. This paper argues that when guided by architectural theory and evaluated through semiotic frameworks, AI can act as a generator of form and as a reader of architectural values.

K e y w o r d s : Architectural Design and Artificial Intelligence, Architectural Theory and Criticism, Architectural Semiotics, Louis Kahn, Exeter Library, Generative Design.

1. Introduction

"Monuments are human landmarks, which men have created as symbols for their ideals, for their aims, and for their actions. They are intended to outlive the period which originated them and constitute a heritage for future generations. As such, they form a link between the past and the future."
— Nine Points on Monumentality, J. L. Sert, F. Léger, S. Giedion (1993)

In contemporary architectural design, artificial intelligence (AI) reshapes how buildings are conceptualised, simulated, and executed (Amen 2024). While AI tools offer impressive capabilities regarding efficiency, environmental responsiveness, and generative form-making, they often struggle to grasp the humanistic, emotional, and metaphysical dimensions that define significant architecture (Aziz Amen 2017; Aziz Amen and Ahmad NIA 2021; Aziz Amen and Nia 2018) . This dissonance between technological innovation and architectural soul makes it timely and necessary to revisit architects like Louis Kahn, whose work continues to resonate for its timeless expression of space, light, and moral purpose. Kahn's role is that of both a victim and an avenger. He was a victim because modernism forcibly separated him from the classism of his education and background. At the same time, he acted as an avenger through his work, which sought to restore classicism despite its modernist leanings and suggested ways the international style could evolve. (Brownlee & Long, 1997, pp 16-18).
Kahn's architecture is distinguished by its spiritual gravity, material honesty, and philosophical clarity. His ability to transform structure into symbol and material into meaning offers a critical lens through which we can assess AI's limitations and latent potential in architectural practice. The Phillips Exeter Academy Library stands out in this discourse as a pinnacle of Kahn's mature architectural language and as a living monument that organises space through harmony, invites contemplation through light, and orchestrates silence and movement through geometric order. Its spatial zoning into "served" and "servant" functions reflects an architectural logic that is as ethical as it is functional (figure 1).

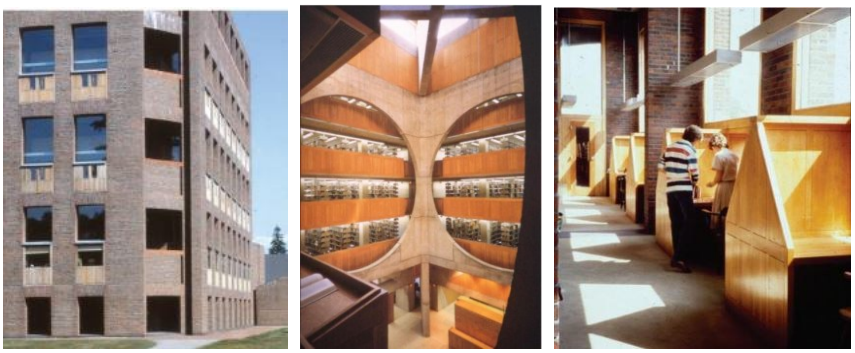


Figure 1. Exeter library and interior (Smith 2014, pp. 82-83).

This research, therefore, asks a deceptively simple yet essential question: Can artificial intelligence understand architectural meaning? What does it mean for a machine to design with silence or the sacred in mind? Can AI be trained to produce buildings and interpret architectural intention—to sense the difference between form and feeling, function and spirit? Through a detailed study of the Exeter Library and engaging with contemporary AI tools—such as generative image models, multimodal semantic evaluators, and prompt-based simulation—this project positions Kahn not as a relic of the past but as a vital interlocutor in the architectural future.

By bridging Kahn's legacy with the emerging logic of AI-assisted design, this paper contributes to a dual discourse: it deepens our understanding of Kahn's continuing relevance in the digital age while also exposing the ethical and conceptual gaps that AI must confront if it is to design spaces that are not only intelligent—but also intentional.

2. Literature Review / Theoretical Framework

At the heart of this research lies a fundamental question: *Can artificial intelligence understand architectural meaning?* Meaning in architecture is not limited to form or function—it is embedded through spatial hierarchy, light, material, and symbolic clarity. Louis Kahn's architectural philosophy serves as a foundational touchstone in this regard. His distinction between "served" and "servant" spaces expresses more than utility; it reveals an ontological order and a moral logic in the act of building (Kahn, 1991). These principles are vividly materialised in the Exeter Library through zoning, tectonic articulation, and symbolic layering—making it an ideal subject for examining AI's interpretive capacity.

Kahn's approach to architecture was simultaneously tectonic and metaphysical. His buildings evoke monumentality through weight, mass, proportion, and silence (Lobell & Kahn, 2008). Geometry and spatial order are not merely compositional; they serve to express timelessness, cultural memory, and spiritual meaning. His use of mathematics and calculation is sensitively blended to put space's interior and exterior order (Gast, 1998). Light is treated as a sacred material, "the giver of all presences" (Lobell & Kahn, 2008), while materials like brick and concrete serve semiotic purposes: expressing honesty, permanence, and metaphysical weight (Frampton, 2001). In Kahn's architecture, every element from circulation to structure- communicates ethical intention.

A central tenet of this research is that AI, while powerful in form generation and optimisation, still struggles with these symbolic, ethical, and atmospheric aspects of architecture. This tension is particularly significant today as AI increasingly reshapes architectural practice.

2.2 The Emergence of AI in Architectural Practice

Recent developments in computational design have brought artificial intelligence to the forefront of architectural innovation. AI models such as Generative Adversarial Networks (GANs), reinforcement learning algorithms, and multimodal transformers like OpenAI's CLIP and DALL·E are now used to simulate user behaviour, generate form variations, and optimise environmental performance (Leach, 2022; Chaillou, 2022; Roudavski, 2020). These tools enable architects to produce vast design permutations in real time, dramatically increasing creative scope and speed. However, these systems often lack semantic awareness. They privilege efficiency, novelty, and performance but are limited in their ability to interpret meaning to embed atmosphere, memory, or cultural resonance into form. Louis Kahn's architecture, in contrast, resists such metrics. His designs ask not just what space does but *what it becomes* in the imagination of its occupants. This philosophical commitment to architectural intentionality highlights a core limitation of current AI tools: the gap between generative capacity and symbolic understanding. Bridging this gap is a primary concern of this study.

