

The Impact of Artificial Intelligence on the Visual Identity of North Sinai Governorate - Egypt

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Abstract

Every city has a special identity depending on the Natural environment, human environment, and artificial environment. The visual identity of a city refers to the unique characteristics and elements that make a city visually distinct, such as its architecture, urban design, public spaces, and landmarks. According to the importance of identity for cities, it should be studied that all sides of cities could affect their identity. Technological development has an important role in all sides of life, especially in architecture. Therefore, the study had been used AI applications in finding the shape of identity for the North Sinai government - Egypt in. Also, it has included studying the elements of the identity of the North Sinai Governorate from all sides the Natural environment, human environment, and artificial environment. Additionally, it has studied using AI to find the application of the elements of the identity of the North Sinai Governorate at the building. The finding explains the role of AI applications in designing buildings according to the identity of the city. Additionally, it explains the main geometric shapes that could be used to design buildings in North Sinai.

Keywords: Artificial Intelligence (AI); identity; Natural environment; Human environment; Artificial environment.

1. Introduction:

The visual identity of a city refers to the unique characteristics and elements that make a city visually distinct, such as its architecture, urban design, public spaces, and landmarks. A city's visual identity is shaped by various factors, including its history, culture, geography, and economic development [1,2].

Architecture is a key element of the visual identity of a city, as it shapes the city's skyline and street level. Different architectural styles, materials, and forms can create a city's unique and recognizable visual character[3]. Landmarks, such as famous buildings, monuments, and statues, can also contribute to the visual identity of a city[4]. Also, Urban design is another essential aspect of the visual identity of a city. A city's layout, circulation, and public spaces can create a sense of place and contribute to the city's visual character[5].

The visual identity of a city can also be shaped by its natural and cultural elements, such as its climate, topography, vegetation, and cultural heritage[6]. In recent years, the visual identity of

cities has been increasingly shaped by globalization, urbanization, and technology[7]. The impact of these factors can be seen in the growth of high-rise buildings, uniformed architecture, and the homogenization of cities[8]. However, cities must maintain distinct visual identities that reflect their history, culture, and context[9]. The result of the increase using technology in a lot of sides of architecture that made Artificial intelligence applications play important role in all sides of the design.

Artificial intelligence (AI) in architecture refers to the use of AI techniques and technologies to assist in designing, constructing, and managing buildings and other architectural structures[10]. The purpose of AI in architecture is to improve the efficiency, effectiveness, and sustainability of the design and construction process and enhance the user experience of buildings [11].

The role of AI in architecture is to provide architects and designers with tools and algorithms that can help them to generate and evaluate design options, optimize building performance, and analyze the impact of design decisions on the built environment [12]. AI can also improve the construction process by automating repetitive tasks like scheduling and managing construction activities [13].

The importance of AI in architecture lies in its ability to help architects and designers to create more innovative, efficient, and sustainable buildings [14]. AI can also help improve buildings' user experience by providing enhanced functionality and comfort [15].

The advantages of AI in architecture include the ability to generate and evaluate design options quickly and efficiently, optimize building performance, analyze the impact of design decisions on the built environment, and automate repetitive tasks [16]. The disadvantages of AI in architecture include the potential for AI-generated designs to be less creative or unique than designs created by human architects. The potential for AI-generated designs to be less responsive to users' specific needs and preferences. Also, the potential for AI-generated designs to be less contextually sensitive to a site's cultural, social, and environmental context [17].

AI's impact on the formation of the visual identity of cities is that it can help architects to design buildings that are more visually appealing, functional, and sustainable. AI can also help architects to create buildings that are more contextually sensitive to the cultural, social, and environmental context of a site, and can help to create a more visually diverse and interesting city[18,19,20]. However, the use of AI in architecture should be balanced with human creativity and expertise to ensure that the visual identity of cities is not homogenized and that the cultural and social context of the place is considered[8,9,21]. AI can be used to form the visual identity of a city in two ways as explained in **Figure 1**.

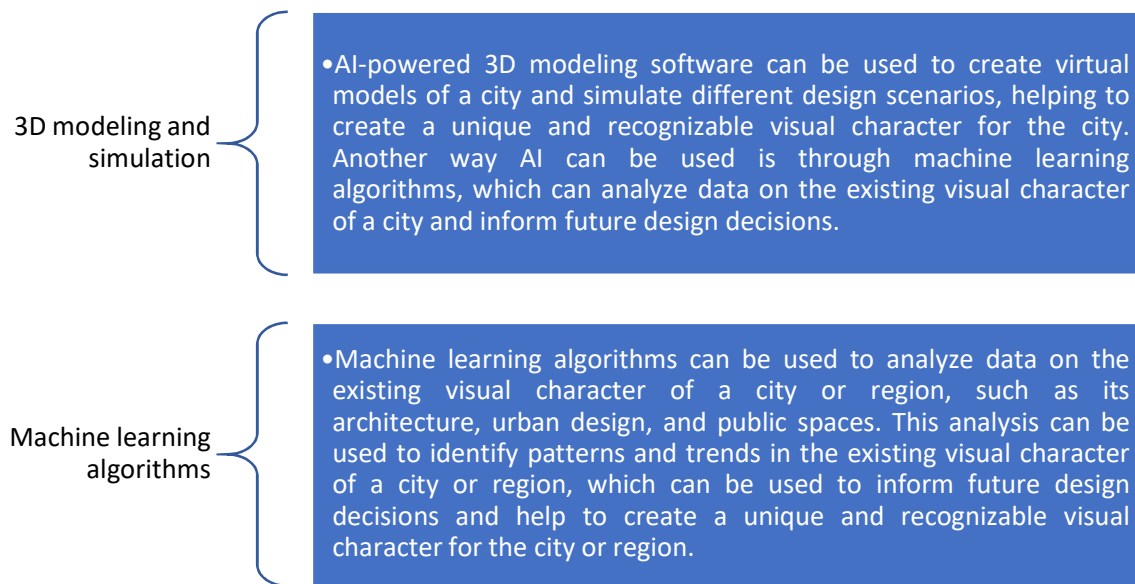


Figure 1 explains the ways that AI can be used to form the visual identity of a city.

Artificial Intelligence (AI) has the potential to play a significant role in forming the visual identity of a city or region, such as the North Sinai Governorate. AI can be used in various ways to create a unique and recognizable visual character for a city or region.

AI can also improve the efficiency of designing and constructing buildings and infrastructure in a city or region. For example, AI-powered design software can optimize building layouts, reduce construction costs, and improve energy efficiency. Also, it can help to create a more sustainable and livable environment for the residents of a city or region [22,23].

