



**ANALYSIS OF EXHIBITION SPACES IN THE CASE OF
ARTIFICIAL INTELLIGENCE ARTWORKS**

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ABSTRACT

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Advisor: Asst. Prof. Dr. Lâle BAŞARIR

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Art has existed and has been discussed since the existence of man. The production style and spaces of art exhibitions have also changed over time. These changes also reflected in the architecture and how art was exhibited affected the spaces. The developments of Artificial Intelligence (AI) in the field of art in recent years have shown us how the spatial need has changed in this sense and how it is reflected in architecture from different perspectives. How artificial intelligence transforms exhibition spaces will be discussed in this study. This thesis aims to examine how art production forms based on AI and digital art transform exhibition spaces to accommodate digital art forms and new ways of interaction with the audience.

Keywords: Artificial Intelligence, Artificial Intelligence Artwork, Display, Exhibition Space

ÖZET

YAPAY ZEKA SANAT ESERLERİNDE SERGİ ALANLARININ ANALİZİ

Göktürk, Şeyma

Mimarlık Yüksek Lisans Programı

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Sanat insanın varoluşundan beri var ve tartışılıyor. Sanat sergilerinin üretim tarzı ve mekânları da zaman içinde değişmiştir. Bu değişimler mimariye de yansımış ve sanatın sergilenme biçimi mekânları etkilemiştir. Yapay Zekânın (AI) son yıllarda sanat alanındaki gelişmeleri bize mekânsal ihtiyacın bu anlamda nasıl değiştiğini ve mimariye nasıl yansıdığını farklı açılardan göstermiştir. Bu çalışmada yapay zekânın sergi alanlarını nasıl dönüştürdüğü tartışılacaktır. Bu tez, yapay zekâ ve dijital sanata dayalı sanat üretim biçimlerinin sergi alanlarını, dijital sanat biçimlerini ve izleyiciyle yeni etkileşim biçimlerini barındıracak şekilde nasıl dönüştürdüğünü incelemeyi amaçlamaktadır.

Anahtar Kelimeler: Yapay Zekâ, Yapay Zekâ Sanat Eseri, Sergileme, Sergileme Mekanı

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CHAPTER 1: INTRODUCTION

1.1 Background

Exhibition Spaces, to the community; It was made to showcase the products collected and researched and to tell their stories. For this reason, the development and arrangement of exhibition spaces have changed in parallel with the development of societies (Velarde, 1988). In society, the design and layout of exhibition spaces also create a different experience for each person. These experiences create spatial memory for people and cause each person to perceive the connection between the product to be exhibited and the space differently. The starting point of this thesis is to understand the transformation of exhibition spaces until today, the establishment of contemporary art centers, and the changes that have occurred in the exhibition spaces as the exhibited artworks have become more digitalized due to the change and development of societies. For this reason, the history of exhibition spaces has been examined in this study. Then, a new framework has been created to answer the question of whether these spaces are still needed for digital works today. In this context, the concept of exhibiting digital art, and artificial intelligence works in designated structures and areas, and the spatial perception experience of the visitors were evaluated. In addition to the discussion of whether the works made through artificial intelligence and digital art are works of art, the main idea of the thesis is whether there is a need for an architectural space for the exhibition of these works.

Artificial intelligence artworks can also be displayed on a single wall surface using only one projection. In this case, this leads to asking the question and doing research on how it transforms the space.

Throughout history, even in prehistoric times, people have tried to express themselves. While art, which is one of these forms of expression, is handled with the paintings made on the cave wall by Paleolithic people, today it can be done with an artificial intelligence artwork reflected on the wall of an architectural structure in an urban texture. In this process, which has come to the present day, the definition of the tools used has actually changed. While the Paleolithic man used the cave wall as a canvas, today's artists use an architectural facade as a canvas.

According to the progress planning of the thesis, how the exhibition is defined and the history of exhibition systems, the concept of museology, and especially the classification of digital systems used in museums are discussed. In Chapter 3, Artificial intelligence and digital artworks will be discussed.

In chapter 3, before discussing spaces of display for to artificial intelligence works of art, which is the main subject of the thesis, what artificial intelligence is and its history through a timeline are explained. Since the history of artificial intelligence actually shows us the transition from artificial intelligence to production processes, the timeline was also examined in that process. In addition, in the third chapter, the concepts of digital art and artificial intelligence artworks were examined, and their similarities and differences were discussed.

