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Innovative Integration: Exploring AI Art Platforms in Architectural Education for Mosque Facade Design

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Abstract:

This research aims to investigate the effectiveness of implementing the mentoring model in Mosque facade design presents a unique challenge in the field of architecture due to their importance as the mosque's front-facing feature and their role in representing Islamic identity. In this study, an AI art platform was introduced as a tool to improve the creativity and design process for architecture students and professionals. The study investigated the platform's novel application in the context of architectural learning for mosque façade design. The research methodology was divided into three parts: a description of the platforms used, identification of common use cases in mosque architectural design, and query analysis using NLP methods in Midjourney AI art platform. According to the findings of the study, the AI art platform is a valuable tool for architectural learning, allowing students and professionals to generate diverse and innovative designconcepts. The Midjourney AI art platform has flaws such as difficulty recognizing architectural styles from specific regions.

Key Words: *Architecture, Artificial Intelligence, Façade, Mosque*

INTRODUCTION

The evolution and rapid growth of mosques as vital spaces for worship and multifunctional community gatherings, including residences, are evident in Malaysia (Malee et al., 2021). These religious institutions, strategically located in urban areas, serve as prominent landmarks and hubs for public activities. Ensuring thermal comfort within urban mosques is crucial to accommodate pilgrims amidst varying environmental conditions (Lak et al., 2020). This consideration is pivotal not only for buildings accommodating congregations but also for maintaining a conducive indoor environment that influences the overall health and quality of life within urban settings. Therefore, this paper aims to address the challenges associated with regulating thermal comfort in Malaysian urban mosques. It will delve into issues pertaining to mosque design, particularly facade considerations, and analyze how these elements contribute to thermal

comfort and subsequently impact the overall quality of life (Nasrollahzadeh, 2021).

Architecture and design are two fields that require a delicate balance of functionality and aesthetics. When creating a design that meets the needs of their client, architects must consider not only the purpose of the structure but also its form. Diffusion-based AI art platforms have recently emerged as a promising tool for generating visually appealing images from simple text descriptions. Such platforms are not limited to architectural design but could be used in a variety of disciplines that require creative and imaginative visual design. Designers and architects can improve their design processes with the help of AI art platforms, accelerating them while maintaining their inventiveness (Wang et al., 2022).

Artificial intelligence studies have achieved substantial improvements in practical tasks by using extensive amounts of data (Zhang et al., 2021). AI art platforms offer promising tools to enhance architectural learning, especially in the context of mosque façade design (Hernandez-de-Menendez et al., 2020). It is important to use AI responsibly and ethically, overcome potential challenges and ensure its integration into functional learning processes to improve, not replace, traditional design education (Meyer et al., 2020).

Architectural visual design is an important aspect of creating structures and places that meet their clients' functional and aesthetic needs (Spence, 2020). Architects have traditionally communicated their ideas visually through sketches, drawings, and models. However, the traditional design process can be time-consuming and limit creativity. With the advent of AI art platforms, architects now have a new way to create stunning visuals from simple text descriptions, providing a more efficient and flexible alternative to traditional design methods. Architects can save time and resources while exploring new and innovative design options that were previously impossible with traditional methods by using these platforms (Nesbit et al., 2020).

An in-depth analysis of Midjourney's capabilities in mosque façade design and an investigation into its applicability to specific use cases will be conducted in our research (Derevyanko et al., 2023). Our goal is to identify the strengths and limitations of the platform and assess its potential for producing high-quality images (Longhurst et al., 2020). To achieve this, we will evaluate the images generated by Midjourney using both quantitative and qualitative methods. We hope to gain insights into the effectiveness of using AI art platforms in architectural education and contribute to the ongoing debate about the role of technology in the creative field (Putri et al., 2021).

The aim of this study is to assess the current state of AI art platforms in architectural learning and their potential to enhance the mosque façade design process. We will compare Midjourney with other AI art platforms to determine their strengths and limitations. Our findings will be beneficial to architecture students and professionals seeking to integrate AI into their design processes. Additionally, as we explore the potential of these platforms to enhance the

mosque façade design process, our research will contribute to the ongoing discourse regarding the role of technology in the creative field.

RESEARCH METHODS

The focus of the research used in this study is to explore how vital the mosque facade design is as a representation of Islamic identity, and how these designs contribute to the architectural as well as cultural beauty of the urban environment. The research methodology used in this paper involves an analytical survey approach that integrates insights from various fields (Dawadi et al., 2021). The focus of this analytical review is to think, evaluate, and analyze the linkages between urban mosques, facade design, and thermal comfort, culminating in the evaluation of their impact on overall quality of life quality of life. The aim is to gather a comprehensive understanding of urban mosques, facade design principles, considerations of thermal comfort, and its association with quality of life (Mittal et al., 2020).