According to all previous studies, the visual identity of a city is a complex and dynamic aspect shaped by many different factors. It reflects the city's history, culture, and context and plays an important role in creating a sense of place and a unique and recognizable visual character for a city. Also, the visual identity of a city refers to the unique characteristics and elements that make a city visually distinct, such as its architecture, urban design, public spaces, and landmarks. These elements shape various factors, including history, culture, geography, and economic development. Additionally, AI has the potential to play a significant role in forming the visual identity of a city or region, such as the North Sinai Governorate. Through 3D modeling and simulation, machine learning algorithms, and optimization techniques, AI can be used to create a unique and recognizable visual character for a city or region while improving the efficiency and sustainability of the built environment.

2. Methodology:

This paper will include two steps, first step study the elements of the identity of the North Sinai Governorate. So, it has been made Introduction to North Sinai Governorate. After that, it has been studied the elements of identity for the region. The elements of identity for the region included three phases, the first phase studies the Natural environment. The second phase studies the Human Environment (Individual and society). The third phase studies the Artificial environment (Urban constituents).

The second step study using AI to find the application of the elements of the identity of the North Sinai Governorate at the building. This step includes four phases, the first phase studies the effect of AI on design building by using the elements of identity. The second phase studies the impact of AI at design buildings by changing the type of building. The third phase studies the effect of AI on designing buildings by using different Shapes for buildings. The fourth phase studies the role of AI application in the process of architecture presentation.

2.1. Step one:

In this step has been studied the identity of the North Sinai Governorate. This step includes an Introduction to North Sinai Governorate explain shaped by its rich history, diverse population, diverse economy, and unique geography and environment. After that, it has been studied the elements of identity for the region in three phases. The first phase studies the Natural environment such as Topographic, Climate, vegetation, general location and etc. The second phase studies the Human Environment (Individual and society) such as Socio-culture, History, population, culture, Socio-economic, and Psychological. The third phase studies the Artificial environment (Urban constituents) such as avenues, streets, equipment, buildings, and main streets.

Introduction to North Sinai Governorate:

The North Sinai Governorate, located in northeastern Egypt, has a rich cultural heritage and a diverse population. The governorate's identity is shaped by its history, geography, and the people who live there. The Bedouin tribes, who have lived in the region for centuries, have a strong presence in the governorate and play an essential role in shaping its identity [24]. The governorate is also known for its distinctive landscape, which includes the Sinai Peninsula, the Suez Canal, and the Gulf of Suez. Overall, the North Sinai Governorate's identity is a unique blend of culture, history, geography, and the people who call it home [25].

Another important element of the identity of the North Sinai Governorate is its economy. The governorate is home to several important industrial and agricultural activities, including mining, oil and gas production, and fishing. The Suez Canal, which runs through the governorate, is a significant source of income and employment for the local population [26]. Additionally, the governorate has some important military bases and facilities, contributing to its economy [27].

The presence of different religious groups also shapes the governorate's social and cultural identity. The governorate has a significant population of Coptic Christians, who have lived in the region for centuries and have unique customs and traditions. The governorate is also home to

several mosques and Islamic cultural centers, which reflect the region's strong Muslim heritage[28].

North Sinai Governorate also has a unique geographical and environmental identity. The governorate is in northeastern Egypt and bordered by the Mediterranean Sea and the Gulf of Suez. The governorate is known for its diverse landscape, which includes mountains, deserts, and coastal areas[29]. The governorate is also home to several protected areas, and it is home to a wide variety of plant and animal species [30].

Overall, the identity of the North Sinai Governorate is complex and multi-faceted, shaped by a rich history, diverse population, diverse economy, and unique geography and environment. identity of urban includes three elements Natural environment (Topographic, climate, vegetation, general location, etc) Human Environment (Socio-culture, History, population, culture, socioeconomic, Psychological), and Artificial environment (Avenue Street, equipment, buildings, main streets) as explained in **Figure 2**.

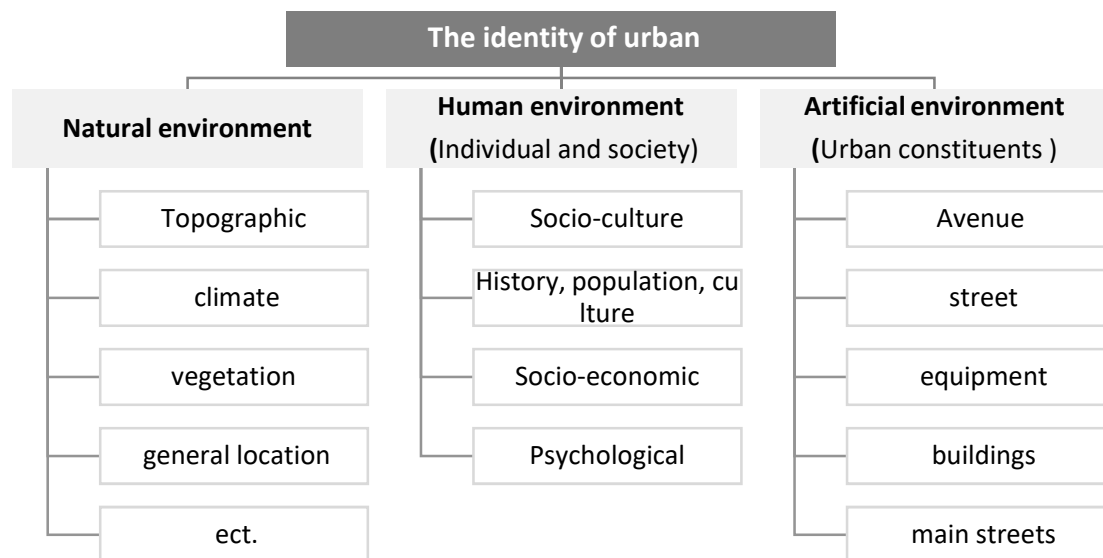


Figure 2 explains the elements of the identity of urban[31]

2.1.1. The first phase studies the Natural environment of the North Sinai government:

The natural environment of the North Sinai Governorate is characterized by its diverse landscape, which includes the Sinai Peninsula, the Mediterranean Sea, and the Gulf of Suez[32]. The sea, sand, and sun are prominent elements that define the region's natural environment[33] as explained in **Figure 3**. The Mediterranean Sea, which borders the governorate to the north, provides a wealth of marine life and supports a vibrant fishing industry[34]. The sandy beaches along the coast are popular tourist destinations, offering opportunities for swimming, sunbathing, and other water-based activities[32]. The sun, meanwhile, is a constant presence in the region, providing warmth and light throughout the year [35].