In chapter 4, the definition of artificial intelligence works of art and their different types are mentioned. In addition, examples from the exhibitions and works of today's artificial intelligence artists, which constitute the methodology of the thesis, are discussed. Most of the examples are related to artificial intelligence and architecture. Imaging systems are discussed in various categories.

The last part is the conclusion-discussion part. There are limitations and research recommendations that I encountered in my study.

1.2 Problem Statement

Throughout history, one of the means of communication of humankind has been art. It is known that people live in large groups/crowded families in places such as caves and rock shelters. They communicated with the paintings made on the walls of the caves. They tried to make the art that they used as a communication tool by actually showing/exhibiting. The first step in which early humans used the murals they made in caves as a means of communication to tell a story is based on the works that modern humans exhibit on the walls of art galleries.

In the meantime, the development of exhibition systems throughout history, the explanation of the emerging concepts of museum and museology, their use for exhibition purposes as an architectural space, and the creation of a new approach by

including exhibition systems and artificial intelligence architecture. The most discussed art is work today. In this thesis, the reflection of artificial intelligence on architecture and exhibition systems is discussed through examples of works of art.

Artificial intelligence works of art are increasing in popularity day by day in various parts of the world. At the same time, it changes the forms of exhibitions in architecture. It uses all of the building elements or a wall surface as a display element. In this thesis, the effects of artificial intelligence on architecture will be discussed through examples of artworks.

1.3 Research questions

In line with the information and observations obtained during my research the research questions are shaped as follows to guide the thesis:

RQ 1. What is artificial intelligence artwork and how is it transferred to architecture?

RQ 2. What are the design criteria of exhibition spaces for artificial intelligence artworks?

RQ 3. How are the architectural spaces required for artificial intelligence artists? Can it be displayed anywhere?

RQ 4. Are artificial intelligence artworks transforming the exhibition space?

1.4 Methodology:

While scanning the literature related to this research, upon a literature review, the artists working on artificial intelligence-digital works were determined. In determining the artists, the artists who included the architectural space by using the art of artificial intelligence were searched.

The installation areas where the artists exhibited their works were determined. The research of the designated exhibition areas, the digital installation methods, the space, and the effect of the exhibition were interpreted according to the table I created. For

the selection of the venue, both artificial intelligence works and different works will be selected as the venue.

1.5 Aim of Study

A message has been given since prehistoric times through wall paintings on caves and rocks. It has been transferred with pictures. Today, artists do this with different types of artwork. In this thesis, it is aimed to investigate how exhibition spaces and artificial intelligence works transform exhibition spaces. The main topic of this thesis is to explore the fact that when it comes to digital and artificial intelligence (AI) artworks, exhibition spaces need not be limited to space typologies with specific patterns, when in fact a building façade or a simple sign board for projection can be used. be a medium for the display of works of art.

“Contemporary Art Spaces”, “Museums”, “Modern Art”, “Exhibition Venues”, “Digital Art”, “Artificial Intelligence” and “Artificial Intelligence Installation” Thesis was searched for words. Master's theses on Museums and Exhibition Spaces Master's thesis; “The effect of the concept of temporality in architecture on exhibition spaces, current in museum exhibition spaces”(Gök, 2021). Master's thesis “Architectural Design with Display Techniques an Examination on Relationship”(Deniz, 2008). Theses reviewed for my research on artificial intelligence and art; Master's Thesis “Art of Artificial Life”(Yavuz, 2020) and Master's Thesis, “The Effects of Artificial Intelligence on Art” (Ergün, 2019).

This research is related to the concept of exhibiting, exhibition space, the user experiences through AI artworks as well as the exhibition spaces required for these works.

1.6 Significance of Study

AI and digital arts have transformed the architectural space in which they are exhibited and caused changes in facades in recent years.

This thesis explores how the representations of AI artworks can be interpreted and the types of exhibitions by making use of related theses and by analyzing the implications of AI artworks on exhibition space. AI artworks can be examined as follows; made and exhibited using all the architectural details of the space, which considers the architectural space as a white cube, or increasing our personal or public memory exhibited through the architectural facade.



CHAPTER 2: THE CONCEPT AND HISTORY OF EXHIBITION

2.1. Exhibition Concept

The terms Exhibition and Exhibit are derived from the word installation. When we examine the relationship from an architectural point of view, we can give examples of works of art placed in a space and connecting with the audience. According to Özyayten, the display is when objects are ;

“With each other, on the plane of meaning and perception” (Özyayten, 1997).