The data sources used come from a variety of reliable and verified sources. This data source includes a wide range of literature, research, and information from related disciplines that have been recognized as reliable in studying topics relevant to this research. In addition, data is also obtained from in-depth reference books on urban architecture, building facade design, and mosques as architectural structures that play an important role in urban contexts. These books provide a solid theoretical foundation for studying the various aspects of this research. Previous research reports and theses on urban mosque design, thermal comfort strategies, and their impact on quality of life were also used as data sources. Empirical data from surveys, case studies, and related information from trusted sources are also used to support in-depth analysis (Wang et al., 2022).

Data analysis derived from literary studies constitutes an invaluable cornerstone within architectural research, offering a powerful lens through which researchers unravel the depth and intricacies of their subject matter. By employing meticulous methods of analysis, researchers are empowered to navigate through the expansive realm of literature, gaining profound insights and a nuanced understanding of their research focus. This methodological approach serves as a compass guiding researchers toward unearthing pivotal keywords or phrases scattered across the landscape of literary data, enabling the identification and extraction of essential elements crucial for comprehensive comprehension. This analytical framework extends beyond mere textual scrutiny; it represents an illuminative journey, unveiling interwoven connections, recurring motifs, and emergent trends within the literature. It acts as a conduit through which researchers decipher the underlying layers of complexity, fostering a deeper understanding of the subject's nuances and subtleties. The discernment of keywords or phrases becomes a fundamental pillar in this exploratory path, illuminating the way toward a more

comprehensive and insightful comprehension of architectural research within the context of literary studies (Yeung et al., 2021).

RESULTS AND DISCUSSION

Overview of the AI Platform

Midjourney AI art platform is a comprehensive platform that can be used for mosque façade design that includes several key features that distinguish it from other platforms (Kudless, A. 2023). The user interface is intended to be user-friendly and intuitive, with simple controls that allow designers to quickly customize their designs. Furthermore, the platform includes a plethora of available parameters that can be used to fine-tune the generated designs, such as materials, lighting, patterns, and other design elements (Lyu et al., 2022; Rasrichai et al., 2023).

Midjourney's distinct approach to mosque façade design is one of the key features that set it apart from other platforms. The platform employs an innovative approach that combines traditional Islamic design elements with modern design principles, resulting in one-of-a-kind and visually appealing designs that are both functional and aesthetically pleasing. This design approach is based on a thorough understanding of the cultural and historical significance of mosque façades, ensuring that the designs produced are both respectful of Islamic architectural traditions and relevant to contemporary design practices (Idham, 2021).

The Midjourney AI art platform emerges as a multifaceted and comprehensive tool, pioneering a revolutionary paradigm in mosque façade design, as noted by Kudless (A. 2023). What distinguishes Midjourney from its counterparts lies not only in its user-friendly interface but also in its rich array of features tailored specifically for designers seeking unparalleled customization and innovation in their creations. Its interface is meticulously crafted to be intuitive, catering to designers' preferences by offering a seamless experience while navigating the platform. This emphasis on user-centric design manifests through simplified controls, enabling swift modifications and adjustments to designs, empowering designers to visualize and iterate concepts swiftly and effortlessly.

Delving deeper into its expansive toolkit, Midjourney boasts a diverse spectrum of parameters accessible to designers, offering extensive customization options. From materials and lighting to intricate patterns and diverse design elements, the platform grants designers the freedom to fine-tune every intricate detail of their mosque façade designs. This comprehensive set of parameters provides an extensive playground for creativity, allowing designers to manifest their visions into tangible, intricate, and culturally resonant architectural expressions.

Moreover, what truly sets Midjourney apart is its innovative approach that amalgamates traditional Islamic design ethos with contemporary design

principles. This unique blend births designs that transcend mere functionality, resulting in visually stunning creations that honor the rich legacy of Islamic architectural traditions while seamlessly integrating with modern design sensibilities. Midjourney's design philosophy is anchored in a profound understanding of the historical and cultural significance of mosque façades. By seamlessly melding tradition with innovation, the platform curates designs that pay homage to Islamic architectural heritage while staying relevant and resonant within the context of contemporary design practices. Thus, Midjourney emerges not just as a tool but as a catalyst for architectural innovation, bridging the gap between tradition and modernity in the realm of mosque façade design.

