

AI-Driven Furniture Design: Bridging Creativity and Manufacturability in the Digital Age

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Abstract:

Artificial intelligence (AI) technology has changed many design approaches at the time. Designing furniture using AI platforms and applications to simulate designers' ideas into a 3D form has a crucial effect on the future of design and its workflow. The technology was made available for non-designers and amateurs to try their ideas raising questions among designers about the new technology and its possibilities. The research aims to investigate whether it is possible to rely on the designs produced by AI or if it is just a tool to help the designer to provide a new set of ideas that can enhance their ideas and push their design boundaries. In order to evaluate the extent of this technology on the design process and design implementation a questionnaire for (100) furniture designers was made. Experimental designs were conducted using AI on the same platform with the same prompt to understand the AI approach to furniture design. These designs were analyzed for their manufacturability and whether we can rely on these designs to replace the designer's skills or if it's just a fancy tool that needs a reformat. The questionnaire results showed that 70% of the samples agreed that AI designs can help designers in their sketches and serve as an initial idea for new design approaches. The research provides recommendations to designers and academic institutes about the importance of adopting and working with AI technology benefiting from its capabilities and its impact on creativity and innovation in design.

Research Background: Design is an innovative process that originates in mind and is directed by the designer to appear in a physical form. Recently, the development of design technologies and the emergence of artificial intelligence (AI) applications in furniture design raised many questions in designers' society. These applications have triggered a new approach to design that is even available for amateurs and non-specialists. The beta version launched by (Midjourney) - a self-funded computer research laboratory working on innovative design and artistic creativity tools – was a starting point for a creative design approach that creates images from text.

Research Problem: The research was a result of artificial intelligence applications in furniture designs today. The research question is (Can designers rely on designs produced by artificial intelligence technology or they are just tools to help the designers present their ideas?). This question leads us to other sub-questions as the following: How can designers benefit from this technology in the near future? What is the impact of this technology on the future design practices?

Research Objectives: The research aims to study the use of artificial intelligence in furniture design and to investigate whether it is possible to rely on the designs produced by AI for manufacturing or if the designs need a reformat.

Research Significance: The research significance shows the applications of artificial intelligence technology and its contribution in the field of furniture design in addition to providing an understanding of technology aspects and its impact on futuristic practices.

Research Methodology: The research applied an experimental approach by using AI online platforms to generate furniture designs. The research also applied a descriptive-analytical approach through a questionnaire of furniture designers on their opinions about AI designs and their insights on the influence of this technology on the profession's future.

Results: The questionnaire results for the designers were Collected, summarized, and presented as shown in Table 1. The level of experience ranged from one year up to more than five years as the following: From 1

but less than 3 years (30%), From 3 but less than 5 years (60%), From 1 but less than 3 years (10%). According to their job responsibilities, 60% of the questionnaire sample worked in the design office, while 30% worked in the technical office. Only 10% worked in quality control.

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Artificial Intelligence, Furniture Design, Furniture Manufacturing, Machine Deep Learning, Futuristic Design.

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