An exhibition is a concept that changes the environment in which works of art such as painting and sculptures are collected and exhibited. Exhibition areas can be transformed according to the exhibition concept and the work to be exhibited. The exhibition design has changed significantly? from the 17th century until today (Pitman, 1999). This change has also affected the exhibition spaces in terms of architecture.

Museums come to mind first as exhibition spaces. Collecting, preserving, and exhibiting our cultural heritage, museums, which are places that contribute to the development and formation of cultural identity, form the basis of exhibition spaces. Chosen among many definitions, the definition of a museum in the 1989 directorate of the Ministry of Culture is;

“Cultural Investigating, collecting, preserving our heritage with scientific methods, the cultural and aesthetic pleasure of the people are defined as organizations that raise the level of ”(Sezgin, 2009).

Based on this definition, the main purpose of museums, which form the basis of exhibition spaces: is to transfer the heritage of society to future generations in the most accurate and reliable way. In order to provide this transfer, both aesthetically important and reliable spaces were needed. Museum spaces were built to provide for this need.

Exhibition spaces that started with a simple plan have undergone many changes in the historical process until they came to digital artworks. In this part of the thesis, this change and process part in the exhibition spaces will be discussed.

2.2. Historical Development of Exhibition and Exhibition Spaces

In this section, the change and transformation of exhibition spaces will be explained. This change from the past to the present has started with the changes in exhibition designs in museums and art galleries, which are exhibition venues. In addition, the change in the exhibition design is explained by supporting examples of thematic exhibitions in museums and art galleries.

Since the exhibitions in museums are more permanent, they have been designed more comprehensively throughout history, unlike art galleries. For this reason, museum exhibitions should be planned according to the internal dynamics of the museum, adhering to the content of the exhibition. While planning the exhibition design in museums, the target audience, the type of the museum and what they want to convey are determined and a long-term design plan is prepared accordingly. The exhibition designs in Art Galleries, unlike museums, are much more flexible in terms of design and are shaped depending on the artist, as they are of shorter duration. In art galleries, the exhibition design is read as a whole with the works of the artist, transforming the space when necessary.

Exhibiting is defined as the act of presenting objects. In fact, the exhibitions in the historical process until the modern period show themselves differently. For example, when we look at the 17th century, people created curiosity cabinets under the name of exhibition space (Çalışkan, 2016). These objects, which were collected by noble families and collectors from various parts of the world, were exhibited in these rooms without classifying them according to any category or historical order (Figure 1).

“Cabinet of Curiosity are not only places of satisfaction and enjoyment, they are also learning structures; Curiosity cabinets appeal to the dominant and elite part of the society. Findings, antiques, jewellery, etc. They represent the social class and value of its owner.” (Pittman, 1999).



Figure 1. Cabinets of curiosity (Source: American Museum of Natural History)

In the 16th and 17th centuries, the method of organizing and displaying the collections. The collected were gathered to show the presence of noble families in Europe. These display rooms were called ‘‘cabinets of curiosity’’. Since it is accepted as the beginning of modern museums in literature, it is also called the pre-modern museum. This system enables the exhibition of products collected, organized, and categorized by a certain group restricting the exhibition to an audience from a certain social group.

In the 18th century and later, exhibition systems began to become more organized. Art galleries began to emerge as the rare collections of noble families became accessible to large groups over time (Kılıç Özkan, 2021). In these exhibition spaces, which are open to the access of not only a certain group but also large groups, new systems have emerged in the forms of exhibition.

As a continuation of the public exhibitions, the British Museum opened in London in 1759 (Figure 2) and the Louvre Museum, which was opened in Paris in 1793, is considered the beginning of museums and art galleries. These two museums have an important place in terms of exhibition history. While the exhibition remained at the level of a certain group and family until the establishment of these museums, artworks reached all segments of the public with these museums. They functioned as places established for the purpose of informing and educating the public.

Towards the end of the 19th century, the first examples of exhibition works and concept-based exhibitions thanks to the world fairs, which are the continuation of the expos began to emerge. Exhibitions have turned into a brand-new concept that tells stories (Çalışkan, 2016).