The North Sinai Governorate is known for its rich natural resources, including raw materials such as oil, gas, and minerals [32]. The governorate has many mining operations that extract

various minerals, including gold, silver, and copper [34]. These resources play a significant role in the region's economy and support various industrial activities.

Another notable element of the natural environment in North Sinai is turquoise. The governorate is home to several mines that extract turquoise, a semi-precious stone highly valued for its beauty and durability[32]. The mines are an essential source of income for the local population and have played a significant role in shaping the region's history and culture.

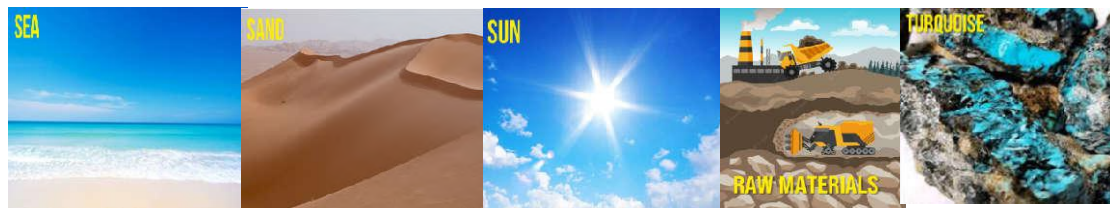


Figure 3 explains the main natural environment element.

2.1.2. The second phase studies the Human environment of the North Sinai government:

The human environment includes elements such as Bedouin outfits for men and women, Farming, Industry, and Tourism. The human environment of the North Sinai Governorate is shaped by its diverse population, which includes many Bedouin tribes. The Bedouins, who have lived in the region for centuries, have a strong presence in the governorate and play an important role in shaping its cultural identity [36]. Bedouin culture is deeply rooted in tradition, and their customs and traditions have been passed down through generations. One of the most prominent elements of Bedouin culture is their traditional clothing, which both men and women wear[37].

Bedouin outfits for men typically consist of a long, loose-fitting garment known as a thobe, which is worn over a traditional headscarf known as a keffiyeh. The thobe is generally made from a light, breathable fabric and is decorated with intricate embroidery and beadwork. Men also often wear a traditional headband known as an egal, made from a thick, twisted cord and worn around the head to keep the headscarf in place[38].

Bedouin outfits for women typically consist of a long, loose-fitting dress known as a galabeya, worn over a traditional headscarf known as a sheila. The galabeya generally is made from a light, breathable fabric and is decorated with intricate embroidery and beadwork[36]. The sheila is typically made from lightweight cotton or silk. It is worn over the head or wrapped around the face to protect from the sun. Women also often wear a traditional headband known as a tahtiba, made from a thick, twisted cord and worn around the head to keep the headscarf in place [37] as explained in **Figure 4**.



Figure 4 explains Bedouin outfits for men and women.

The human environment of the North Sinai Governorate is also shaped by its agricultural practices. The region has a long history of farming, which a complex system of irrigation and water management has sustained. The main crops grown in the area include Olive, palm, wheat, barley, fruits, and vegetables [39].

Farming is an important source of income and livelihood for many residents, particularly the Bedouin people who have lived in the region for centuries [39]. They have developed unique farming practices tailored to the harsh desert climate, such as using underground water resources for irrigation and crop rotation. These traditional farming practices have allowed them to cultivate crops and sustain their livelihoods in the region [40].

The agricultural sector is an important part of the human environment in North Sinai. It provides a source of income and livelihood for many residents and supports various industries [39] as explained in **Figure 5**.



Figure 5 explains Farming in North Sinai.

The human environment of North Sinai Governorate is also shaped by the industrial sector, particularly the cement industry as explained in **Figure 6**. This industry plays an essential role in the region's economy as it is one of the main sources of employment and income for many residents.

The cement industry in North Sinai started in the 1960s and has grown significantly over the years. There are several large cement factories located in the region, which produce a variety of cement products for both domestic and international markets [41]. The factories use the raw materials available in the area, such as limestone, clay, and gypsum, to produce their products [42]. The industry also provides employment opportunities for many residents, particularly those with skills and experience in cement production. Also, the cement industry uses natural resources, such as limestone, clay, and gypsum, which are extracted from the surrounding area [43].



Figure 6 explains Industry in North Sinai.

Tourism is another aspect of the human environment in the North Sinai Governorate. The region's unique natural beauty and rich cultural heritage attract visitors from all over the world [44] as explained in **Figure 7**. One of the region's most popular forms of tourism is camel racing. This traditional Bedouin sport has a long history in the region and is deeply ingrained in the culture of the local people [45].

Camel racing is an important part of the cultural heritage of the Bedouin people of North Sinai. It is a traditional sport that has been passed down through generations [46]. Camel racing is typically held in the winter when the weather is cooler, attracting large crowds of spectators from all over the region [46]. The races are usually held in open desert areas and are organized by local Bedouin tribes.

Camel racing is not only an important aspect of the human environment in North Sinai, but it also brings economic benefits to the region [46]. The races attract many tourists from all over the world, supporting the local economy [45]. Many residents are also involved in the sport, either as racers or as trainers, providing them with a source of income and livelihood [44,47].

Tourism, especially camel racing, is an essential aspect of the human environment in the North Sinai Governorate. It is deeply ingrained in the culture of the local people, and it brings economic benefits to the region [48]. However, it is important to ensure that it is developed sustainably, which preserves the natural and cultural heritage of the area, while also providing economic benefits to the residents [49].



Figure 7 explains Tourism in North Sinai.

2.1.3. The third phase studies the Artificial environment of the North Sinai government:

The artificial environment in North Sinai Governorate is shaped by using tents as housing. Tents have been used in the region for centuries as a traditional form of shelter for the Bedouin people. These tents are typically made from animal hides or woven fabrics and are designed to withstand the harsh desert climate [47].

Tents are an essential aspect of the artificial environment in North Sinai, as they provide a sense of community and connection to the land for the residents. Bedouin families often live in close-knit tent communities, sharing resources and supporting one another. Tents also offer a sense of mobility, as they can be easily set up and taken down, allowing the Bedouins to move with their herds and follow the seasons [50].

In recent years, however, the region has shifted towards more permanent forms of housing. Many residents have begun to build brick and concrete houses, which offer more protection from

the elements and provide more permanent living arrangements. This change in housing has also led to changes in the way of life for the residents, as they are no longer as nomadic as they used to be.

Despite this shift towards more permanent forms of housing, tents remain an essential aspect of the artificial environment in North Sinai. They are deeply ingrained in the local people's culture and way of life and continue to be used for traditional events and ceremonies. Tents also remain an important source of housing for many residents, particularly those who cannot afford more permanent forms of housing as explained in **Figure 8**.