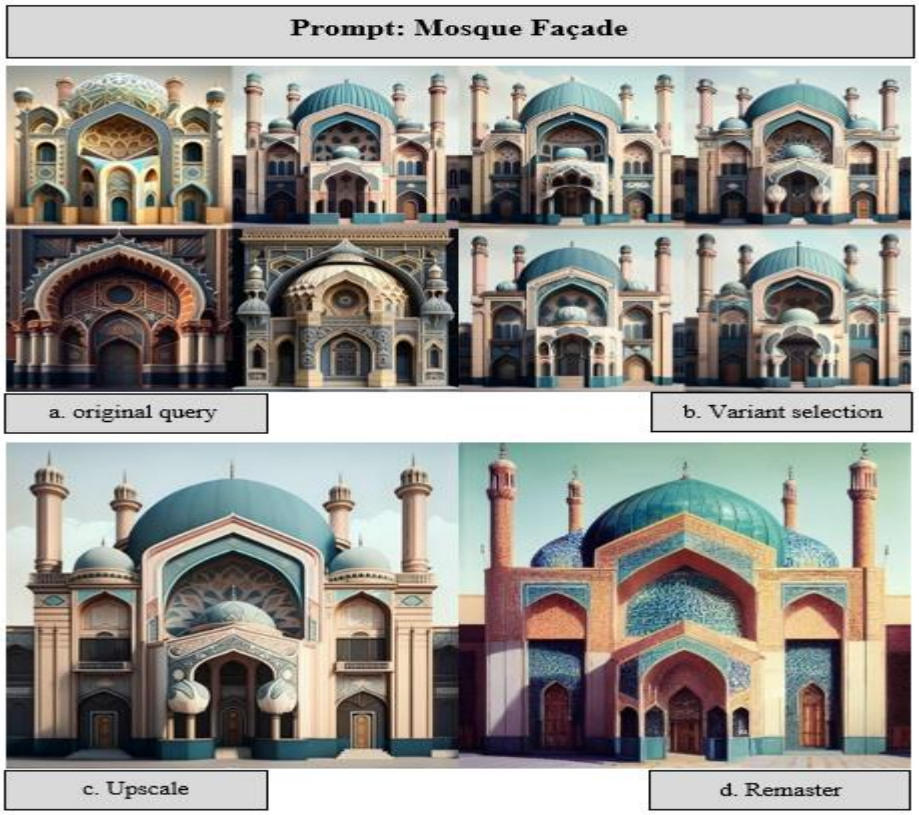

Figure 1. Basic Workflow for Midjourney with "Mosque Façade" Prompt

The Midjourney AI art platform is a valuable resource for mosque façade designers. Its simple user interface and wide range of available parameters allow designers to quickly generate custom designs, and its unique approach to mosque façade design ensures that the generated designs are both functional and aesthetically pleasing. This platform has the potential to revolutionize the mosque façade design process by providing designers with a more efficient and effective tool for generating designs that meet the complex requirements of this unique design space (Mubarak et al., 2022).

Furthermore, combining traditional Islamic design elements with modern design principles creates an innovative and exciting approach to mosque façade design, with the potential tocreate a newvisuallanguage forIslamicarchitecture.

Designers can use this approach to create designs that are both respectful of Islamic architectural traditions and relevant to contemporary design practices, bridging the gap between the past and the present. The Midjourney AI art platform is a valuable tool for mosque façade designers, providing new opportunities for creativity and innovation in this unique design space.

Common Use Cases in Mosque Façade Design

In this context, designers are frequently trapped in a strict framework that is unable to adapt to the unique needs or subtle aesthetic preferences of specific projects. This rigid adherence to established design rules and principles stifles originality, leading to a laborious and frequently depressing design trajectory. The resulting limitations inside this deeply ingrained system can result in a tedious and drawn-out design process, impeding the investigation of creative, unique, and eye-catching concepts that might come to pass with a more adaptable and open approach to design (Braun et al., 2022).

Consequently, as designers traverse a terrain ruled by predetermined rules and established norms, the battle against these design limits becomes apparent. The desire to create outstanding and distinctively beautiful mosque façades is fueled by the desire to escape the constraints of traditional architectural methodologies (Tamm et al., 2022). The search for approaches that create a balance between preserving cultural and religious legacy and encouraging innovative and stunning architectural manifestations is spurred by the conflict between tradition and innovation.

When designing mosque façades, a transformative approach that reinterprets existing paradigms is necessary in order to achieve a harmonious confluence between tradition and modernity. It becomes essential to embrace contemporary design thinking techniques while having a profound respect for traditional Islamic design aspects. With this transformative perspective, designers are able to envision mosque façades that embrace modern aesthetics while embodying cultural depth, allowing them to traverse the delicate balance between tradition and innovation. Thus, the story of the building of mosque façades changes as a result of an evolving approach to design, promoting the synthesis of tradition and innovation into architectural marvels that are both aesthetically pleasing and culturally significant.