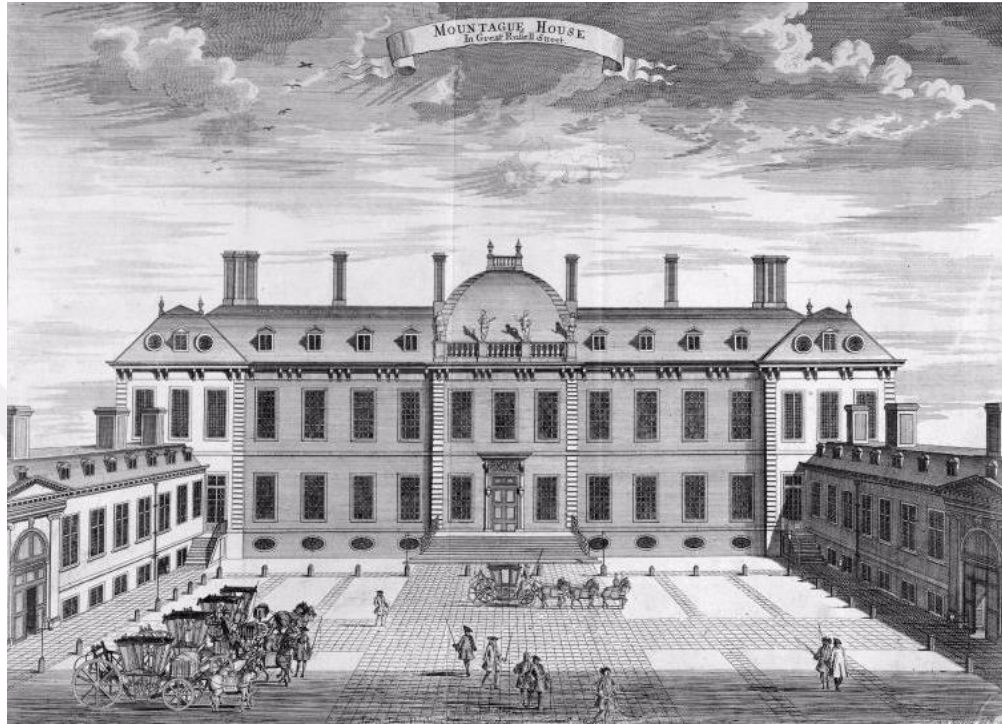


Figure 2. British Museum 1759 (Source: Museum in London)

In the modern age, the concept of the expo has emerged for the emergence of technology and for exhibitions in larger areas. Temporary or permanent spaces were created and exhibited in these expos. Modern Display Methods According to Mari Hvattum's; with the modern period, the factors affecting the appearance of museums have gained importance with the exhibition of artifacts thought to be under protection. In this way, people can make comparisons between the past and the present and learn the history of the civilizations they lived in, thanks to the exhibitions held in museums. The most important exhibition representing the modern display system was held in London in 1851. Designed by Sir Joseph Paxton, the Crystal Palace is made of iron and glass, using two basic materials representing modernism in architecture. There were two exhibition principles in this exhibition (Hvattum, 2004).

- Unity of humanity (problem different modern nations)
- Division of labor (eg. machinery, textiles).

There are Categories of the modernist display understanding. These (Hvattum, 2004);

- To the material
- Historical Ranking
- It varies according to cultural geography.

In fact, the concept of curiosity cabinets, which we talked about in the 17th century in this exhibition, differs in wider areas according to a certain chronology and category. This differentiation can also be explained by the way the exhibition system is more regular. From the curiosity cabinets to the expo process, the exhibition spaces have also undergone a transformation. As I mentioned in that section in the curiosity cabinets, the pieces of the collectors are placed on the walls in a room without a certain order. World fairs, which started with the expo at the beginning of the 19th century, are large and magnificent organizations.

These fairs were held in order to keep some segments of the society in the background with the development of technology and to show the products produced by this segment with increasing technology. Exhibitions, it changes temporarily or permanently until the present day. Museums are important examples of permanent exhibition systems.

2.3 Museum Concept and Classification

According to the International Council of Museums, ICOM, the definition of a museum made in 1946 and showing minor changes until today is as follows;

The concept of Museum, defined by ICOM in 1946, is spaces that include all collections open to the public containing artistic, technical, scientific, historical, or archaeological material, including botanical gardens, excluding libraries, which can be exhibition halls. (ICOM, 1946)

According to the last definition made by ICOM at the 2019 Paris session; Museums are inclusive and polyphonic spaces about the past and the future. They state that they work on exhibitions and planning phases and concepts such as , keeping the works safe in the society, providing different memories and equal rights for future generations, and being non-profit and equal for all people. (ICOM, 2019)

It has been decided to classify museums as follows, without changing the main definition of museums, in article 2 of the declaration (1.a), which was adopted by the Dutch General Assembly on September 5, 1986, and reorganized at the 18th General Assembly convened in Norway on July 7, 1995.