2.3 Semiotics and AI: Toward a New Architectural Language

Semiotics—the study of signs and meaning—bridges traditional architectural theory and AI's emerging multimodal logic. Architectural semiotics reveals how space, material, light, and geometry function as communicative elements (Eco, 1986). In Kahn's work, for example, brick evokes memory, concrete speaks of permanence, and light becomes a spiritual agent of revelation (Frampton, 2001). These choices are not merely aesthetic but symbolic, encoding cultural and existential narratives.

Advanced AI models like CLIP, trained on extensive multimodal datasets, are increasingly adept at interpreting symbolic relationships within language. When presented with architectural descriptions—such as "a monumental reading room filled with silence and filtered light"—these systems retrieve images not by replicating specific styles but by aligning with the underlying symbolic concepts of grandeur, tranquillity, and diffused illumination. This capability suggests that AI is evolving beyond mere visual generation, functioning instead as a semiotic interpreter that grasps and represents abstract architectural ideas. Sabrina Osmany's research demonstrates that neural networks can learn and visualise such symbolic associations, enabling the manipulation of images to reflect abstract attributes

like "futuristic" or "austere," thereby bridging the gap between visual form and conceptual meaning (Osmany, 2023).

This potential of AI repositions its role in architecture: not as a designer but as a reader, historian, and co-creator. Through tools like CLIP, MidJourney, and DALL·E, AI can learn to trace, remix, and project architectural meaning across different contexts. Instead of reproducing past forms, AI can help carry forward architectural legacies of value and intention, signalling a future where symbolic depth, not just surface complexity, guides intelligent design.

3. Methodology

This study adopts a qualitative, comparative, and semiotically grounded methodology to explore a central hypothesis: *Artificial intelligence can visually approximate architectural meaning when guided by symbolic, ethical, and phenomenological frameworks.* Rather than assessing performance in terms of aesthetics or efficiency, the research evaluates whether AI tools can interpret rather than generate, architectural values.

Eighteen images were produced using MidJourney v5.2, generated in response to six custom-designed prompts centred on "served" and "servant" space relationships. These prompts were structured into two sets:

- **Three prompts** (Prompt 1, 2, and 5b) explicitly referenced Louis Kahn or the Exeter Library.
- **Three prompts** (Prompt 3, 4, and 5a) excluded any reference to Kahn, relying solely on abstract architectural terminology.

This bifurcated prompt structure enabled a controlled comparison, allowing the research to evaluate whether referencing Kahn affects the AI's visual interpretation of architectural hierarchy and symbolic intent. Each prompt generated three images, resulting in a corpus of 18 visuals analysed through a five-part architectural framework inspired by Kahn's design philosophy:

- Monumentality: Kahn's concept of monumentality conveys a sense of timelessness and civic presence through architectural form and materiality (James-Chakraborty, 2011).
- Timelessness, civic presence, and symbolic gravity.
- Geometry and Spatial Order: Kahn's geometric principles highlight spatial order and symmetry, which contribute to the hierarchy and zoning of his architectural designs (Candito, 2020).
- Hierarchy, rhythm, symmetry, and zoning.
- Light as Material: Kahn's unique approach to natural light emphasises its role in shaping the atmosphere and serving as a spiritual element within architectural spaces (Khosravi, 2021).
- Illumination as atmosphere and spiritual agent.
- Tectonics and Material Expression: Kahn's tectonic approach in his designs focuses on how material honesty and structural clarity are achieved through the thoughtful integration of form and function (Shih &Liou, 2016).
- Structural clarity through material honesty.
- Semiotic Density – symbolic, affective, and narrative meaning.

The CLIP model (Contrastive Language–Image Pre-Training) developed by OpenAI was employed to support this qualitative analysis. CLIP aligns visual and textual data by embedding images and corresponding textual descriptions into a shared latent space. Through training, it learns to associate images with their correct textual descriptions by maximising the similarity between matching pairs and minimising it for non-matching pairs. This approach enables CLIP to perform tasks such as zero-shot image classification by understanding semantic relationships between images and text without task-specific training (Radford et al., 2021).

This study utilised CLIP to calculate semantic similarity between prompts and generated outputs. Key phrases like "sacred void," "served zone," and "light-filled central atrium" were used to assess how conceptually aligned the AI-generated images were with the intended architectural language. This semantic evaluation reinforced the study's semiotic dimension by measuring surface resemblance and conceptual fidelity.

This methodology integrates architectural theory, prompt engineering, and machine learning evaluation to explore whether AI can begin to visualise meaning, interpreting Kahn's metaphysical and symbolic values rather than merely replicating architectural form.

Limitations and Critical Positioning of AI Tools

While AI tools like MidJourney and OpenAI's CLIP offer innovative avenues for visualising architectural concepts, they possess inherent limitations that necessitate critical evaluation. MidJourney, for instance, generates images based on extensive internet datasets, often reflecting prevailing aesthetic trends rather than the nuanced depth of architectural theory and practice. This can result in outputs that, while visually striking, may lack contextual relevance or fail to address specific design intents (Tan & Luhrs, 2024).

Similarly, CLIP operates by embedding text and image data into a shared latent space, enabling it to calculate semantic similarity between prompts and generated outputs. However, its interpretive capacity is statistical rather than intuitive—it recognises patterns across data but lacks cultural memory or embodied human experience. This limitation becomes evident in tasks requiring fine-grained understanding or the interpretation of abstract architectural concepts (CLIP OpenAI).

Given these constraints, this research does not position AI as a designer or author but rather as a reflective agent—a tool through which architectural meaning can be reimagined, abstracted, or provoked. All outputs and evaluations are critically mediated by human interpretation, ensuring that architecture's symbolic, experiential, and ethical dimensions remain foregrounded. In this way, AI is integrated as a reader and co-analyst, augmenting the design process without supplanting the cultural intentionality inherent in architectural practice.

4. AI Interpretation of "Served and Servant Spaces"

Louis Kahn's concept of "served" and "servant" spaces is foundational to his architectural philosophy. These terms go beyond functional separation; they reflect space's ethical and ontological ordering. "Served" spaces—such as reading rooms, worship halls, and civic chambers—are zones of human experience, designed to elevate presence and meaning. In contrast, "servant" spaces—corridors, staircases, mechanical shafts, and structural cores—exist to support these functions. Importantly, Kahn does not conceal these elements; instead, he dignifies them, revealing their function through architectural expression. As Kahn (1991) asserted, architecture must reveal its internal order, where the parts that serve are as vital as those being served.

