

**“The impact of the use of artificial intelligence applications  
in interior design and the monitoring of the pros and cons  
through applied experiments”**

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**Abstract:**

Artificial intelligence applications have become the main concern of the era, and are the focus of the main dialog now, as these applications have invaded all the different fields, and save a lot of effort, time and cost, and we see this in many fields, starting from the medical, agricultural, industrial, engineering and many different fields, especially in the field of interior design, we see many different applications in this field, We find the product of several different and varied designs in just a few minutes or even seconds, without the cost of time and effort, but the question remains what is the role of the designer And what are the pros and cons of these applications And is it possible to dispense with the human role of design , And in this research An applied study of several design experiments using multiple applications of artificial intelligence in interior design, and monitoring the pros and cons of each experiment.

**Key words:**

Artificial intelligence, artificial intelligence applications in design, development of design programs.

**Introduction :**

The design process is the main concern of every designer who submits to design a new project, and reaching the design idea and design line is one of the essential important elements for the beginning of design, and it is the most important stage that takes a lot of time and effort to reach a successful idea that the designer can start, and the designer uses the usual design programs such as 3d max, autoCAD and various three-dimensional design programs, which take time and effort and several solutions and experiments to reach the required proposal, and here come artificial intelligence applications to provide steps of effort, Research and initial drawings for the designer, we find by simply typing a description or selecting a type design and entering the data of the design process, there are several design proposals and multiple ideas from which the designer can choose the appropriate design, as these applications deal with a huge amount of data and super fast, with continuity in production without boredom, effort or fatigue, regardless of the surrounding working conditions, to become artificial intelligence programs are one of the main pillars of the next stage, and will certainly show over time the means to avoid the disadvantages and drawbacks of these applications.

**The search problem:**

Designers are completely unfamiliar with the applications of artificial intelligence in interior design and its advantages and disadvantages.

**The importance of the research :**

Identify and benefit from different artificial intelligence applications in the field of design process management. Avoiding the negative and taking advantage of the positive.

**Research Hypothesis :**

Artificial intelligence software design plays an important role in the development of the design process.

**Research topics:**

The research consists of three axes, they are:

- 1-applications of artificial intelligence in interior design
- 2 -applied experiments of different design ideas using different artificial intelligence applications.
- 3 -Monitoring the advantages and disadvantages of artificial intelligence applications.

**Definition of artificial intelligence :**

The term artificial intelligence can be defined as the ability of digital machines and computers to perform certain tasks, where these applications work as a simulation and imitation of intelligent beings and human thinking, such as the ability to think or learn from previous experiences, where artificial intelligence programs aim to achieve the best results while saving effort and time and rapid collection of information, so they work on learning and understanding like humans, where these applications interact and try to achieve the best results.

### Types of Artificial Intelligence:

Artificial Intelligence can be divided in various types, there are mainly two types of main categorization which are based on capabilities and based on functionality of AI. Following is flow diagram which explain the types of AI.

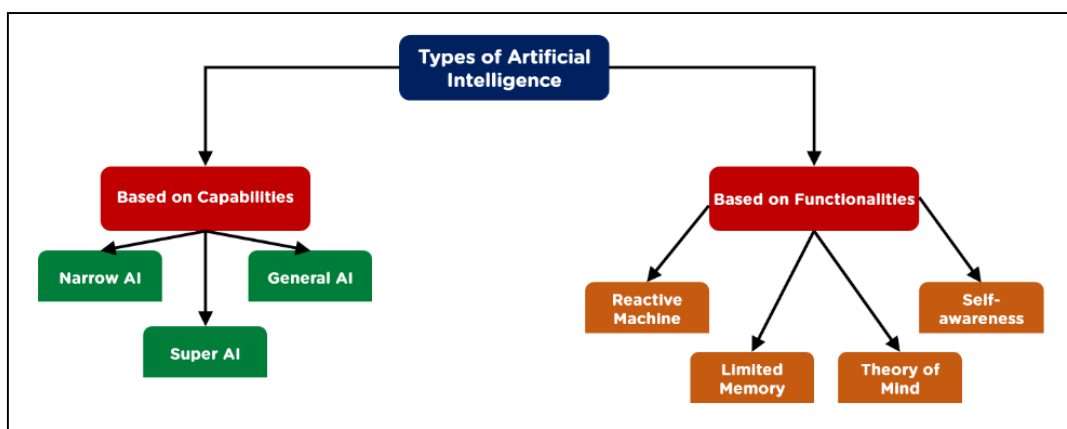


Figure (1) The different types of artificial intelligence

### AI type-1: On the basis of skills

#### 1.Low AI or narrow AI:

Weak AI is a type of AI that can perform a specific task intelligently. The most common and currently available AI in the world of AI is weak AI. Narrow AI cannot perform beyond its field or limitations as it is only trained for a specific task. Therefore, it is also called weak AI. Narrow AI can fail in unpredictable ways when it goes beyond its limits. Apple Siri is a good example of narrow AI. However, it operates with a limited, predefined set of functions. Playing chess, making purchase suggestions on e-commerce sites, self-driving cars, speech recognition, and image recognition are some examples of Narrow AI.

1- [Types of Artificial Intelligence - Javatpoint](#)

2- [4 Types of AI: Getting to Know Artificial Intelligence | Coursera](#)

**2. General artificial intelligence :**

General AI is a kind of intelligence that could perform any kind of intellectual task with the efficiency of a human being. To create such a system that could be smarter and think like a human by itself is the idea behind general AI. At present, there is no such system which could come under the general AI and which could perform any task as perfectly as a human being. The development of general AI machines is now the focus of researchers around the world. Because general AI systems are still under research. It will take a lot of effort and time to develop such systems.

**3. Artificial Superintelligence:**

Super AI is a level of system intelligence at which machines could surpass human intelligence and perform any task better than humans with cognitive characteristics. It is an outcome of general AI. The ability to think, reason, solve puzzles, make judgments, plan, learn, and communicate by itself are some of the key characteristics of strong AI. Super AI is still a hypothetical AI concept. Developing such systems in real is still a world-altering task.

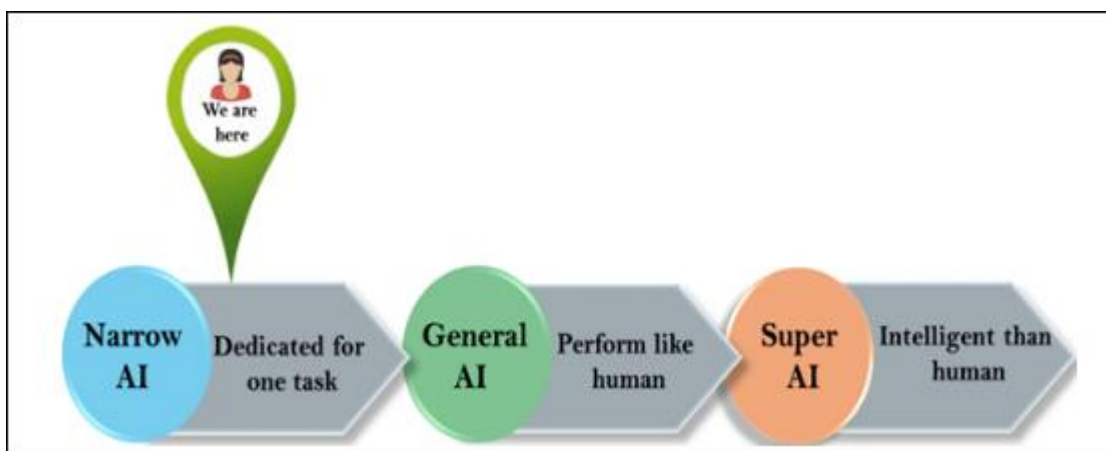


Figure (2) Type 1 of artificial intelligence

## **2. Limited storage**

A machine with a limited memory can store its past experience or some data for a short period of time. These machines are only able to use the stored data for a limited period of time. Self-driving cars are one of the best examples of a system with a limited memory. These cars can store the recent speed of nearby cars, the distance of other cars, the speed limit, and other information to navigate the road.