Figure 8 explains traditional buildings in North Sinai

2.2. Second step:

The second step studies the effect of using AI in giving different designs for building in North Sinai depending on the element of the identity of the North Sinai Governorate. So that in the first introduction, the AI application was used (Midjourney and Discord). After that has been studied the phases This step because it includes four phases. The first phase studies the effect of AI on design building by using the elements of identity. The second phase studies the impact of AI on design buildings by changing the type of building. The third phase studies the effect of AI at design buildings by using different Shapes for buildings. The fourth phase studies some elements that help to change the design of the building such as Building style, elements around the building, and invoking a particular medium.

Introduction to the Midjourney application:

Midjourney is a mobile application designed to improve mental health and well-being, using a client-server architecture pattern. On the client side, it follows the Model-View-Controller (MVC) architecture pattern to separate the application into three main components: the model, the view, and the controller. On the server side, it relies on a microservices architecture to break down the application into small, independently deployable services that can be scaled and managed separately.

Discord, on the other hand, is a chat and communication application that follows a client-server architecture pattern, like Midjourney. However, Discord is built using a more complex architecture pattern known as the Client-Server-Broker (CSB) pattern. This pattern adds a layer of broker services that mediate communication between the client and server, allowing for greater scalability and reliability.

Midjourney and Discord are two different applications that serve different purposes and use different software architecture patterns. Both applications are designed to provide a scalable and reliable platform for their respective purposes.

Midjourney is a design tool that allows users to create and share design projects, while Discord is a communication platform that facilitates real-time chat and voice communication between users. Here are the steps to create a design using Midjourney and Discord:

- Choose a design project: First, decide on the type of design project you want to work on. This could be anything from a logo, website, or app design.
- Create a Midjourney project: Once you have a design project in mind, create a new project in Midjourney. Choose the appropriate template for your project and start designing.
- Invite team members to your Midjourney project: To collaborate with others on your design project, invite them to your Midjourney project. You can do this by sharing the project link or inviting them via email.
- Use Discord for communication: Use Discord to communicate with your team members in real-time. You can create a new server for your design project and invite team members to join. Use voice channels to have discussions and share ideas, and use text channels to share links, files, and feedback.
- Share your Midjourney project in Discord: Once you have made progress on your design project, share your Midjourney project link in Discord so that everyone can view and provide feedback.
- Collaborate and iterate: Use feedback from your team members to iterate on your design. Make changes and updates to your Midjourney project as needed and continue to communicate with your team members through Discord.
- Export your design: When your design is complete, export it from Midjourney in the appropriate format (e.g., PNG, SVG, etc.). Share the final design with your team members through Discord and celebrate your collaborative success!

Midjourney and Discord can help designers to work more efficiently and effectively, collaborate with others, and produce high-quality designs. Also, Midjourney and Discord can help in design building in several ways. Here are a few examples:

- Collaboration: Midjourney and Discord allow designers to collaborate with others in real-time, regardless of their physical location. Designers can work together on the same project, share feedback and ideas, and make changes in real time, which can lead to a more efficient and effective design process.

- **Communication:** Discord provides a platform for designers to communicate with each other, which can help to avoid misunderstandings and ensure that everyone is on the same page. Designers can use voice and text channels to discuss design elements, share files, and ask for feedback.
- **Iteration:** Midjourney and Discord make it easy to iterate on designs. Designers can share their work with others and get feedback, which can help to identify areas for improvement. Designers can then make changes to the design and share it again until they have arrived at the final product.
- **Organization:** Midjourney allows designers to organize their work into projects, which can help to keep everything in one place and make it easy to find what they need. Discord also provides tools for organization, such as channels and categories, which can help to keep conversations and files organized.

2.2.1. The first phase studies the effect of AI on design building by using the elements of identity.

In this phase, the inputs for the program are specified that including the identity elements for the natural environment, human environment, and artificial environment. The Natural environment identity elements include Desert sand, sea waves, The sun, Raw material (Turquoise), and mountains. The Human environment identity elements include Pattern Clothes, Palm trees, Olive trees, camel, and Industry. The Artificial environment identity elements include the tent. Additionally, it determined the main geometric shapes that have been used.

2.2.2. The second phase studies the impact of AI at design buildings by changing the type of building.

In this phase, the inputs for the program are specified that including all identity elements and changing types of buildings every time. Also, it had taken the main geometric shapes from the previous and it had been studied using it in all designs output from AI applications at different types of buildings. This phase included Fourteen types of buildings. The building types are:

-
- | | |
|---------------------------|-------------------------------|
| • Entrance for Arish city | • Recreational building |
| • Residential building | • Mosque Building |
| • Administration building | • Airport building |
| • Commercial buildings. | • A Railway station building. |
| • Hospital Building | • Post office building & Bank |
| • Educational buildings. | • Court |
| • Shack | • Museum |
| • Industrial Buildings | • Cinema building |
-

2.2.3. The third phase studies the effect of AI on designing buildings by using different Shapes for buildings.

In this phase, the inputs for the program are specified that include all identity elements and changing building shape every time. This phase determined the role of AI application in using the different geometric shapes in building design in two cases. Case one used the shape to design the elevation shape. Case two used shape at design element inside elevation. This phase has included nine geometric shapes of the building. The building shapes are:

-
- | | |
|-------------|------------|
| • Rhombus | • Tent |
| • Pentagon | • Square |
| • Rectangle | • Arch |
| • Ellipse | • Triangle |
| • Circle | |
-

2.2.4. The fourth phase studying the role of AI application in process of architecture presentation:

In this phase, it had been used some elements help to change the architecture presentation of the building. The inputs for the program are specified that including all identity elements, building shape, building type, and other elements helps with the design and final rendering of the building. These elements such as:

- building style (realistic, modern).
- Elements around the building (landscape elements).
- Invoking a particular medium such as (pencil drawing – sketch- watercolor painting).

3. Result and discuss:

3.1. Step one:

Result of studying the identity of the North Sinai government it has been explained that the natural environment of the North Sinai Governorate is defined by its proximity to the sea, its sandy beaches, and its abundant natural resources, including turquoise. These elements of the natural environment play an important role in shaping the region's economy, culture, and way of life. The natural environment has a lot of elements such as sea, sand, sun, raw material, turquoise, etc.

Also, traditional Bedouin clothing is an essential aspect of the human environment in North Sinai, it is a symbol of the region's cultural heritage and reflects the strong sense of tradition and cultural identity among the Bedouin people who live there. Besides that, the agricultural sector includes a lot of special plants in North Sinai. The main two plants are the palm tree and the olive tree.