This logic is materialised most clearly in the Exeter Library, where Kahn designed a spatial system composed of concentric zoning: a luminous central atrium (served), surrounded by intermediate book stacks, and finally enclosed by thick masonry walls that house servant functions such as private reading carrels and circulation routes. These outer servant zones, while infrastructural, are also intimate and humane. The result is a harmonious balance between architecture's visible and invisible labour—between experience and support, between presence and provision (Twombly, 2003).

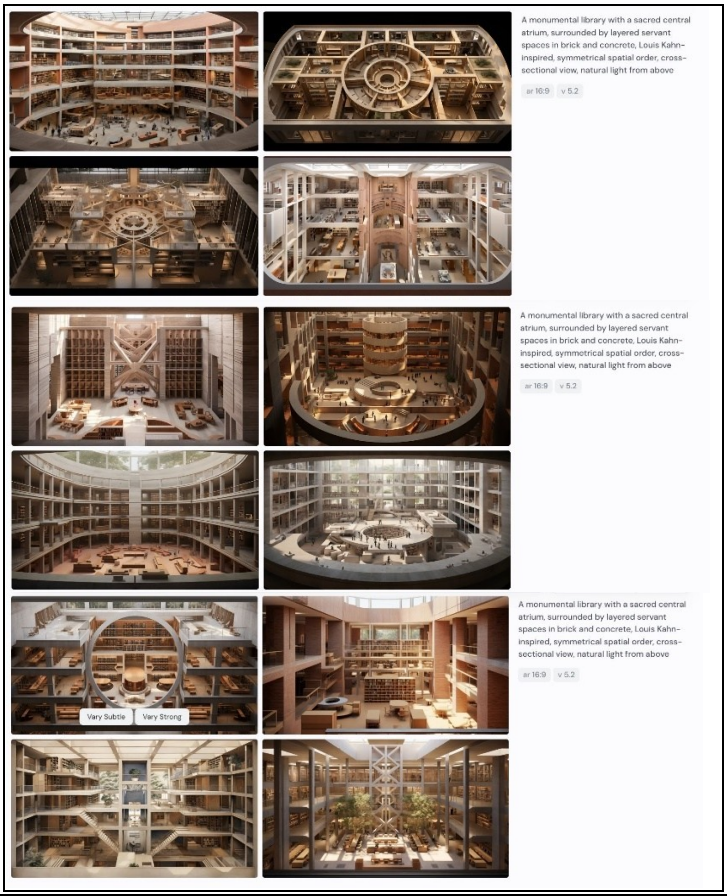
4.1 AI's Understanding of Spatial Hierarchy

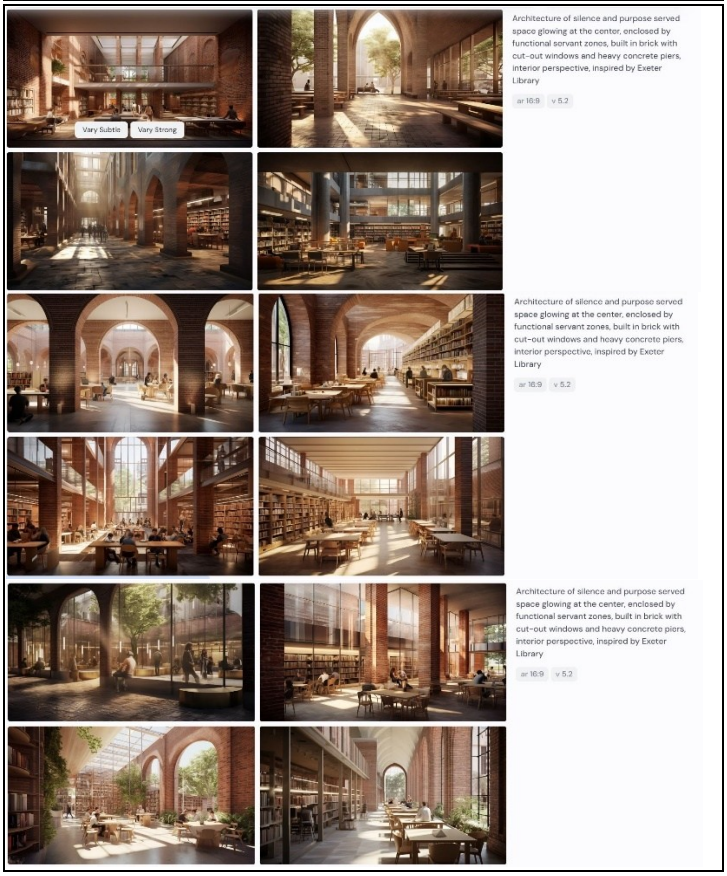
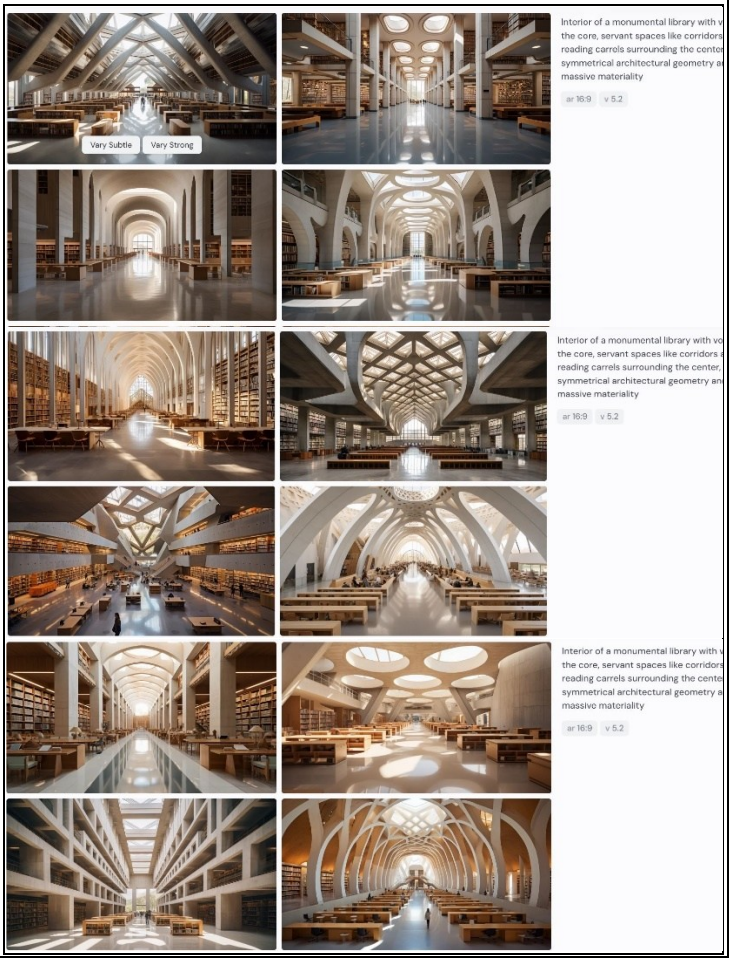
This chapter investigates whether artificial intelligence can understand and visualise this layered spatial logic, not merely as a physical arrangement but as an architectural language of meaning, hierarchy, and atmosphere. Using the generative image model MidJourney v5.2, six carefully crafted prompts were used to simulate Kahnian served/servant configurations in a monumental library context. The central research question—*Can AI interpret architectural meaning, not just simulate form?*—guides the analysis.