## **3. Theory of Mind**

Theory of Mind AI should have an understanding of human emotions, people, beliefs, and be able to interact socially like humans. This type of AI machines are not yet developed. However, researchers are making a lot of efforts and improvements to develop such AI machines.

## **4. Self-knowledge**

The future of Artificial Intelligence is self-aware AI. These machines will be super intelligent. They will have their own consciousness, emotions and self-awareness. These machines are becoming more intelligent than human beings. Self-aware AI does not yet exist in reality and is a hypothetical concept.

## **The impact of using artificial intelligence applications in interior design :**

### **Stages of interior design :**

The designer goes through several stages of design until he reaches his final design, where he first begins to search and collect information and see the designs that correspond to the client's taste, and that after holding several discussions and

dialogues with the client, the designer reaches the client's favorite model of designing furniture pieces or colors for walls, mattresses, carpets and other interior design elements, and his thinking in drawing sketches, determining the dimensions, preparing drawings and the perception that the client wants to reach. It is a difficult stage to collect information and data and work on the design either using a computer or manually, and then he presents the design to the client, and the client may want to make some adjustments, which leads to the designer returning again to the design and visualization stage, and after the client's approval comes the cost presentation, which is expected for the client, where the design was conceived and design solutions are found in accordance with the cost that the client sets for design and implementation, and the designer begins with the executive drawings and start implementation.

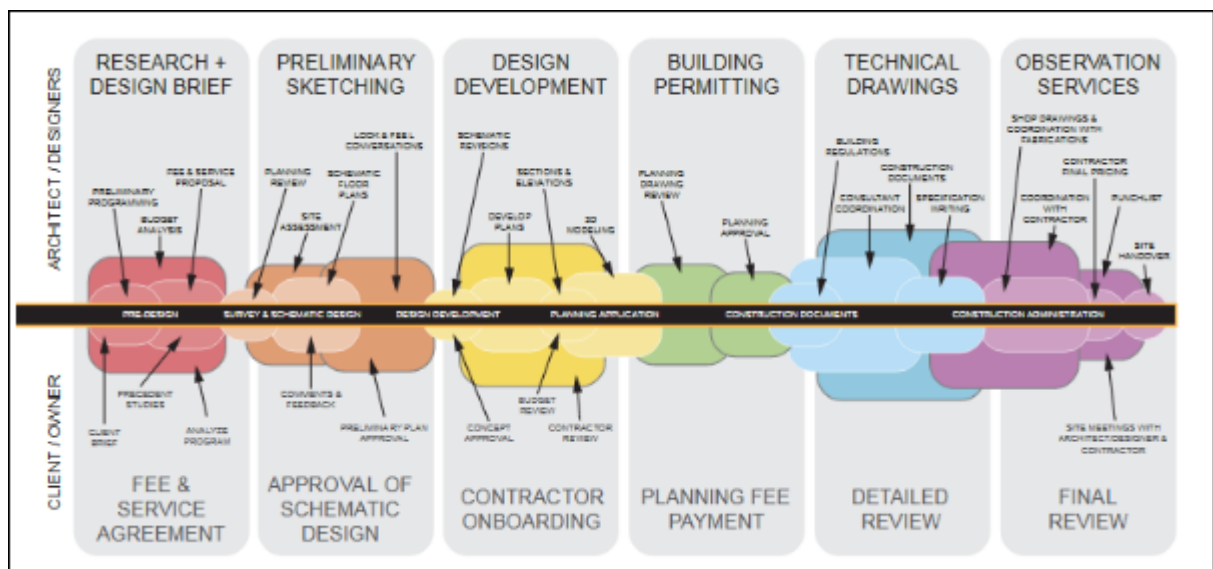


Figure (3) Stages of interior design carried out by the designer

And here comes the role of artificial intelligence applications, where they contribute greatly to saving effort, time and money, so they collect the necessary data for design and work on producing several solutions, the designer chooses the most suitable for him from those solutions with the possibility of changing the data to obtain different results, and there are multiple artificial intelligence programs and applications, and the following is a presentation of the various applications that can be used by the designer to reach the best design results while saving his effort, money and time .

**1- Using virtual reality applications in interior design**

Based on a person's lifestyle and preferences, artificial intelligence systems can recommend specific color palettes, furniture and design elements. This allows interior designers to personalize spaces based on a person's personality and lifestyle in a very specific way, which is a huge step forward. AI is unmatched in its ability to create designs based on a person's personality when it comes to creating customized designs. And there are many different design methods and applications, so we find what is known as virtual reality, which is an anomaly, the designer designs the space and the possibility of entering that design and moving inside it using several applications that support virtual reality, and the design can be entered after completion of it with the 3d max program to the virtual reality (VR) application, also some elements can be changed, such as moving chairs, changing colors and paintings, and redistributing the space, all this and more can be achieved with programs and applications that support virtual reality, there are many names, so we find augmented reality (AR), which is an



environment or a real place exists and we insert virtual elements into it, but virtual reality is a whole branch that we imagine And we design it and it doesn't really exist, and we also find what is known as mixed reality (MR) , which is a virtual reality (VR) and the augmented reality (MR) , and all these definitions come under the so-called extended reality (XR) .