Analysis of Platform Queries

NLP (Natural Language Processing) is a subfield of Artificial Intelligence (AI) that involves analysing, processing, and understanding human language using computer algorithms. One of methods used in NLP to accomplish these tasksistokenization. Tokenization isbreakingdown text into smallerunitscalled tokens, such as words or phrases. Figure 2 shows how tokenization works as recurrent neural work. More token added then more quantity of information can be processed.

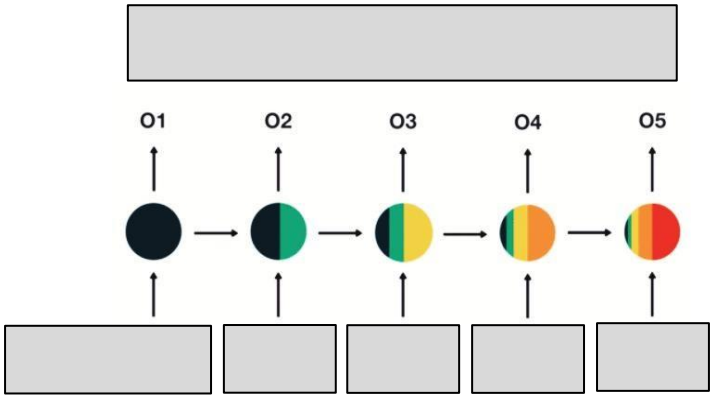

Figure 2. Working of Tokenization as Recurrent Neural Network

Tokenization method is used in Midjourney as well, but the term is 'prompt'. Prompt is a short text phrase that the Midjourney Bot interprets to generate an image. The Midjourney Bot breaks down the words and phrases in a prompt into smaller pieces called tokens, which it then compares to its training data to generate an image. A well-crafted prompt can help in the creation of desired images (Midjourney, 2023).

Midjourney guidelines advise us to employ prompts freely. Promptsdon't have to be difficult (Pearson, A. 2023). A single word will result in an image. Very brief prompts will rely heavily on Midjourney's default design, thus a more descriptive request for a more distinct appearance is desirable. These are some examples of prompt usage: There must be a main subject to which one or more adverbs can be appended. The main subject that we want might be anything from a character to a building, an animal, or any object. Adverbs such as medium, environment, lighting, colour, mood, and composition might be employed. Not only that, we can use noun or plural words.

Evaluation of Generated Images

the introduction of Mosque façade typology in Indonesia will result in efforts to classify, group, or classify based on specific aspects or rules. These aspects are as follows (Kocaman et al., 2023): (1) Function (pray, study centre, tutoring, social activity, safety, etc; (2) Geometric (mosque building components and construction); and (3) Style (traditional or modern mosque). So that in architecture, the things that are observed in the facade of the mosque also have a composition consisting of windows, doors, walls, roofs, sun shading, windows and columns. In this study, will be analysed how the facade is created from modifying adverbs with the main subject in the form of a mosque facade.

Table 1. Mosque Façade Analysis from Prompts and Results in Midjourney AI Art Platform

No	Prompts	Analysis
1	Traditional Mosque Façade	The facade of the mosque that was built is a common facade in the Middle East
2	Modern Mosque Façade	The facade of the mosque was created using concrete and iron structures with current construction technology
3	Mosque Façade designed by Michelangelo	The facade of the mosque that was created is of European architecture and is typical of Michelangelo's work which is rigid and symmetrical
4	Mosque Façade designed by Zaha Hadid	The facade of the mosque that was created is Zaha Hadid's signature shape which is asymmetrical and organic
5	Mosque Façade in architecture oriental Chinese style	The facade of the mosque that was created was not as expected. There is an oriental Chinese style, but the other styles are not related to prompts.
6	Mosque Façade in architecture contemporary style	The facade of the mosque that was created does not only seem stiff, but also dynamic to keep up with the current era.
7	Indonesian Traditional Mosque Façade	The facade of the mosque that was created does not reflect traditional Indonesian architecture, because instead it looks like architecture from Thailand and Vietnam
8	Indonesian Modern Mosque Façade	The facade of the mosque that was created does not yet reflect Indonesian modern architecture as seen from the lack of identity which gives the impression that the mosque is part of Indonesian architecture

CONCLUSION

Application of household financial management to PNM Mekaar Syariah customer households in Jambesari District, Bondowoso Regency, Part of big is in accordance with Sakinah finance. Dalam konteks konsumen PNM Mekaar Syariah di Kelurahan Jambesari, Bondowoso, Family financial management practices are still simple and limited by uncertain income constraints and a lack of understanding of financial literacy. Nevertheless, this research shows that most of their family financial management practices are in accordance with the Sakinah financial principles in Islam.

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