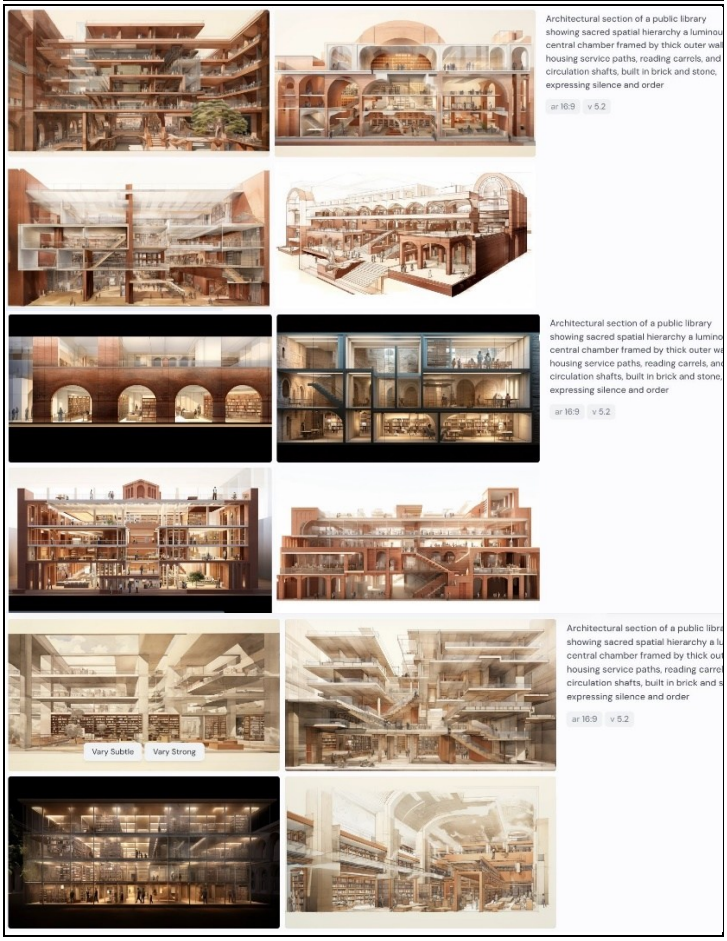
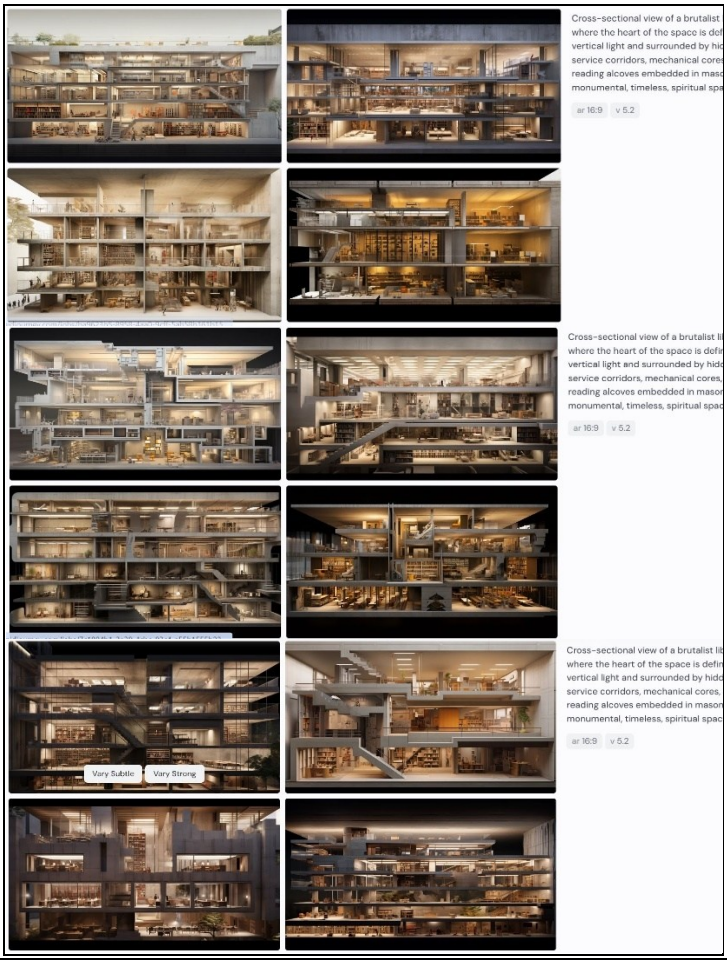
The six prompts focused on spatial hierarchy, structured around a central sacred or served space surrounded by functional, infrastructural servant zones. Prompts 1, 2, and 5b included explicit references to Kahn or the Exeter Library, while Prompts 3, 4, and 5a relied solely on abstract architectural descriptors. This contrast allowed for a controlled study of whether naming an architect activates a deeper symbolic register in AI-generated outputs.