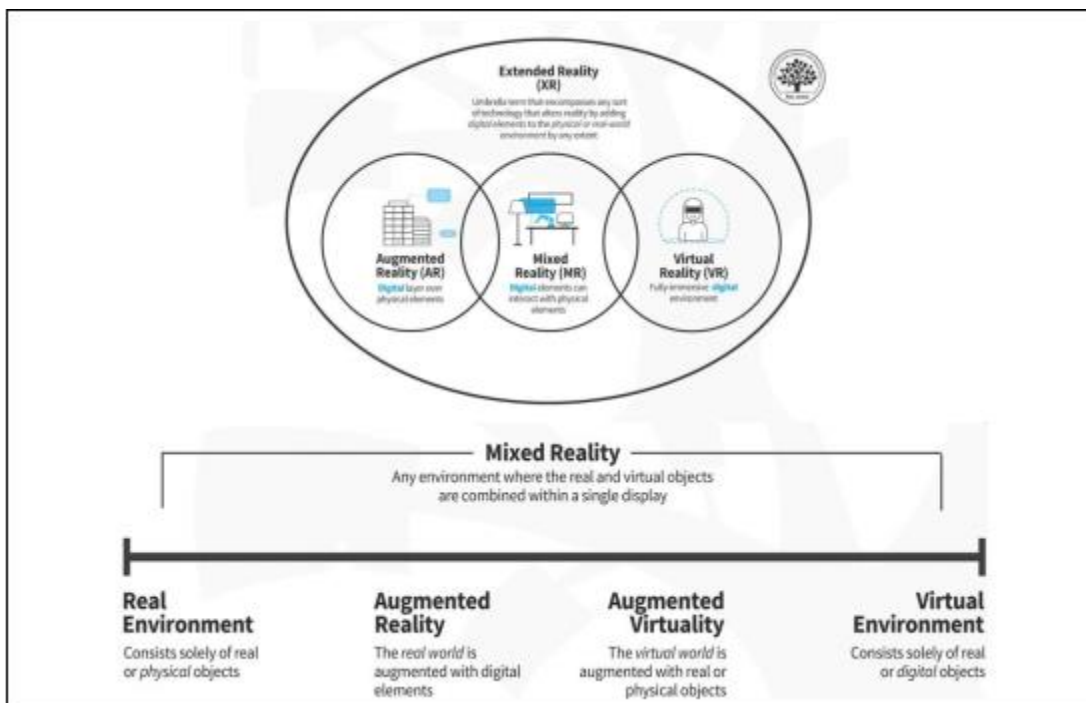


Figure (4) the Difference between AR vs. MR vs. VR vs. XR

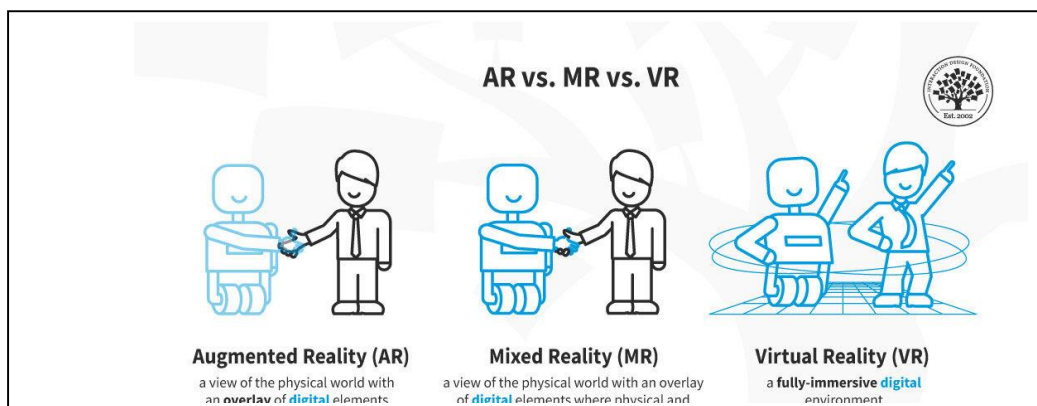


Figure (5) In MR experiences the user can interact with both digital and physical elements.



Figure (6) Using virtual reality applications in interior design

Based on your design ideas, virtual reality creates virtual representations of spaces. Augmented reality superimposes design elements onto real rooms, essentially allowing you to test certain designs and floor plans in your own room to see how they will look. The tools for virtual reality and augmented reality are available on a wide range of compatible devices. One simply needs a device that supports the software and AR or VR software that lets one create virtual and augmented designs.

It seems that this type of technology will become increasingly popular in the interior design industry in the future. People are already seeing the benefits of seeing their designs in this way. It allows you to visualize how things will look in your space without having to build physical prototypes. In the interior design planning process, AI can help save a lot of time and money. RoomSketcher, Planner 5D, Interior Flow and Foyr are some great software for this.

#### 1- **Artificial intelligence programs for interior design**

The following is an application demo of several programs that use artificial intelligence to prepare designs :

We note that most of the programs are based on giving a design concept after entering a proposed concept, and the following are some of those programs I entered my design and then chose several data to get the result .

- AI ROOM PLANNER :

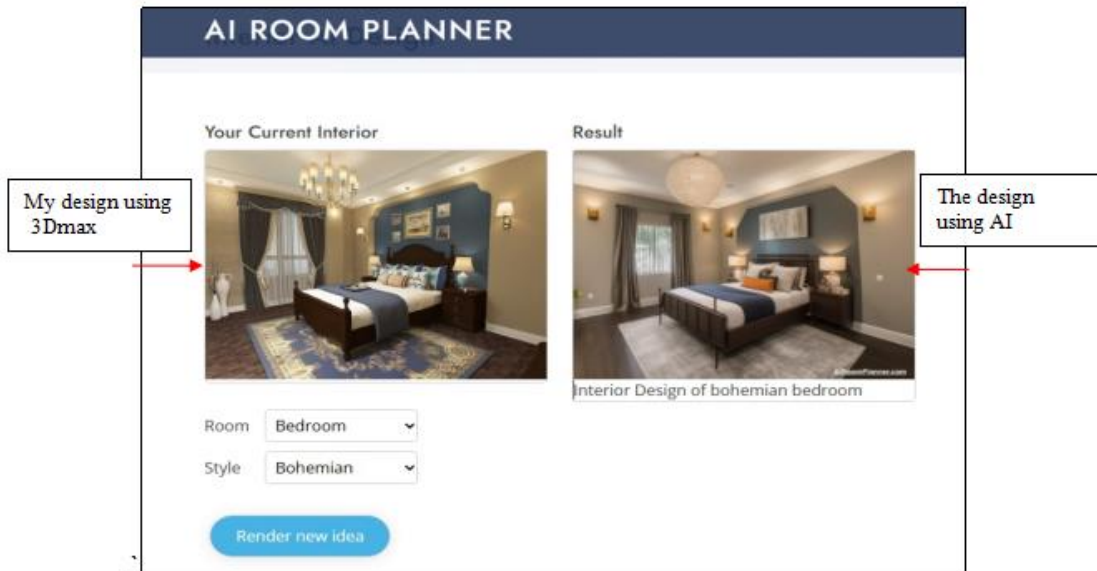


Figure (7) In this design, the basic elements of the room have been retained and adhered to and not changed.

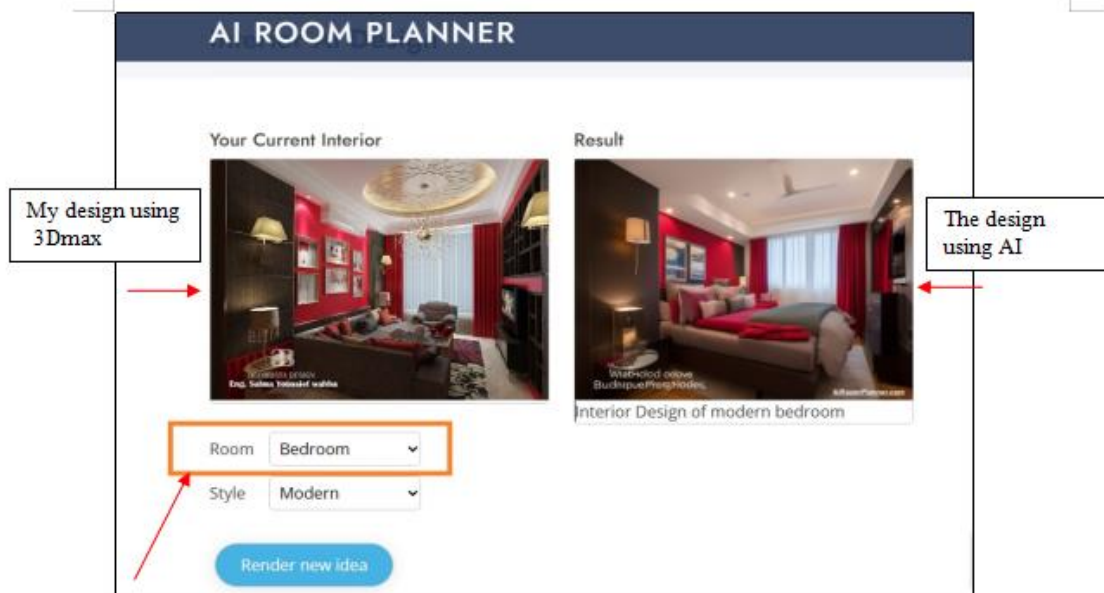


Figure (8) The function of the room was changed from a living room to a bedroom, noting the closeness of the two designs.