Additionally, the cement industry is an important aspect of the human environment in North Sinai. It plays a significant role in the region's economy and provides employment opportunities for many residents. However, it is essential to consider the potential negative impacts on the

environment and the use of natural resources and take appropriate measures to mitigate these effects. Besides all that the main elements of Tourism are camel racing and the sea and the mountains.

Despite this shift towards more permanent forms of housing, tents remain an essential aspect of the artificial environment in North Sinai. They are deeply ingrained in the local people's culture and way of life and continue to be used for traditional events and ceremonies. Tents also remain an important source of housing for many residents, particularly those who cannot afford more permanent forms of housing.

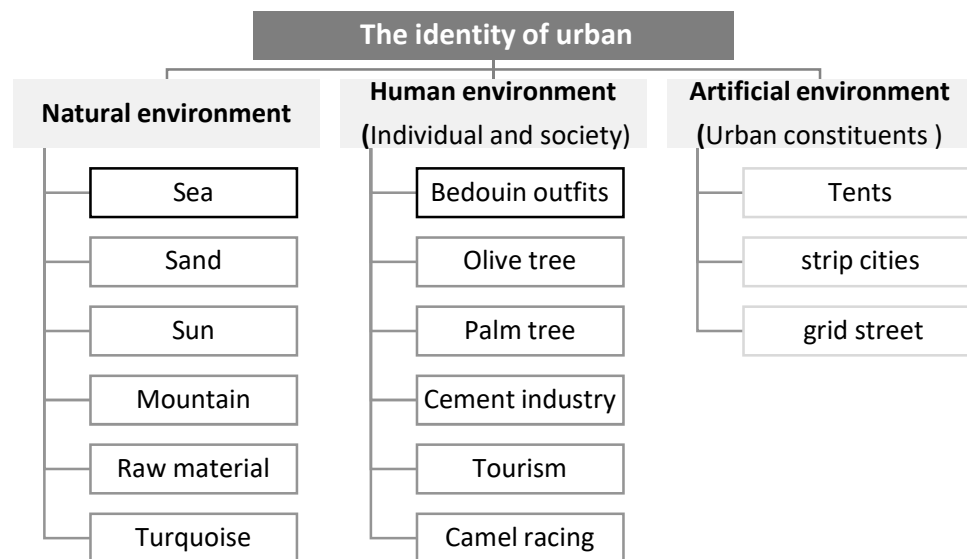


Figure 9 explains the elements of the identity of urban in the North Sinai government.

3.2. Step two:

3.2.1. The first phase studies the effect of AI on design building by using the elements of identity.

The AI application has been given different designs for the façade with the same input for The Natural environment identity elements. The element of desert sand was given three different designs as the output of the AI application as explained in **Figure 10**. Although differences between these three designs, they share the geometric shapes used in the design such as chamfer box, triangle, circle, and ellipse. The element of sea wave was given three different designs as the output of the AI application as explained in **Figure 11**. Although differences between these three designs, they share the geometric shapes used in the design such as the Chamfer box, curve, triangle, and ellipse. The element of the sun was given three different designs as the output of the AI application as explained in **Figure 12**. Although differences between these three designs, they share the geometric shapes used in the design such as the Chamfer box, triangle, circle, and ellipse. The element of the Raw material (turquoise) was given three different designs as the output of the AI application as explained in **Figure 13**. Although differences between these three designs, they share the geometric shapes used in the design such as the rectangular, Square, and

triangle. According to that the geometric shapes used in the design by using The AI application are Chamfer box, curve, rectangular, Square, triangle, circle, and ellipse.





Natural environment:			Shape
Desert sand:			
	Figure 10 explains the design facade of a building in north Sinai inspired by desert sand by AI.		
sea wave			
	Figure 11 explains the design facade of a building in north Sinai inspired by the sea wave by AI.		
The sun			
	Figure 12 explains the design facade of a building in north Sinai inspired by the sun by AI.		
Raw material (turquoise)			

Figure 13 explains Designing a facade of a building in North Sinai inspired by the turquoise by AI.

The AI application has been given different designs for the façade with the same input for TheHuman environment identityelements.The element of Pattern Clotheswas given three different designs as the output of the AI application as explained in **Figure 14**. Althoughdifferences between these three designs, they share the geometric shapes used in the design such asRectangular and Triangle. The element of Palm treewas given three different designs as the output of the AI application as explained in **Figure 15**. Althoughdifferences between these three designs, they share the geometric shapes used in the design such as the Chamfer box, Rectangular, Triangle, and ellipse. The element of The Olive treewas given three different designs as the output of the AI application as explained in **Figure 16**. Althoughdifferences between these three designs, they share the geometric shapes used in the design such as the Chamfer box, triangle, and ellipse. The element of the camelwas given three different designs as the output of the AI application as explained in **Figure 17**. Althoughdifferences between these three designs, they share the geometric shapes used in the design such as the Square, and triangle. The element of the industrywas given three different designs as the output of the AI application as explained in **Figure 18**. Althoughdifferences between these three designs, they share the geometric shapes used in the design such as the Chamfer box and triangle. According to that the geometric shapes used in the design by using The AI application are Chamfer box, rectangular, Square, triangle, circle, and ellipse.