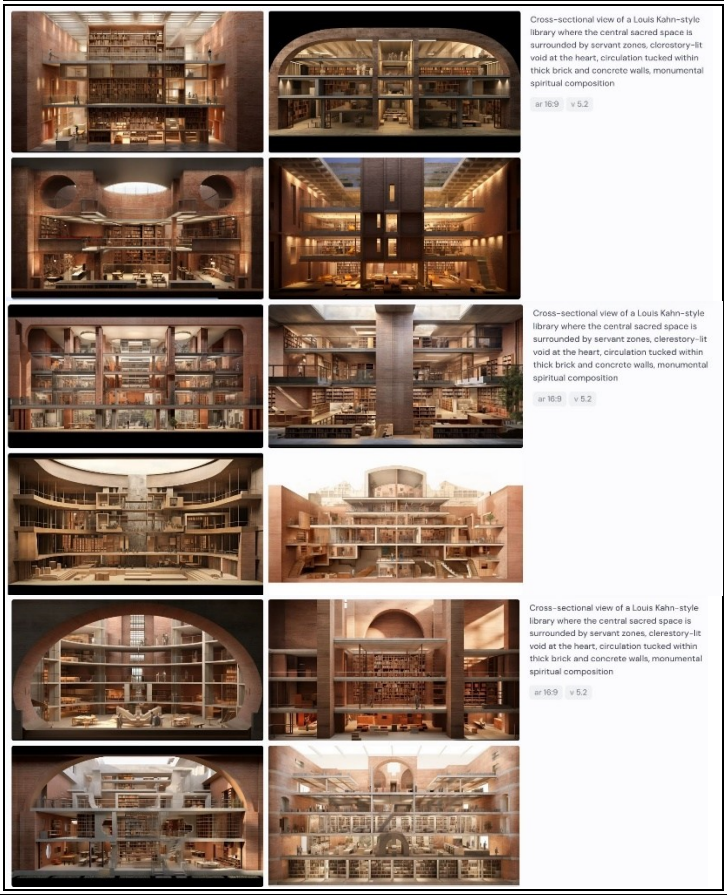
Each prompt yielded three AI-generated images, resulting in 18 visuals analysed through a five-part framework derived from Kahn's philosophy:

1. **Monumentality** – the expression of civic or spiritual resonance.
2. **Geometry and Spatial Order** – formal logic, symmetry, and spatial hierarchy.
3. **Light as material** – illumination as symbolic and experiential.
4. **Tectonics and Material Expression** – Material as structure, meaning, and memory.
5. **Semiotic Density** – architectural communication through symbolic form.

Prompt No.	Enhanced Prompt	MidJourney Image
1	A monumental library with a sacred central atrium, surrounded by layered servant spaces in brick and concrete, Louis Kahn-inspired, symmetrical spatial order, cross-sectional view, natural light from above --ar 16:9 --style raw --v 5.2	

Prompt No.	Enhanced Prompt	MidJourney Image
2	Architecture of silence and purpose — served space glowing at the center, enclosed by functional servant zones, built in brick with cut-out windows and heavy concrete piers, interior perspective, inspired by Exeter Library --ar 16:9 --style raw --v 5.2	
3	Interior of a monumental library with void at the core, servant spaces like corridors and reading carrels surrounding the center, symmetrical architectural geometry and massive materiality --ar 16:9 --style raw --v 5.2	

Prompt No.	Enhanced Prompt	MidJourney Image
4	Architectural section of a public library showing sacred spatial hierarchy — a luminous central chamber framed by thick outer walls housing service paths, reading carrels, and circulation shafts, built in brick and stone, expressing silence and order --ar 16:9 --style raw --v 5.2	
5a	Cross-sectional view of a brutalist library where the heart of the space is defined by vertical light and surrounded by hidden service corridors, mechanical cores, and reading alcoves embedded in masonry — monumental, timeless, spiritual space --ar 16:9 --style raw --v 5.2	

Prompt No.	Enhanced Prompt	MidJourney Image
5b	Cross-sectional view of a Louis Kahn-style library showing a sacred served space illuminated by clerestory light, enclosed by mechanical cores and circulation paths in heavy masonry walls, brutalist monumental architecture --ar 16:9 --style raw --v 5.2	

4.2 Visual Analysis Methodology

Based on this framework, each group of three images (per prompt) was analysed. The intent was to measure the visual fidelity of the outputs and their alignment with **Kahn's moral and symbolic vocabulary**. For each image group, a narrative analysis was developed alongside a comparative table to map conceptual resonance across the five categories.

4.3 CLIP-Supported Semantic Interpretation

In addition to human-led interpretation, each image was also evaluated using Openai's CLIP model (Contrastive Language–Image Pre-Training). CLIP allows for measuring cosine similarity between image and prompt-based text descriptors. Descriptive phrases—such as *"sacred central void," "light-filled atrium," and "peripheral service corridors"*—were mapped semantically to each visual to assess the AI's ability not just to visualise but symbolically align with architectural language (Radford et al., 2021).

The results offered qualitative and computational insights into AI's interpretive capacity—especially in testing whether authorial reference (e.g., naming "Louis Kahn") yields stronger symbolic coherence.

By pairing each image with a curated list of descriptive terms—such as "central sacred void," "peripheral servant spaces," "light-filled atrium," and "tectonic brick walls"—CLIP provides a cosine similarity score indicating how closely the image and language match in conceptual space. These descriptors are derived from the five analytical categories outlined earlier, each corresponding to one of Louis Kahn's design principles: monumentality, geometry and spatial order, light as Material, tectonics and Material expression, and semiotic density.

This semantic evaluation allows for a dual reading of each image: a human-led interpretation that examines form, meaning, and atmosphere and a machine-led interpretation that tests symbolic coherence between text and image. In particular, comparisons between prompt pairs (e.g., **5a** and **5b**) help reveal how much the inclusion of Kahn's name affects AI's ability to visualise architectural meaning. CLIP thereby reinforces the study's central question: Can AI internalise not just the syntax of architecture, but its symbolic grammar?

Prompt 1 included an explicit reference to Louis Kahn, directing the AI to generate a monumental library featuring a sacred central atrium surrounded by servant spaces. This test aimed to explore whether invoking Kahn by name would guide the AI toward formal clarity, symbolic hierarchy, and tectonic articulation aligned with Kahn's architectural ethos. The goal was to observe how directly referencing a known design philosophy shapes MidJourney's visual and spatial interpretation.