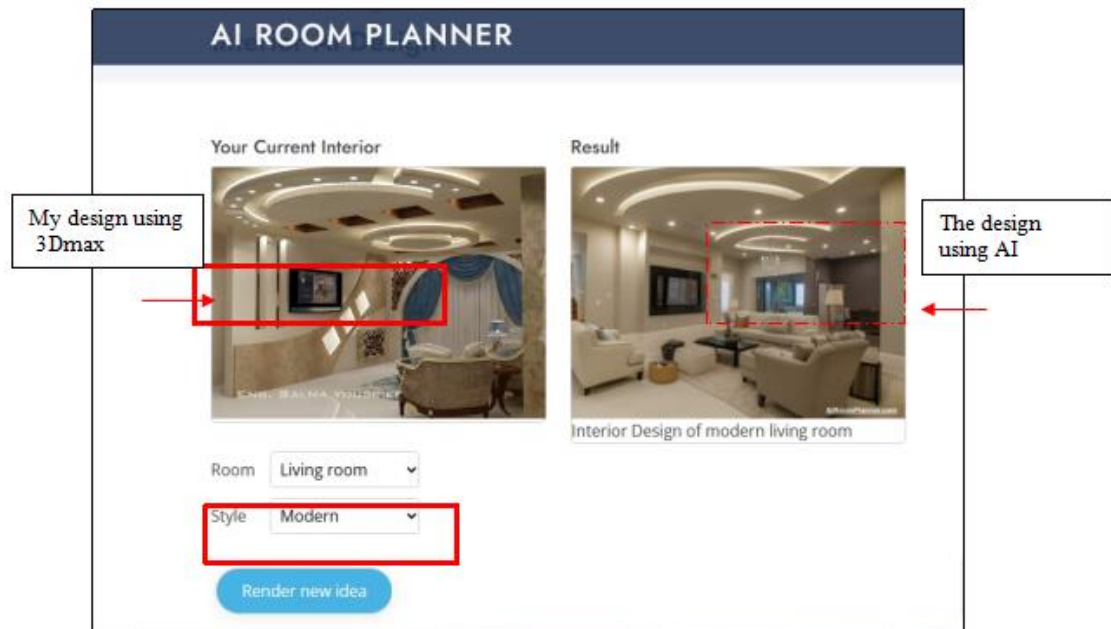


Figure (9) The side of the room was changed and another vacuum was assumed .

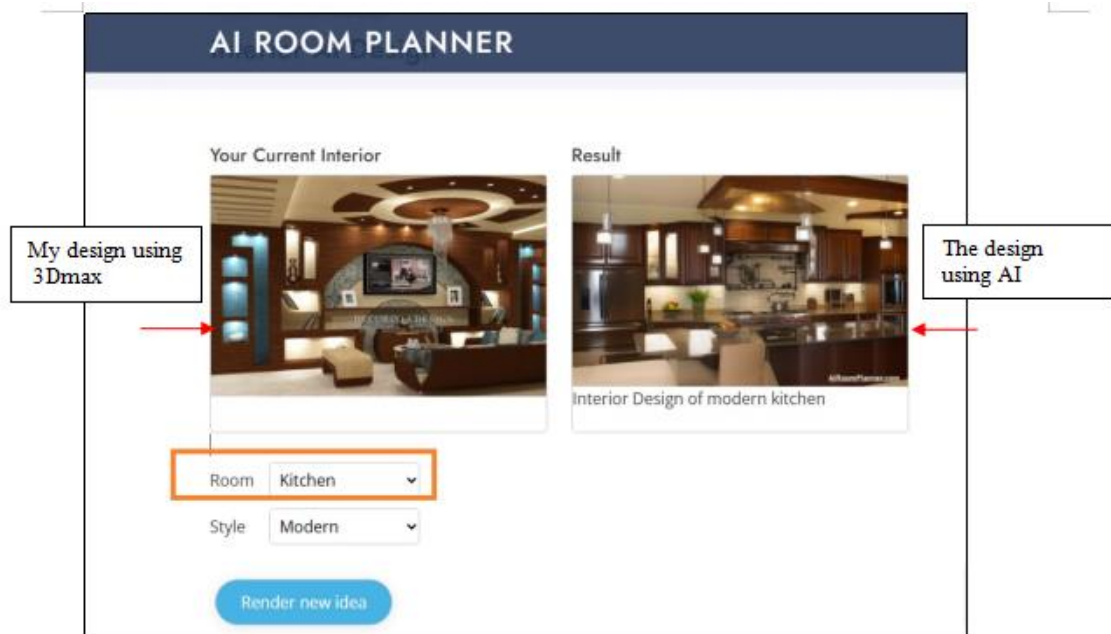


Figure (10) We find the possibility of changing the function of the room while retaining the same design line, so the function was changed to a kitchen.

- **FOTOR AI interior design :**

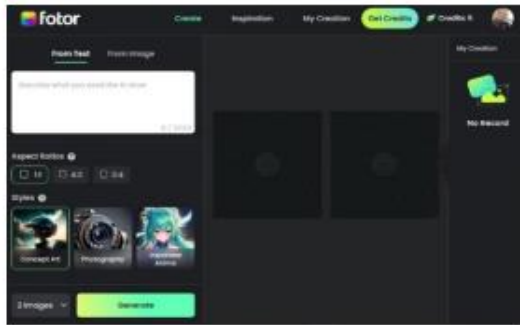


Figure (11) External appearance before using AI .



Figure (12) We first upload a photo and here I uploaded my design with 3D max program .



Figure (13) Then we choose the number of designs you want to get.



Figure (14) The program prepares the required design.

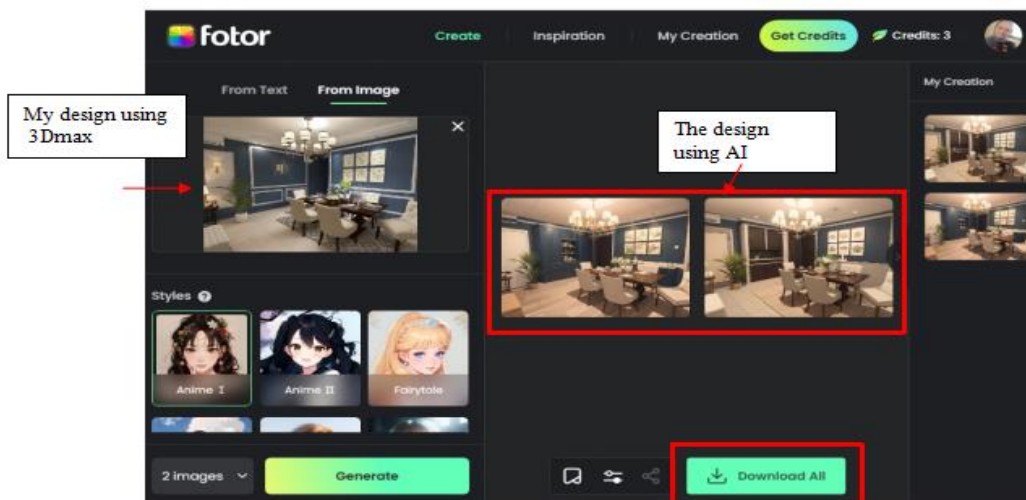


Figure (15) The required designs appear and can be downloaded individually and in high quality.