- According to the Administrative Unit
- According to Regional Characteristics
- According to Functional Structure
- By Collection Type
- According to Exhibition Methods

This research examines the developing exhibition systems and the ways of exhibiting the works made by using AI in terms of their effects on the architectural space, in the examples that I will examine based on the classification above.

The purpose of establishing museums is to store and transfer knowledge and experience from the past to the present. This transfer function is done with the exhibition design. Visitors who come to the museum with the help of the exhibition designer in a limited structure receive information about the structure of the society. Exhibition designs made in museums; Continuous or can be classified as temporary, but also according to their functions and contents (Çalışkan, 2018). There are usually permanent exhibitions in museums. Contrary to museums, temporary arrangements and concept exhibition designs are more common in art galleries. (Demir, 2009).

2.4 The impact of digital art on museums

When we look at the ICOM definitions, the only function of museums that have not changed since the time they were founded is to exhibit.

Miller (2017) describes the exhibition as “the foundation of museums.”

Today, art galleries have been added to these polyphonic spaces. In order for museums and art galleries to attract the attention of visitors, they must be easy to perceive and attract attention. In this case, the exhibition is the re-functioning and design of the space according to the story used.

In this case, for visitor experiences by using the latest technological opportunities of today. technological systems are used. We classify some of these systems as follows;

Table 1. Technological approaches in imaging systems (created by author, 2022)

Exhibition System	Application Area
Projection Dressing	<i>Architectural Facade Systems</i>
Interactive Systems	<i>Interactive Wall Projection</i>
Virtual Workshops	<i>Augmented Reality and VR applications</i>
Digital Timeline	-
Live Tables	-

As seen in Table 1, the inclusion of technological possibilities in exhibition designs is an important communication tool for museums. In addition to permanently arranging museum exhibitions of digital systems, the use of projection systems and AI artwork together, as seen in Table 1, has also led to a change in the concept of exhibition space. Contrary to traditional exhibition methods, today's exhibition designs are made to attract the audience and to create a wide space perception, and to allow them to connect with the exhibited work. The change in the content of works of art since the 20th century also necessitated the transformation of exhibition spaces. As in the 18th century, the exhibited works began to be exhibited not in a way that completely covers a wall, but with a new exhibition arrangement called “White Cube” (O’Doherty, 1976). In this new exhibition arrangement, the experience of the art space was reduced to the sense of sight (Kılıç Özkan, 2021). This new layout, which does not want the audience to perceive the space completely, is completely isolated from daylight, outdoor images, and sounds in the exhibition spaces. It has the aim of detaching the viewer from the reality of the outside world and focusing entirely on the work of art. Abstracting the sense of sight from a holistic perception of space, this new normative experience detached the viewer from the reality of the outside world in open spaces where

sunlight, sounds of life, and images do not penetrate, as it demands the viewer's full attention.

The spread of this exhibition system and its application in exhibition areas made by star architects are mostly encountered until the 21st century. When we come to this century, digital add-ons are now made to the exhibition spaces and are used to attract the audience to the exhibition areas, especially in Archeology museums that exhibit classical works.

One of the examples that narrate the whole space by using technology is the digital applications made in Antalya Archeology Museum. It shows that digital applications are made even in Archeology museums where the most classical works are exhibited. The museum, which digitally recreates the “12 Duties of Hercules” from Greek mythology, changes the perceptual experiences of the audience (Figure 3).



Figure 3. Antalya Archeology Museum “The 12 duties of Hercules” (Source: Archeological Museum in Antalya)

Digital systems lead to some separations in exhibition systems in museums;

Table 2. Digital Display Approaches (Source: Efendioğlu, 2022)

Educational-Training Communication Method	<i>Active Audience Engagement</i>
Entertaining-Exploratory Communication Method	<i>Active Audience Engagement</i>

Table 2. (continued)

The Method of Communication Through Story-Narrative	<i>Passive Audience Engagement</i>
--	------------------------------------

*Interaction Design Approaches and Interior Exhibit Design Formations in Archeology Museums was Created by Şeyma Göktürk, Citing from her Master's Thesis.

As seen in Table 2, active participation of the audience is aimed in museum exhibitions with digital systems. Digital systems, whose applications continue in museums today, are used to ensure the active participation of visitors to the museum and to draw attention to the works if there is a story to be told in the museum. As can be seen in Figure 4, it can also be positioned in the form of different storytelling panels in an area around the work to be drawn attention or at the entrance. These systems are under two main headings, 2d and 3d dimensional exhibitions classified as (Goldstein, 2009).