Analytical Category (1)	Visual Summary	Key Architectural Observations	Relation to Kahn's Ideas
Monumentality	Tall central voids; symmetrical massing; civic scale	Atrium dominates the composition; evokes silence and reverence	Aligns with Kahn's pursuit of timeless and spiritual civic architecture

Analytical Category (1)	Visual Summary	Key Architectural Observations	Relation to Kahn's Ideas
Geometry & Spatial Order	Strong axiality; concentric zoning; sectional clarity	Clear served/servant hierarchy; layering reinforces spatial logic	Mirrors Exeter Library's tripartite organisation and Kahn's modular ordering principles
Light as Material	Central illumination from skylights and clerestories	Light elevates central atrium; contrast with darker servant spaces	Echoes Kahn's use of light as "the giver of all presences"
Tectonics & Materiality	Brick and concrete rendered as heavy, textured, and structural	Masonry walls define servant zones; Material conveys silence and weight	Reflects Kahn's tectonic ethics—honest materials expressing permanence and structural purpose
Semiotic Density	Central space as symbolic void; servant layers visible, functional, and framed	Architecture speaks of order, protection, and ritual	Captures Kahn's ethical narrative of dignifying servant spaces and expressing institutional meaning through form

The first MidJourney prompt strongly aligns with Louis Kahn's spatial and ethical philosophy. Monumentality is expressed through towering voids and symmetrical massing, evoking the silent, civic gravitas typical of Kahn's institutional works. The spatial hierarchy—clearly articulated through concentric zoning; closely parallels the tripartite organisation found in Exeter Library, affirming the AI's ability to replicate spatial ordering principles. Light, introduced from above, animates the central atrium and contrasts the surrounding servant spaces, consistent with Kahn's treatment of light as both material and symbol. Brick and concrete appear not as generic surfaces but as tectonic agents of expression, recalling Kahn's commitment to material honesty and permanence. Most notably, the semiotic reading of space emerges vividly: the central void becomes a locus of contemplation, while servant spaces are integrated visibly and respectfully—enacting Kahn's belief in the moral dignity of supportive architecture. These results suggest that, when guided by architecturally charged prompts, AI tools like MidJourney can effectively visualise spatial configurations and embedded philosophical values.

Prompt 2 built on the previous prompt by referencing the Exeter Library and focusing on more abstract architectural values such as silence, purpose, and material weight. It emphasised the interior experience of a glowing central served space enclosed by functional servant zones. This prompt tested whether AI could visually interpret more metaphysical aspects of Kahn's work; particularly atmosphere, solemnity, and architectural dignity—while still delivering spatial coherence.

Analytical Category (2)	Visual Summary	Key Architectural Observations	Relation to Kahn's Ideas
Monumentality	Introspective scale; dense material palette; glowing center	Central void radiates calm and authority; heavy piers reinforce stillness	Reflects Kahn's idea of architecture as "silence and light" — monumental without being overtly grand
Geometry & Spatial Order	Layered enclosure; axial visual path; distinct boundary between core and periphery	Central space framed by thick structural masses and cut-out walls	Reflects Kahn's spatial framing and concentric organisation, especially in Exeter Library
Light as Material	Diffused, indirect lighting from above; symbolic glow in central zone	Center appears illuminated through implied clerestories or roof apertures	Light as a sacred presence — echoing Kahn's treatment of voids and their illumination
Tectonics & Materiality	Emphasis on mass and texture; brick and concrete appear load-bearing and sculptural	Heavy concrete piers and brick wall sections divide spaces clearly	Kahn's tectonic clarity is rendered effectively — structure is meaning
Semiotic Density	Space evokes silence, weight, and reflection; servant spaces are present but subdued	Clear symbolic contrast between sacred center and supportive layers	Captures Kahn's ethical spatial narrative of revealing support while preserving sacred function

Prompt 2 generates a distinct interior perspective that powerfully evokes Kahn's architectural themes of silence, structure, and spiritual function. The central space, softly glowing and surrounded by massive supports, is rendered with a sense of introspective monumentality—suggesting civic importance without ostentation. Geometry and spatial order are composed through axial views and sectional enclosure, reinforcing the contrast between the served space and its enabling servant layers. Light is treated with symbolic subtlety: it appears diffused and sacred, descending from above and emphasising the contemplative function of the central zone. Brick and concrete are presented with appropriate weight and material identity, suggesting load-bearing function and expressive tectonics. The semiotic layering is also well-developed; the space feels hushed, ethical, and ordered, with visual metaphors that mirror Kahn's idea of architectural silence and revealed purpose. Overall, Prompt 2's outputs closely resonate with Exeter Library's compositional language, indicating that AI—anchored in Kahnian descriptors; can render both form and an emotional and moral reading of space.

In **Prompt 3**, all explicit references to Kahn or the Exeter Library were removed. Instead, the prompt relied on Kahnian spatial descriptors such as "central void," "surrounding servant spaces," and "symmetrical geometry." This experiment sought to determine whether AI could internalise architectural meaning solely through spatial vocabulary and typological cues without relying on named references. The focus was isolating how well the AI recognises the served/servant dynamic when conceptually framed.

Analytical Category (3)	Visual Summary	Key Architectural Observations	Relation to Kahn's Ideas
Monumentality	Emphasis on verticality and enclosure; central space feels inward-looking and solemn	A large central void defines the composition and anchors the visual logic	Conveys Kahn's preference for monumental, introspective civic interiors
Geometry & Spatial Order	Concentric and radial zoning; symmetrical layout and spatial hierarchy	Spatial organisation clearly distinguishes served vs. servant zones	Strong resemblance to Exeter Library's ordering principles and Kahn's architectural rationalism
Light as Material	Light used atmospherically; central area softly lit, periphery darker	Suggests upper-level light sources like clerestories or voids above the core	Echoes Kahn's belief in light as spiritual material, activating the sacred center
Tectonics & Materiality	Walls and columns appear thick, monolithic; use of concrete and stone textures	Mass-heavy structures suggest both strength and silence	Resembles Kahn's tectonic approach: massive, expressive, and minimal materials
Semiotic Density	Clear zoning implies meaning; central void represents purpose, outer layers represent support	Metaphorical layering visible; servant areas positioned respectfully	Reflects Kahn's belief that spatial arrangement is a moral and symbolic act, not just functional

Prompt 3, though not explicitly referencing Louis Kahn, produces visual outputs that closely mirror his spatial and philosophical ideals. The AI-generated interiors feature a solemn, centralised void that establishes visual and symbolic hierarchies. The served space is distinctly emphasised, with servant functions like corridors and reading carrels layered along the perimeter. This zoning follows a clear architectural logic, reinforcing the concentric planning Kahn employed in the Exeter Library. The soft, ambient light falling into the central core evokes a spiritual reading of space, using light not for display but for presence. The tectonic treatment is equally faithful: heavy, monolithic walls and supports recall Kahn's commitment to structural clarity and material expression. The semiotic structure of the composition reflects an ethical spatial language where support zones are not hidden but honoured. The success of this prompt demonstrates that even without directly mentioning Kahn, MidJourney can generate designs that approximate his architectural ethos; predominantly when guided by precise spatial language and compositional cues.