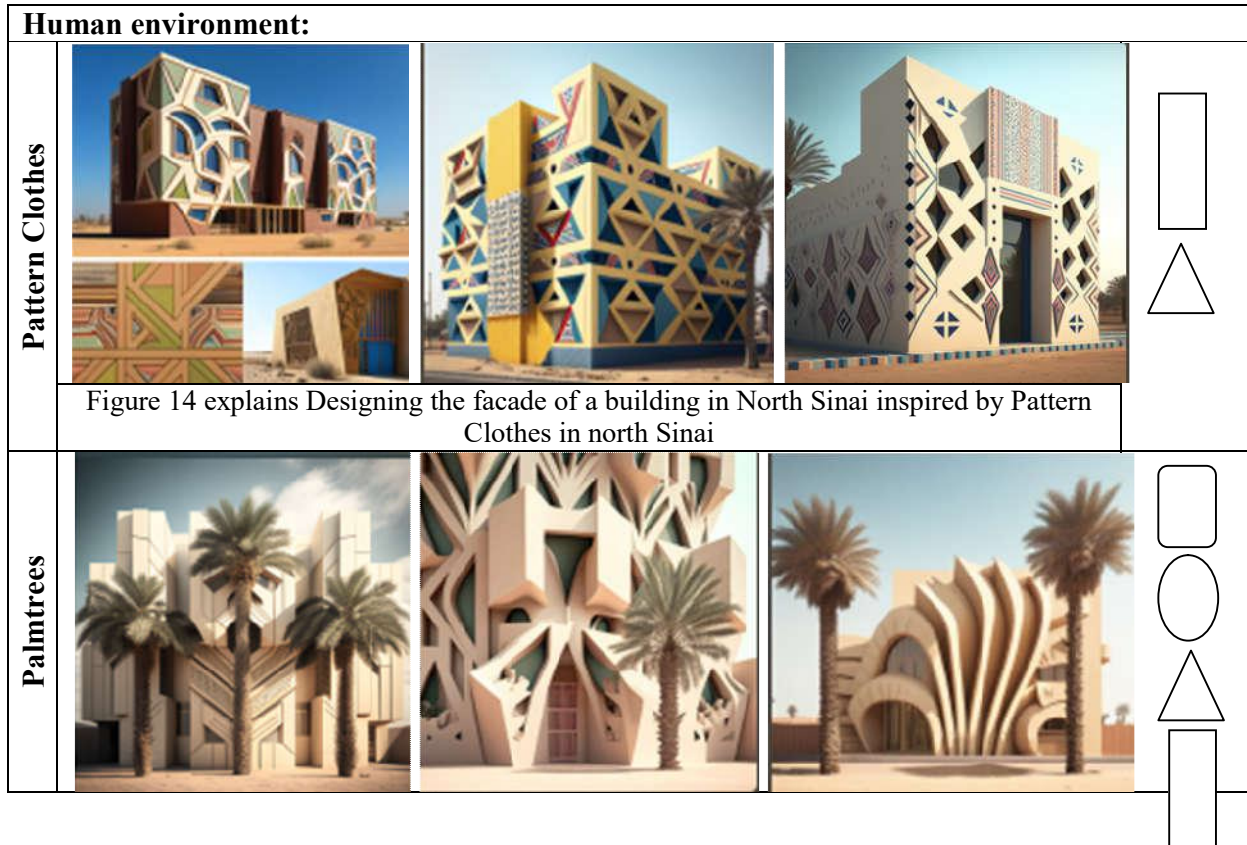

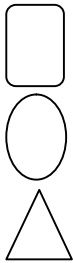



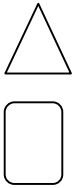
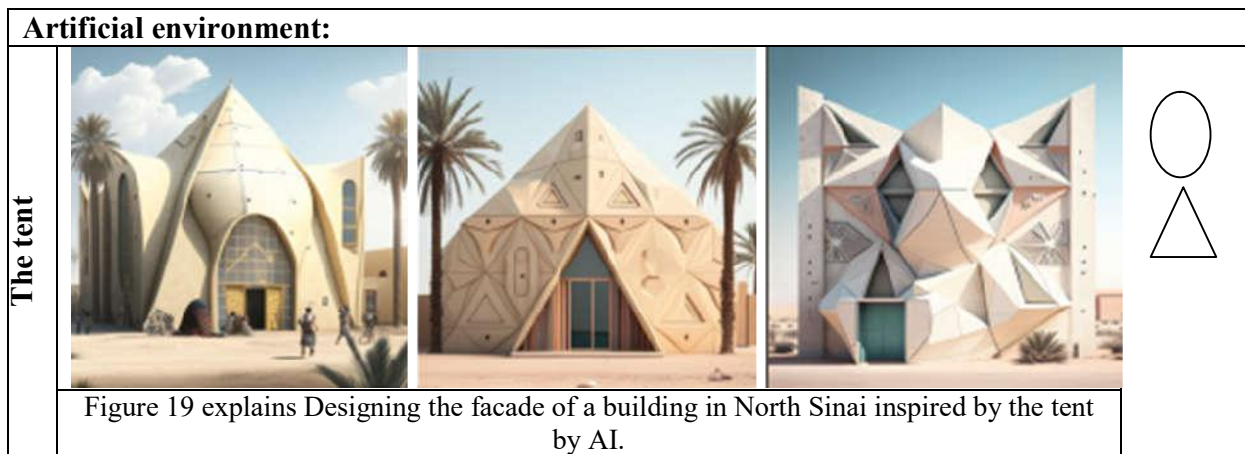


	Figure 15 explains the design facade of a building in north Sinai inspired by palm trees by AI.			
The Olive tree				
	Figure 16 explains Designing the facade of a building in North Sinai inspired by the Olive tree by AI.			
The camel				
	Figure 17 explains Designing the facade of a building in North Sinai inspired by the camel by AI.			
Industry elements				
	Figure 18 explains Designing the facade of a building in North Sinai inspired by industry elements			

The AI application has been given different designs for the façade with the same input for TheArtificial environment identityelements.The element of the tent was given three different designs as the output of the AI application as explained in **Figure 19**. Althoughdifferences between these three designs, they share the geometric shapes used in the design such asRectangular,Triangle, and ellipse.



Finally, the number of identity elements is ten. Figure 20 below explains the number of uses of the gematric shape in all elements of identity. The triangle shape has been used in all identity elements. The chamfer box and ellipse have been used equally with a ratio of 60%. The rectangular has been used lower than a triangle and chamfer box and ellipse with a ratio of 30%. The square and ellipse have been used equally with a ratio of 20%. The curve was the lowest one in use with a ratio of 10%. According to that the triangle is the main gematric that could use in North Sinai government identity. After that could use a chamfer box and ellipse followed by all forms depending on their graduation.