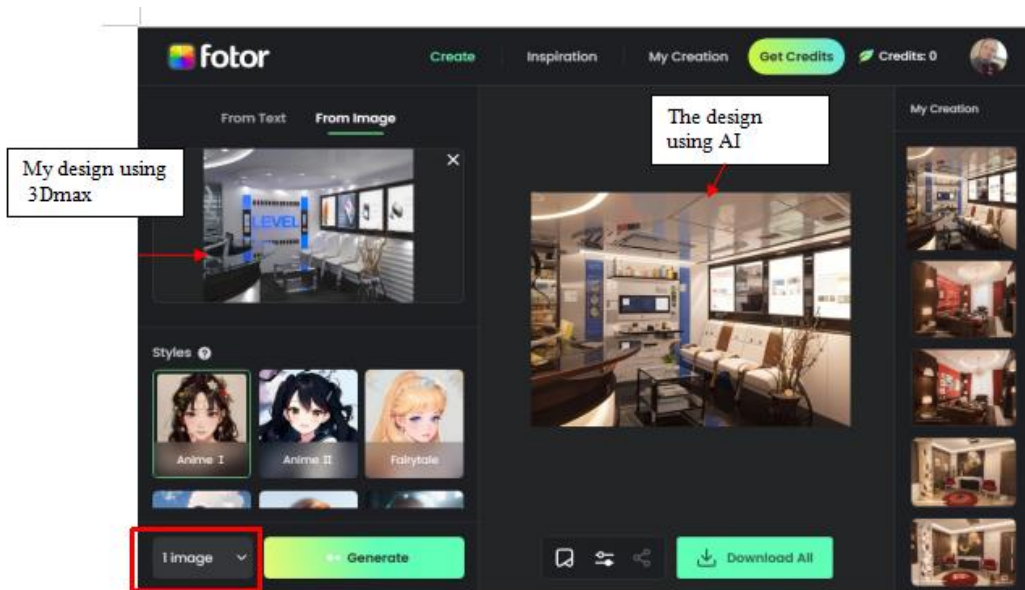


Figure (16) I uploaded my design to the 3D-MAX program and chose to show one result for the design.

- **Reroom.ai** :



Figure (17) External appearance before using AI .



Figure (18) The design that you have designed is loaded with 3D MAX.



Figure (19) Then choose the shape of the Mode and the design line that I like in a similar way.

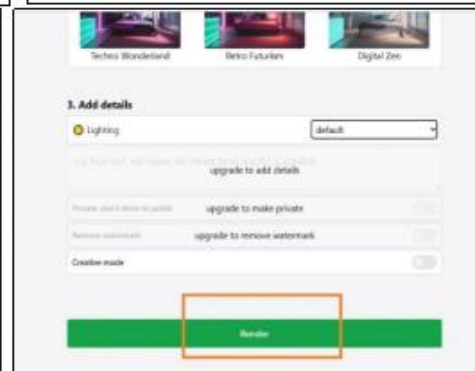


Figure (20) Click to render the design and its appearance.

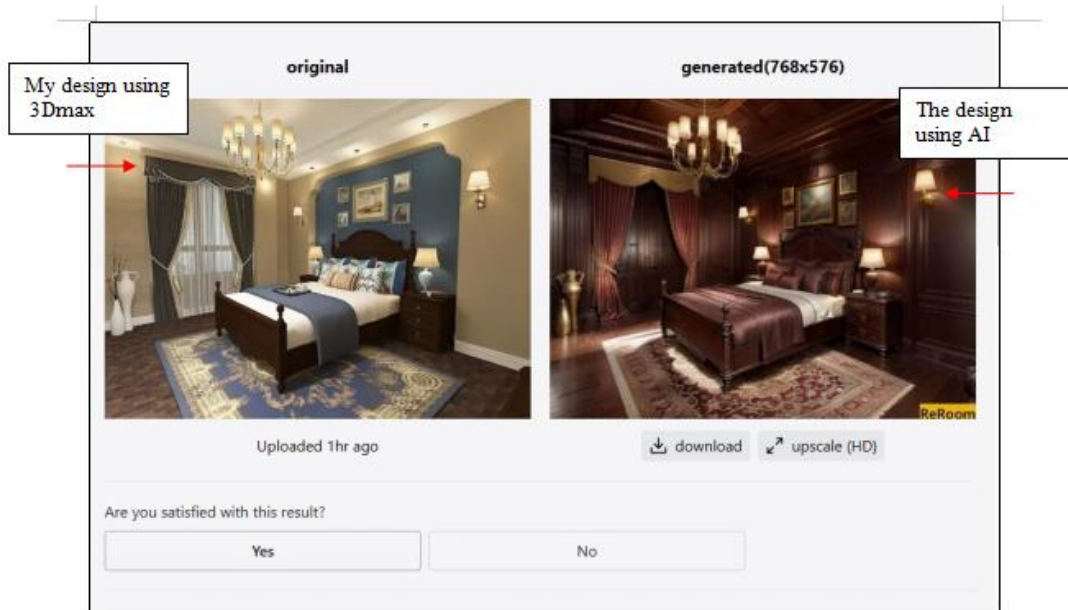


Figure (21) The new design is shown using AI program .

**Homedesigns.ai :**

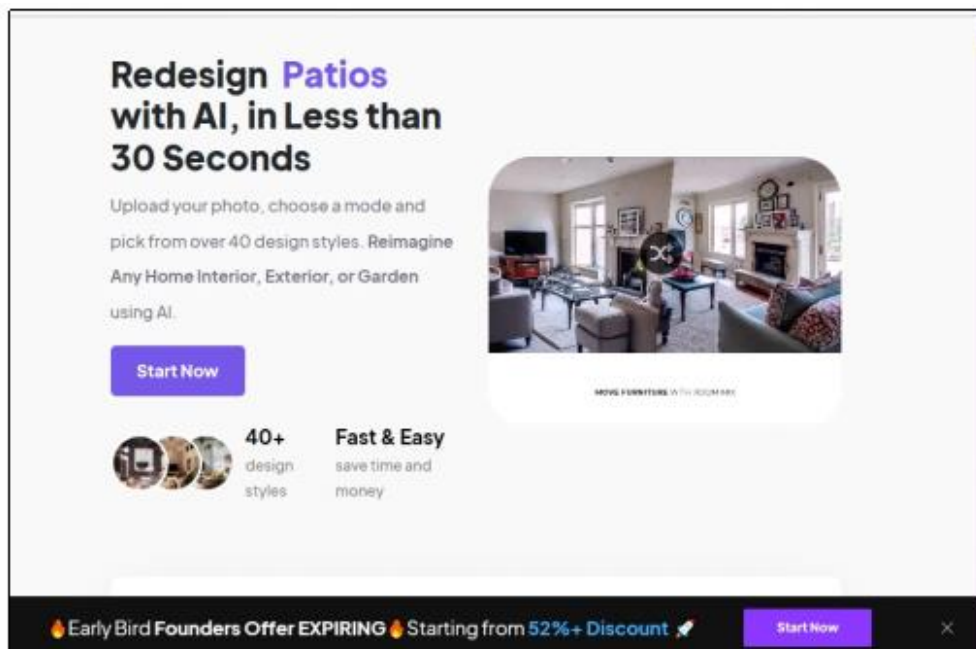


Figure (22) press start now to create the new design .