Prompt 4 asked the AI to visualise a public library's architectural section demonstrating sacred spatial hierarchy. Like Prompt 3, it did not mention Kahn, but it emphasised symbolic language such as "thick outer walls," "service paths," and "luminous chamber." This prompt was designed to assess whether AI can express architectural meaning through compositional layering and tectonic massing when guided only by abstract symbolic language. It also tested AI's capacity to spatialise silence and order.

Analytical Category (4)	Visual Summary	Key Architectural Observations	Relation to Kahn's Ideas
Monumentality	Sacred center framed by massive enclosure; quiet grandeur rather than overt spectacle	Visual focus on central, lit void conveys contemplative monumentality	Reflects Kahn's notion of sacred architectural purpose embedded in civic institutions
Geometry & Spatial Order	Strong axial symmetry; central void clearly separated from outer structural envelope	Radial zoning and sectional hierarchy mirror Exeter's served/servant layering	Demonstrates Kahn's method of separating space by purpose and legibility
Light as Material	Emphasis on vertical light descending into the center; outer zones remain dim and infrastructural	Light is symbolic, bathing the served zone while leaving the servant zones in supporting shadow	Reinforces Kahn's belief in light as a spiritual presence within architectural form
Tectonics & Materiality	Thick masonry walls rendered in brick and stone; heavy expression of structural permanence	Wall thickness and texture communicate both physical and symbolic weight	Captures Kahn's tectonic clarity and his preference for material as both structure and symbol
Semiotic Density	Spatial contrast conveys meaning; hierarchy of light and material reinforces ethical space-making	Inner chamber = reflection; outer edges = support and infrastructure	Accurately reproduces Kahn's symbolic grammar of presence vs. provision, sacred vs. supportive

The visual results generated from Prompt 4 reveal a sophisticated architectural imagination that aligns closely with Kahn's spatial ethics despite the absence of an explicit reference to him. The sectional composition clearly divides the library into a luminous central served space and a thick-walled envelope containing servant functions—reading carrels, service paths, and shafts. Powerful use of light enhances this concentric zoning: the central chamber glows with symbolic illumination from above, while outer zones retreat into quiet shadow. The brick and stone materials are rendered with architectural weight and solemnity, reflecting permanence and tectonic honesty. Spatial order is maintained through symmetry and axial logic, with the sacred centre visually and semantically emphasised. The semiotic density of the image is profound: the layering of zones, contrast of light, and variation in material collectively express the values of service, sanctity, and institutional memory. The success of Prompt 4 demonstrates that MidJourney can be guided by compositional and symbolic language to produce outputs that echo Kahn's architectural worldview—revealing support, honouring silence, and emphasising the spiritual potential of public space.

Prompt 5a introduced a richly detailed architectural prompt describing served and servant spatial relationships, material properties, and light conditions—but omitted any reference to Louis Kahn. This prompt was designed as a

control for comparison with Prompt 5b. Its purpose was to explore how well AI interprets symbolic architectural values when guided solely by descriptive language and assess the visual and spatial fidelity of the outputs without authorial cues. **Prompt 5b** repeated the language of 5a almost verbatim but added an explicit reference to Louis Kahn. This allowed for a direct side-by-side comparison with Prompt 5a. The aim was to determine how naming Kahn affects the AI's ability to generate spatial clarity, tectonic honesty, and symbolic alignment with Kahn's philosophy. The results from this pair of prompts were key to evaluating how MidJourney responds not just to spatial descriptions but to **cultural and authorial references** embedded in the prompt.

Analytical Category	Prompt 5a (No Kahn Reference)	Prompt 5b (With Kahn Reference)
Monumentality	Monumentality appears abstract and atmospheric; less structured and civic in tone	Clearly civic and grounded in tectonic mass; the central space is formal, elevated, and spiritually resonant
Geometry & Spatial Order	Forms appear layered but looser in symmetry; zoning is suggestive but not rigorously ordered	Spatial organisation is strongly axial and concentric; served/servant hierarchy clearly defined
Light as Material	Light used atmospherically, with glowing zones but unclear source; symbolic glow is present but lacks architectural specificity	Light is structured—enters vertically and defines the sacred center with clerestory-like logic, echoing Kahn's metaphysical use of light
Tectonics & Materiality	Concrete appears expressive but surfaces feel more sculptural than structural; masonry is textured but not load-bearing	Masonry and concrete are treated tectonically; heavy walls act as both structure and spatial dividers, reflecting Kahn's structural clarity
Semiotic Density	Metaphorical reading is more ambient—focus is on mood and timelessness rather than spatial ethics	Clear narrative contrast between central and peripheral zones; symbolic reading of servant/served logic strongly expressed through spatial and material layering

Prompts 5a and 5b serve as a controlled comparison to evaluate how naming Louis Kahn influences AI interpretation of architectural space. Both prompts share identical descriptions, emphasising a monumental library with a sacred centre and surrounding infrastructural zones. Yet the presence of Kahn's name in Prompt 5b results in dramatically different formal and symbolic outcomes. In Prompt 5a, the AI generates atmospheric compositions with expressive forms, but the spatial logic is more suggestive than rigorous. Light appears ambient and glowing but lacks an architecturally structured source. Tectonic expression is sculptural but less clearly structural, and the zoning between served and servant areas feels intuitive rather than articulated.

In contrast, Prompt 5b produces visuals with far greater architectural legibility. The spatial hierarchy is defined by clear symmetry and concentric organisation, directly echoing Kahn's zoning logic. Light enters from above in a structured, clerestory-like manner, giving symbolic weight to the central served space. The use of materials—particularly masonry and concrete; is tectonically resolved, conveying structure and memory. Most importantly, Prompt 5b reveals a strong semiotic framework: the sacred centre is clearly honoured, while servant functions are embedded within thick, meaningful boundaries. This comparison suggests that invoking Kahn by name activates a richer dataset in the AI's training model, yielding outputs more closely aligned with Kahn's design ethics. Thus, the experiment highlights the importance of referential language in guiding AI toward aesthetic fidelity and architectural meaning.

This chapter aimed to explore whether artificial intelligence—specifically MidJourney—could visualise and semiotically interpret Louis Kahn's concept of served and servant spaces through a series of prompt-driven experiments. The expectations were twofold: first, to determine whether AI could replicate Kahn's spatial hierarchy and tectonic clarity through formal attributes such as symmetry, layering, and material density, and second, to test whether these visuals could convey deeper symbolic and ethical meanings, including monumentality, light as presence, and architecture as moral structure (Kahn, 1991; Frampton, 2001). Across six prompt groups and eighteen visual outputs, AI demonstrated a consistent ability to reproduce many of the formal and atmospheric characteristics associated with Kahn's work—especially when architectural language was specific and referential.