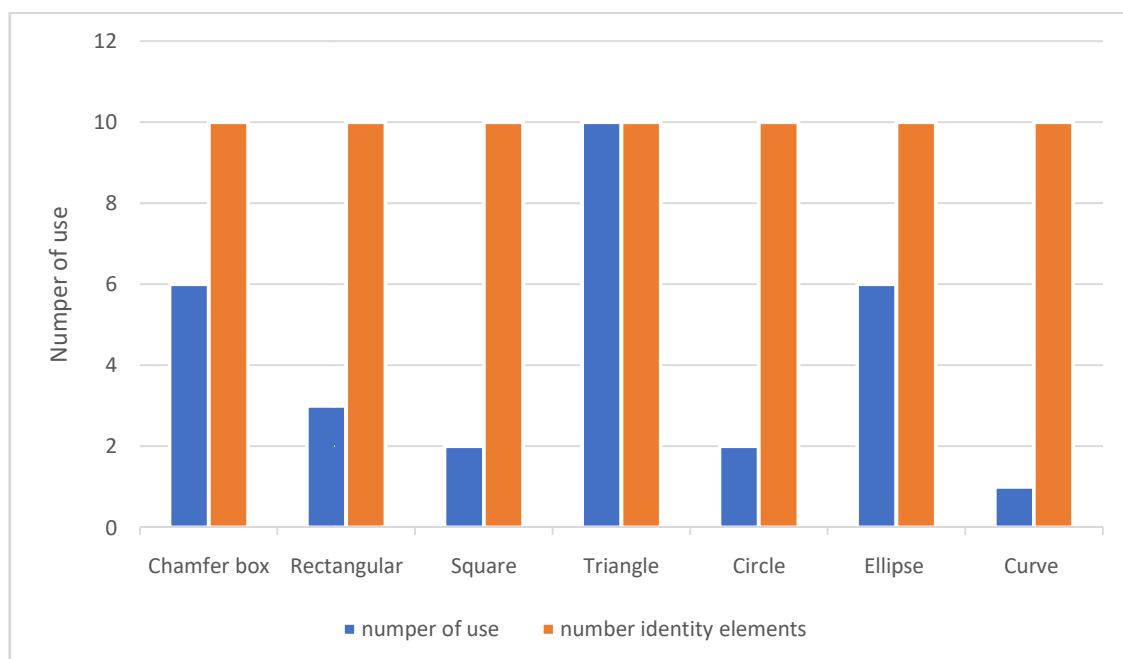


Figure 20 compares the number of using every geometric shape in identity elements.

The AI application has been given different designs for the façade with the same input for all identity elements for the North Sinai government. But these designs have used the same colors

as explained in **Figure 21**.The colors which had been used in all designs were maroon, wheat, blue, mustard, teal, turquoise, bronze, and bisque.



Design with all identity North Sinai elements:	Colors
	Maroon
	wheat
	blue
	mustard
	turquoise
	teal
	bronze
	bisque

Figure 21 explains the design with all identity North Sinai elementsby AI.

3.2.2. The second phase studies the impact of AI at design buildings by changing the type of building.

According to the result from the previous phase, the main geometric had used in all designs is Triangle,Chamfer box, and Ellipse. **Figure 22**explains designs outputs from the AI application in the case of inputs including all elements of the identity of the north Sinai government with different types of buildings. Also, it had been explained using this geometric in designs.

The design output from AI application to all identity element		Geometric shapes		
Entrance for Arish city		Triangle	Chamfer box	Ellipse
		✓	✓	✓

Residential building				Triangle	Chamfer box	Ellipse
				✓	✓	✓
administration building		Triangle	Chamfer box	Ellipse		
		✓	✓	✓		
Commercial buildings		Triangle	Chamfer box	Ellipse		
		✓	✓	✓		
Hospital Building		Triangle	Chamfer box	Ellipse		
		✓	✓	X		
Educational buildings		Triangle	Chamfer box	Ellipse		
		✓	✓	✓		

shack		Triangle	Chamfer box	Ellipse
	✓	X	✓	
Recreational building		Triangle	Chamfer box	Ellipse
	✓	✓	✓	
Airport building		Triangle	Chamfer box	Ellipse
	✓	✓	X	
Industrial Buildings				
		Triangle	Chamfer box	Ellipse
	✓	✓	X	
Mosque Building				
		Triangle	Chamfer box	Ellipse
	✓	✓	✓	
a Railway station building				
		Triangle	Chamfer box	Ellipse
	✓	X	✓	

Post office building & Bank		Triangle	Chamfer box	Ellipse	court		Triangle	Chamfer box	Ellipse
		✓	✓	✓			✓	✓	✓
Museum		Triangle	Chamfer box	Ellipse	Cinema building		Triangle	Chamfer box	Ellipse
		✓	✓	✓			✓	C	X

Figure 22 explains design outputs from the AI application for different types of buildings.

Result of that, It has been proven the main geometric shapes used in all types of buildings by AI applications were Triangle, Chamfer box, and Ellipse. The highest geometric shape used was the triangle. The least used geometric shape was Ellipse. But the three geometric shapes have been used a lot with a ratio above 70% as explained in **Figure 23**. The triangle has been used with a ratio of 100%. The Chamfer box has been used with a ratio of 87.5%. The Ellipse has been used with a ratio of 75%.

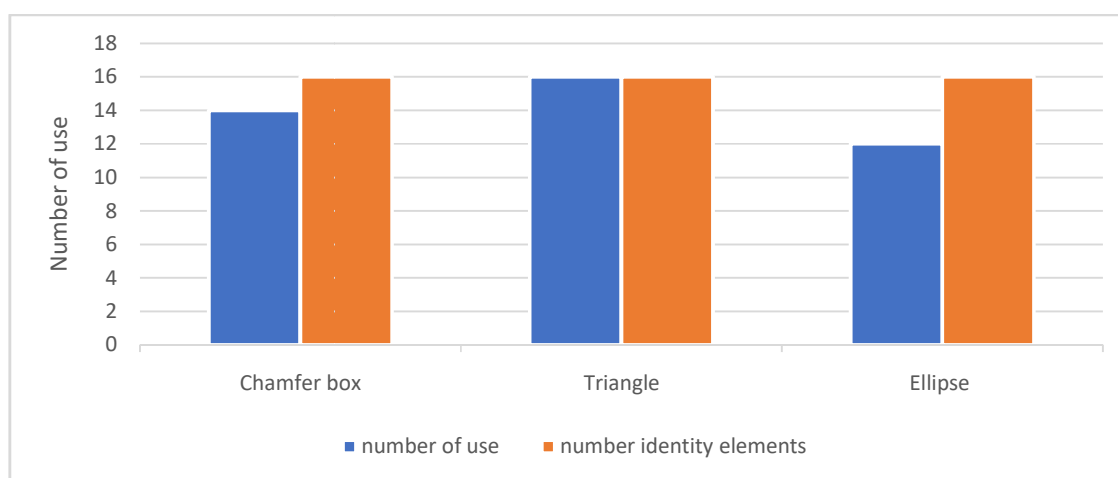


Figure 23 explains compare the number of using every geometric shape in different types of building.

3.2.3. The third phase studies the effect of AI on designing buildings by using different Shapes for buildings.

The AI application had been given different designs for the identity of the North Sinai government with different geometric shapes as explained in **Figure 24**. Also, it had been explained using this geometric shape at design elevation and its elements.