- [ReRoom AI - Photorealistic Renders for Interior Design. Enhance your SketchUp results!](#)
- [HomeDesignsAI - Generate UNLIMITED Design Ideas with AI](#)

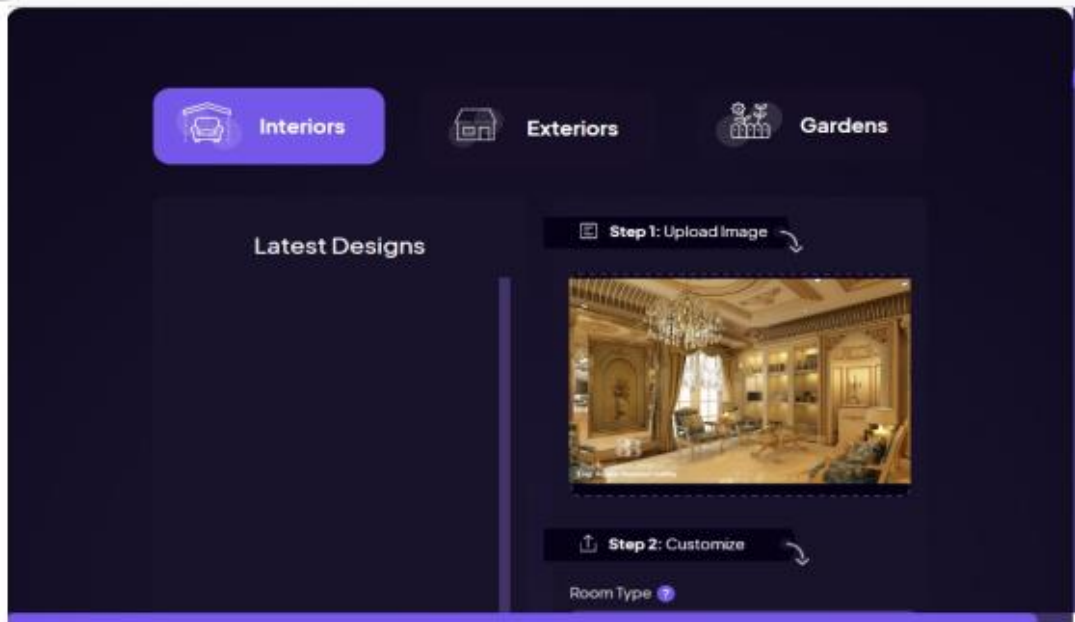


Figure (23) The design that you have designed is loaded with 3D MAX.

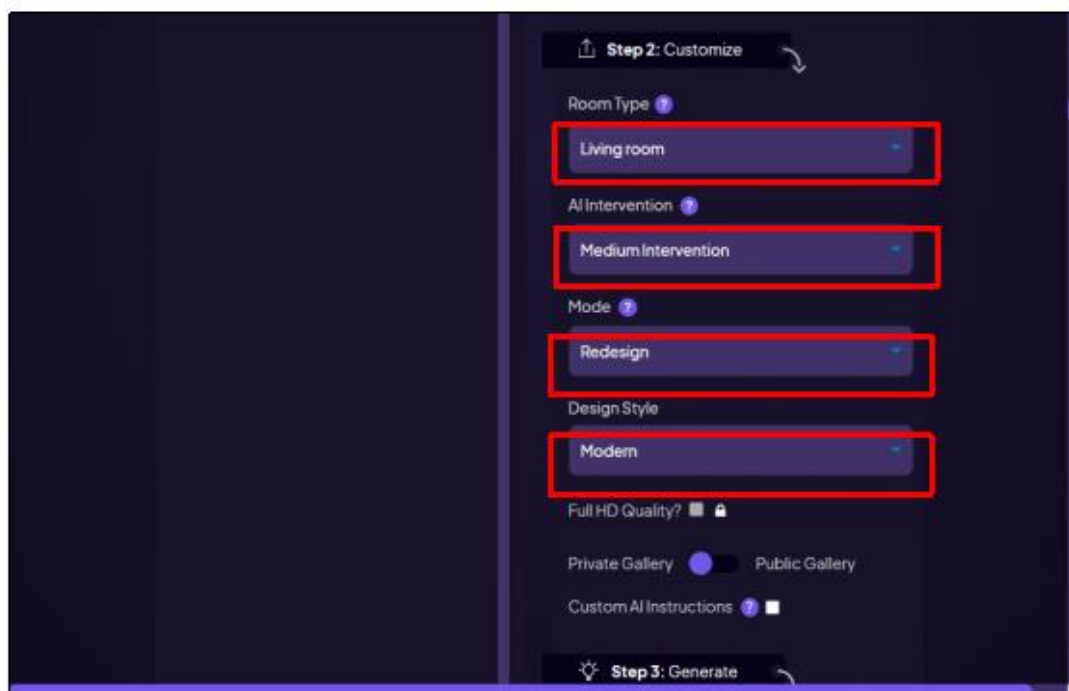


Figure (24) Choosing the design and functionality of the room and the mood .



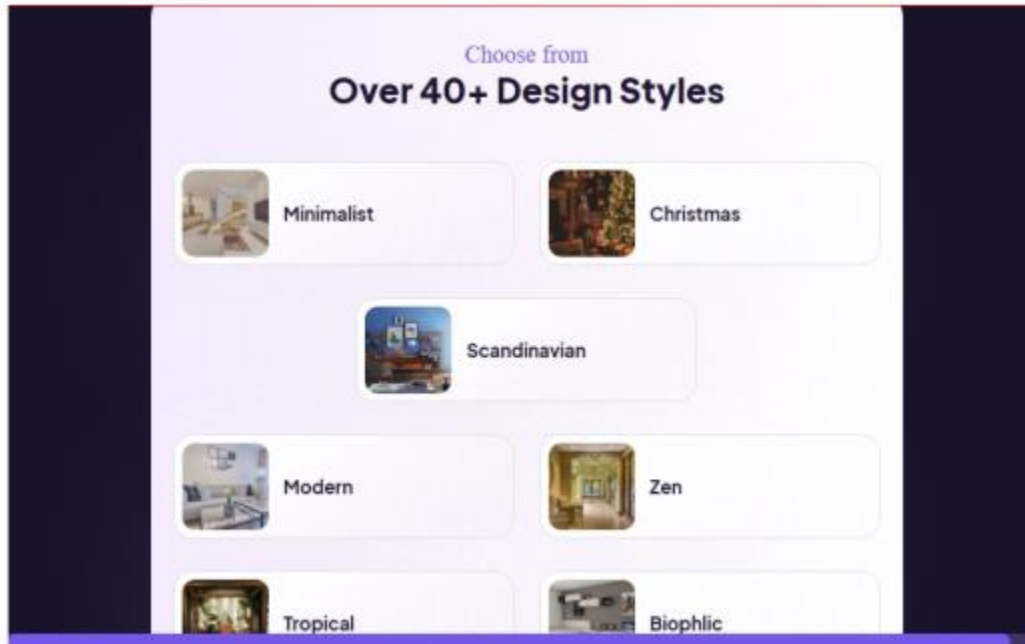


Figure (25) also can Choos the design style photo .