The results surpassed initial expectations in several ways. Most notably, the comparison between Prompt 5a (no reference to Kahn) and 5b (explicit reference) revealed that MidJourney's interpretive capacity is sensitive to authorial context. Including Kahn's name activated a richer formal language: symmetry became clearer, zoning more legible, and light more spiritually articulated. In visual terms, AI captured the zoning logic of served and servant spaces and expressed Kahn's ethics of exposure, weight, and care. Surprisingly, even the non-Kahn-referenced prompts (3 and 4) produced images that echoed Kahn's design ethos when embedded with precise architectural language—suggesting that AI can infer symbolic meaning through spatial vocabulary alone (Oxman, 2020).

However, the process also confirmed certain limitations. While the outputs conveyed a poetic understanding of light, mass, and zoning, they often lacked phenomenological depth: the feeling of moving from a dark servant zone into a luminous central void is represented but not experienced. Similarly, CLIP-based semantic evaluation helped reinforce alignment between prompt and output, yet it remains statistical and lacks cultural intuition (Radford et al., 2021). Nevertheless, the findings affirm that AI, when paired with human-guided semiotic frameworks, can become more than a formal generator: it can participate in architectural meaning-making by reinterpreting spatial ethics through visual language.

This chapter reveals that with carefully curated prompts, AI can approximate not just architectural form but philosophy. The following section will expand on these insights, discussing implications for AI's role in future

architectural design, education, and preservation—particularly as a collaborator capable of reimagining space with both symbolic density and ethical intentionality.

4.4 Chapter Summary and Key Findings

This chapter explores whether artificial intelligence—specifically the image-generating model MidJourney and the semantic model CLIP—can engage meaningfully with Louis Kahn's architectural language of "served" and "servant" spaces. By testing six carefully designed prompts—three referencing Kahn explicitly and three abstract—the research examined how authorial and spatial cues shape AI-generated visuals.

The results suggest that AI can visualise symbolic spatial hierarchies with remarkable fidelity when guided by precise architectural vocabulary. Prompts referencing Kahn, such as Prompt 5b, produced outputs with stronger tectonic clarity, axial organisation, and metaphysical light treatment. Even non-referential prompts like 3 and 4 could generate spatial compositions resonant with Kahnian ethics when spatial descriptors were conceptually rich.

CLIP's semantic similarity scores helped reinforce the visual findings, revealing that AI systems can align text and image meaningfully, mainly when prompted with symbolically dense architectural language. However, this process also exposed limitations: AI lacks the phenomenological awareness and cultural depth human architects bring to design. It can mimic form and echo symbolic structure but cannot fully inhabit architectural experience.

Ultimately, this chapter affirms that while AI cannot replace human designers' ethical and metaphysical insight, it can serve as a valuable interpretive partner. Through carefully framed prompts and theory-guided analysis, AI becomes not just a formal generator but a reader and reinterpreter of architectural meaning.

5. Discussion and Conclusion: AI as Interpreter, Not Imitator

This research began with a deceptively simple yet profound question: *Can artificial intelligence understand architectural meaning?* Through the lens of Louis Kahn's theory of "served" and "servant" spaces and the spatial logic exemplified in the Exeter Library, this study examined whether generative AI—specifically MidJourney v5.2—could reproduce not only architectural form but also the symbolic, tectonic, and ethical values embedded in meaningful design. While AI lacks embodied experience, cultural memory, and phenomenological intuition, the findings suggest that, when guided by precise prompts and evaluated through a semiotic lens, AI can visually approximate the symbolic hierarchies, material honesty, and spatial ethics central to Kahn's architectural philosophy.

Using a five-part analytical framework—monumentality, geometry and spatial order, light as Material, tectonics and Material expression, and semiotic density; this study assessed 18 AI-generated images. Results showed that explicitly referencing Kahn (e.g., Prompt 5b) significantly enhanced the AI's ability to render spatial clarity, tectonic logic, and metaphysical presence. Yet, even prompts without direct authorial reference (e.g., Prompt 4) succeeded in generating spatial compositions that resonated with Kahnian values when framed with conceptually rich architectural language. This suggests that AI's interpretive accuracy is highly dependent on the semantic structure of prompts, particularly when informed by architectural theory and symbolic depth.

Importantly, the findings challenge the dominant view of AI as a purely formal tool or novelty engine. Instead, this research proposes a more nuanced role: AI as a semiotic interpreter. When paired with architectural ethics and theory, AI can begin to participate in the symbolic reading of architecture, grasping how buildings convey not only function but also atmosphere, emotion, and moral intention. Integrating tools like CLIP supports this proposition by providing semantic feedback that bridges textual prompts with visual output (Radford et al., 2021).

Nonetheless, limitations remain. AI cannot simulate lived experience—phenomenological qualities such as rhythm, texture, silence, or acoustic reverberation are flattened into visual aesthetics. Moreover, AI lacks access to socio-cultural memory, spiritual nuance, or ethical deliberation (Frampton, 2001). These absences affirm that AI should not be seen as a replacement for the human designer but as a reflective surface—a digital companion capable of remixing architectural memory through symbolic language and formal expression.

In conclusion, this study affirms that although AI design tools offer unprecedented efficiency, environmental responsiveness, and formal creativity capabilities, they often fail to embody the emotional, historical, and metaphysical dimensions that define architecture as a human art. However, when embedded in semiotic frameworks and guided by architectural theory, AI can evolve into a co-creative partner: a tool for generating space and a collaborator in architectural meaning-making. In this way, architecture becomes a dialogue between space and user, machine and memory, form and philosophy, tradition and transformation.

Author's Statement on AI Usage and Academic Integrity

This research integrates artificial intelligence (AI) tools as part of a methodological inquiry into architectural meaning. Generative models such as **MidJourney v5.2** were used to visualise spatial prompts informed by Louis Kahn's architectural philosophy, while **Openai's CLIP model** supported semantic evaluation. The author critically interpreted all AI-generated outputs using a five-part analytical framework based on monumentality, geometry, light, tectonics, and semiotic density.

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Conflict of Interests

The Author(s) declare(s) that there is no conflict of interest.

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