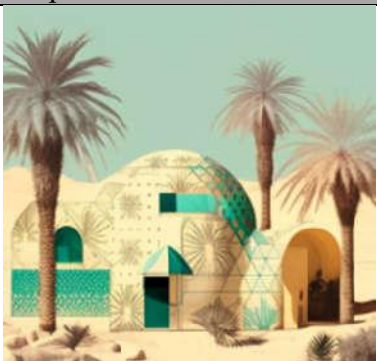





Rhombus	Pentagon	rectangle
		
Shape: ✓ Element: ✓	Shape: ✓ Element: X	Shape: ✓ Element: ✓
Ellipse	Circle	Tent
		
Shape: ✓ Element: X	Shape: ✓ Element: X	Shape: ✓ Element: X
Square	Arch	Triangle
		
Shape: ✓ Element: ✓	Shape: ✓ Element: X	Shape: ✓ Element: ✓

Figure 24 explains design outputs from the AI application for different geometric shape of buildings.

Result of that, the AI application used input geometric shapes at design elevation and its element. But didn't use the geometric shape every time in designing the elements of elevation as explained in **Figure 25**. The geometric shape has been used always in design elevation shapes with a ratio of 100%. The geometric shape has been used as the lowest in the design element of elevation with a ratio of 44%. Finally, AI application design shape of the building is needed while preserving the characteristics of the visual identity of the place.

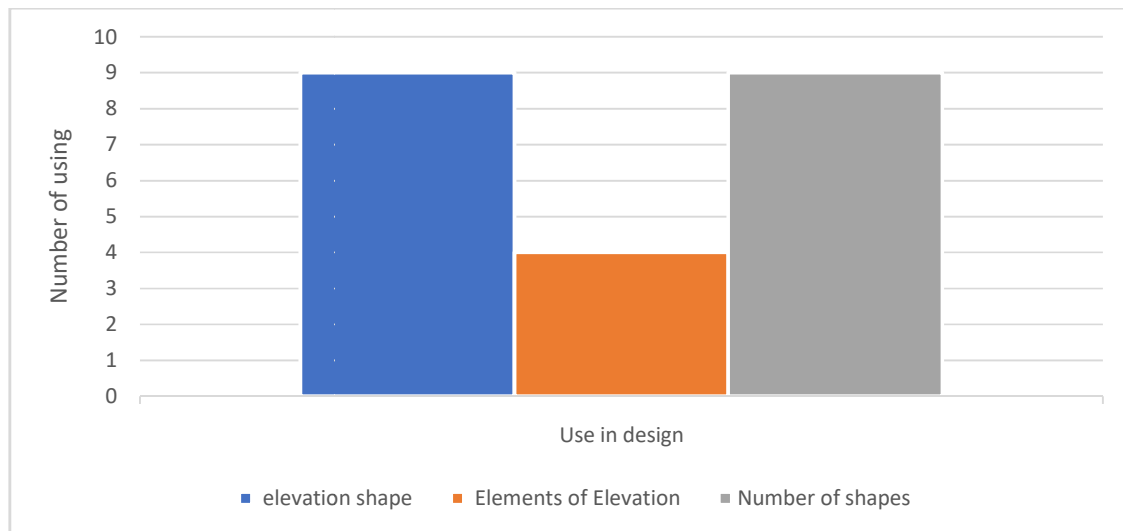


Figure 25 compares the number of using geometric shapes in design elevation and its element.

3.2.4. The fourth phase studying the role of AI application in process of architecture presentation:

In the case of added building style (realistic, modern) to the input of AI application that had been given different output of design building despite stabilizing the identity and building types as explained in **Figure 26**. But all these designs had been used as the main geometric shape of identity and its colors.



Figure 26 explains the output of AI applications for using different building styles.

In the case of added Element (landscape, car, people) around building to the input of AI application that had been given different output of architecture presentation around building despite of stabilizing the identity and building type as explained in **Figure 27**.



Figure 27 explains the output of the AI application for added Elements around the building.

In the case of using a different technique for architecture presentations such as pencil drawing technique, sketch, and watercolor painting to the input of AI application that had been given different output of architecture presentation despite of stabilizing the identity and building type as explained in **Figures 28, 29, 30**. Also, it had been used the main colors and geometric shapes for identity.



Figure 28 explains the output of the AI application for using the pencil drawing technique.

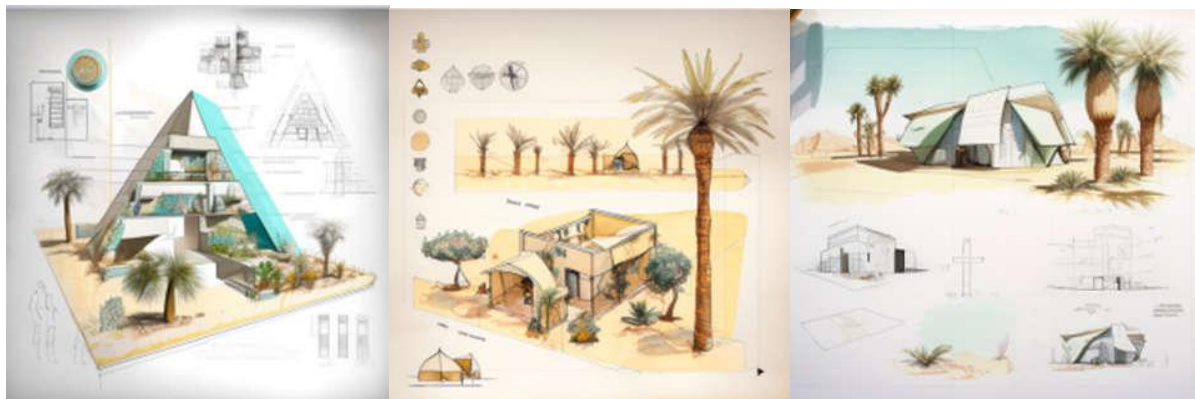


Figure 29 explains the output of the AI application for using sketch drawing technique.



Figure 30 explains the output of the AI application for using the watercolor painting technique.

4. Conclusion:

The North Sinai government identity included the Natural environment, Human environment, and Artificial environment. The natural environment has included Sea, Sand, Sun, Mountain, Raw material, and Turquoise. The human environment has included Bedouin outfits, Olive trees, Palm trees, the Cement Industry, Tourism, and Camel racing. The artificial environment has included Tents, strip cities, and grid streets.

Additionally, the geometric shapes used in all designs of buildings deposited on identity elements by using The AI application are Chamfer box, curve, rectangular, Square, triangle, circle, and ellipse. But the main geometrics that could be used in North Sinai government identity were a triangle, a chamfer box, and an ellipse. The colors should use to express identity were maroon, wheat, blue, mustard, teal, turquoise, bronze, and bisque.

AI application could design the shape of the building according to the input geometric shape, but it didn't use this geometric shape in the design element of elevation for the building every time. Also, the AI application had an important role in the process of architecture presentation. Finally, AI applications can be used to facilitate determining the architectural design of buildings depending on the identity of cities.

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