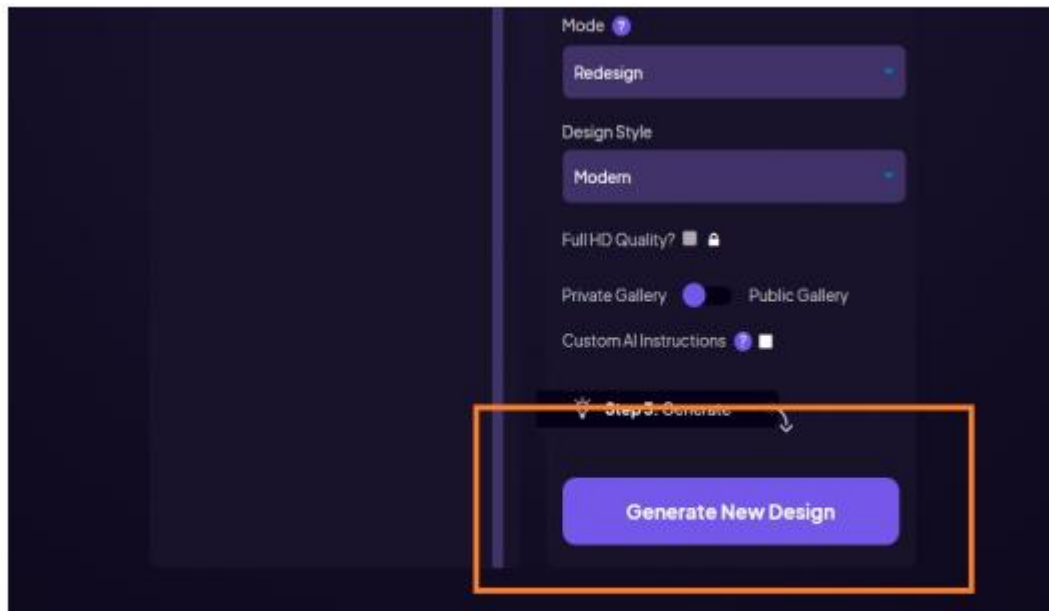


Figure (26) then we can press generate to get the new design .

- Midjourney

This application is different, where the user writes and explains the desired design without entering any photos, but it does a detailed explanation of the design of the color of floors or walls, the materials used, lighting, whether there is natural lighting or not, columns if they exist, Windows, whether there are curtains or not, the colors of furniture pieces, the intensity of lighting and the design line, then the program prepares a visualization according to the data entered. And by searching, we find that the design that is being conceived does not exist in advance on internet sites, that is, it is an individual design .

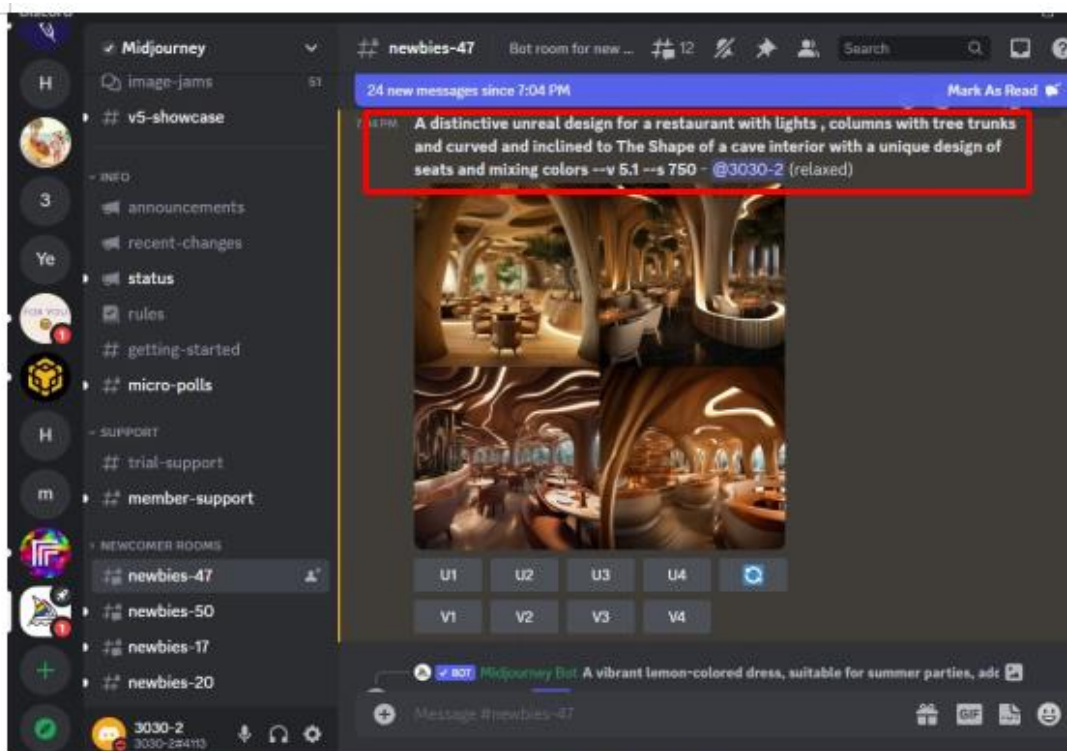


Figure (27) Here I have explained the required design (Coffee shop) .



Figure (28) The program complements the desired view and is easily downloaded in high quality (Coffee shop) ..

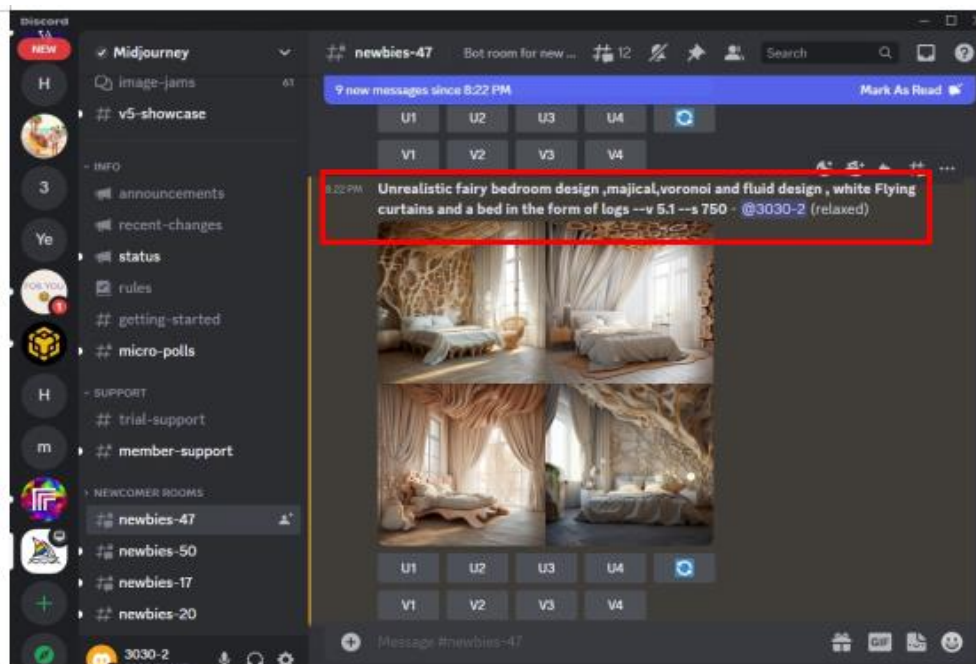


Figure (29) Here I have explained the required design (Master bedroom).

[Midjourney](#)

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Figure (30) The program complements the desired view and is easily downloaded in high quality. (Master bedroom).

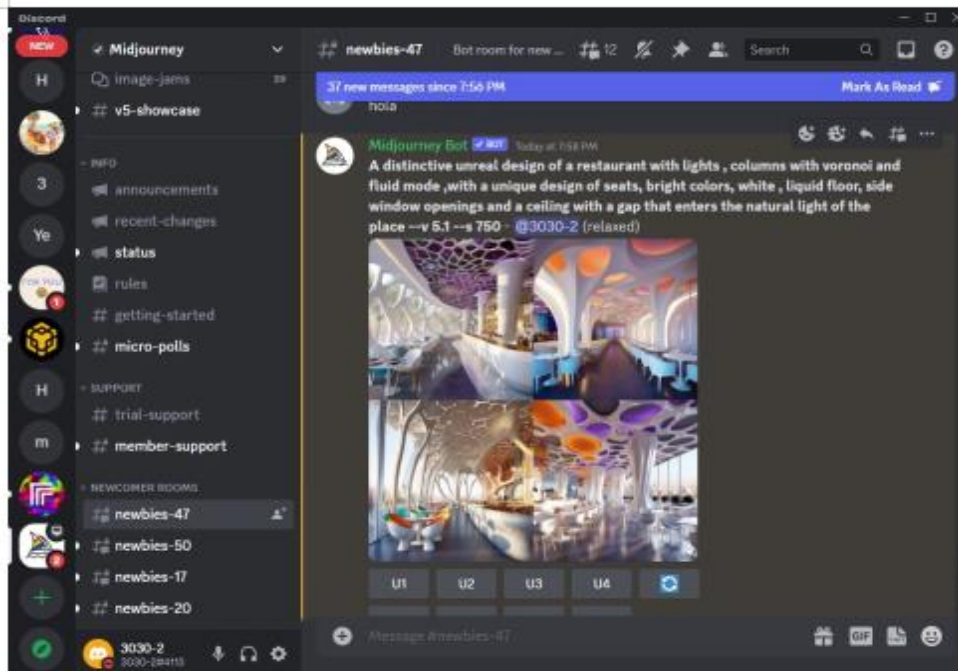


Figure (31) Here I have explained the required design (Restaurant).

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Figure (32) The program complements the desired view and is easily downloaded in high quality, (Restaurant).

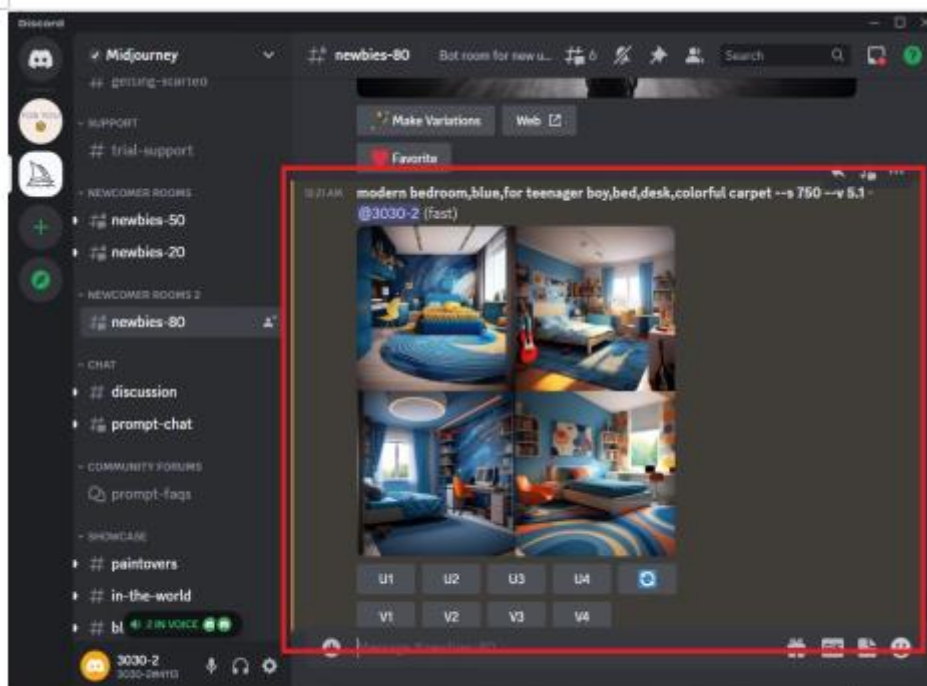


Figure (33) Here I have explained the required design (Teenager bedroom).



Figure (34) The program complements the desired view and is easily downloaded in high quality, (Teenager bedroom).

From the above, we note the participation of the negatives in most applications as well as the positives, the human element is indispensable, and it is possible to find in the future an improvement in these applications after users monitor the negatives, and below, a comparison between the negatives and positives of using artificial intelligence applications in interior design according to what was applied in previous applications.

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<b>cons of using artificial intelligence applications in interior design</b>	<b>Pros of using artificial intelligence applications in interior design</b>
<ul style="list-style-type: none"> <li>- Inaccuracy in reading details and spaces, which results in wrong conclusions, such as the places of door openings and windows.</li> <li>-The absence of dimensions, executive drawings, horizontal projections and sectors.</li> <li>-Loss of innovation and creativity in design.</li> <li>-The appearance of irrational results of internal solutions of blanks.</li> <li>-The results are very close to the original image that is lifted from the designer and the lack of innovation in design or noticeable change.</li> </ul>	<ul style="list-style-type: none"> <li>-The speed of appearance of results.</li> <li>-Saving time and effort by design.</li> <li>-High quality of the resulting images and the possibility of downloading them .</li> <li>-The possibility of working with applications at any time and for any number of hours.</li> <li>-The possibility of repeating attempts to the results several times.</li> <li>- Saving money in paying an employee to modify designs .</li> </ul>

**Finding :**

- The designer must keep up with the existing development and modern programs and applications.
- Human thought and designer creativity cannot be dispensed with, no matter how science develops.
- Programs and applications always need a human mind and thought to control them to achieve the best results.
- The lack of interference of the designer's thought and guidance leads to the appearance of several errors and incorrect solutions.

**Recommendation :**

Designers should be aware that while AI can be helpful, it should never be a substitute for the creative process. With a strong concept and the use of algorithms to execute the design, designers can achieve the best results. Rather than letting AI dictate the direction of a project, it's important for designers to maintain their unique voice and

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perspective and use AI to improve and refine their concepts. Allowing AI to take complete control can result in the final design lacking uniqueness and authenticity. That's why it's so important that developers fully understand how AI works and how its features and algorithms fit with the developer's vision and goals. Designers need to remember that a balance of human creativity and algorithmic support is required for optimum results. By controlling the AI, designers can produce truly original and authentic designs that will endure.

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[- Evolution of AI role in architectural design: between parametric exploration and machine hallucination](#)

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**Web sites :**

[- Types of Artificial Intelligence - Javatpoint](#)

[- 4 Types of AI: Getting to Know Artificial Intelligence | Coursera](#)

[- 7 Types of Artificial Intelligence | Built In](#)

[- Beyond AR vs. VR: What is the Difference between AR vs. MR vs. VR vs. XR? | IxDF \(interaction-design.org\)](#)

[- Interior AI Design - Get tons of home design ideas rendered by AI \(airoomplanner.com\)](#)

[- HomeDesignsAI - Generate UNLIMITED Design Ideas with AI](#)

[- Create 3D Visualizations & Rendering in Minutes | Coohom](#)

[- HomeDesignsAI - Generate UNLIMITED Design Ideas with AI](#)

[- Midjourney](#)

[- ReRoom AI - Photorealistic Renders for Interior Design. Enhance your SketchUp results!](#)