2d Display;

Surfaces created using projection

- Kiosk and Touch screens

3d Display;

- Hologram
- VR Apps
- AR (Augmented Reality)
- MR (Mixed Reality)
- Simulation.

2.4.1 2D- Two Dimension System

2D display systems can be defined by systems such as projected surfaces and kiosk/touch screens, which are used extensively in museums for information purposes. Exhibits made using projection appeal to the user's sense of sight and hearing. These systems are mostly used to transfer information in museums where classical works are exhibited. In addition, these systems form the basis of AI works of art. The exhibition function is carried out by using a single wall surface in the exhibition space to exhibit the work.

In the exhibition of AI works of art made with projection, a single color coating is definitely applied to prevent other objects from attracting attention in the exhibition area. This can be black curtains or wall paint. Thus, it is ensured that the attention of the viewer is on the AI artwork. In some AI works of art, the work is used not only in the image but also in the sound, which creates the feeling that the work, which is on a single wall surface, is actually exhibited throughout the space.

“The Bosphorus Digital Statue” exhibition (2021), made by Refik Anadol, was exhibited at the Izmir International Fair between 3-12 September 2021. In order for this work exhibited in the public space to be understood by the audience, a closed space had to be created. Therefore, the exhibition area is a temporary prefabricated system, creating a space perception as long as it is desired to understand only the digital sculpture.



Figure 4. The Bosphorus Digital Statue exhibition (Source: photographed by the author, 2021)

The AI work, created based on the sounds and images of Bosphorus, appeals to the perceptual and auditory senses of the audience with its projection surface design.

The wall and ceiling surfaces of the temporary exhibition space have been rendered invisible using black. Although the AI artwork, which is reflected by the projection system, is on a single wall surface, it creates a three-dimensional work perception with

sound and image in the space. As in the concept of the white cube used in modern exhibition systems, we see the invisibility of the space in the temporary exhibition area by using black. In this case, an example can be given to designing the exhibition space as an invisible surface to highlight the AI artwork.

2.4.2 3D- Three Dimension System

3d systems; can be defined with different types of mirrored surfaces used in museums and art galleries, and systems such as VR glasses, holograms, MR and AR systems that enable the perception of different areas.

Hologram systems enable the transfer of rare artifacts, which may be difficult to show in museums or prohibited, to the user by using this technology. Today, hologram technologies do not only reach the user in museums, but also;

“Hologram technology is technologies used in three dimensions. It ensures that the user's visual and perceptual information is both permanent and very clear. Hologram technology is generally seen more in science and art museums in display design” (Deniz, 2008).



Figure 5. La Bella Principessa (Source: Gürbüz, 2022)

The original work (La Bella Principessa) is locked in the Geneva free port. The work will be exhibited in the autumn at a world-renowned European institution. The work,

which has been exhibited only three times since 1998, does not belong to any museums.

Thanks to a company called Holoverse, the original work was scanned to be transferred to a “multi-gigabyte photogrammetry” image in order to create the Holo form of the Artifact. In this way, enthusiasts will be able to zoom in on the work and capture much more detail than they saw in the original work.

The hologram will be placed inside a crystal ball. According to the Holoverse company, the sphere in question will be delivered to the owner and placed in the desired location through a high-security and high-quality service. VR Technology creates an exhibition experience that appeals to all senses by ensuring the active participation of the audience.

VR technology is a technology that makes the user believe that virtual reality is actually real. It consists of large glasses, headphones, and cameras that are passed over the head and placed on the eyes with a cord. In this context, VR technology consists of the support of lenses that increase the visual quality and the controls designed to manage the view. In this context, it enables users to perform an exhibition experience in which they will actively participate in digital exhibitions.



Figure 6. Virtual Reality experience of Osman Hamdi Bey's Turtle Trainer (Source: Pera Museum)

In 2019, one of the famous Turkish painters, Osman Hamdi Bey's Turtle Trainer, at the Pera Museum, provided an interactive exhibition experience to visitors to the Pera Art Museum, thanks to VR technology. Thanks to VR glasses, the audience can get out of the architectural environment of the Pera museum; into the first months of 1906, they had the opportunity to experience Osman Hamdi Bey's study room (Figure 7)



Figure 7. Osman Hamdi Bey's Study Room in 1906 with VR application (Source: Pera Museum)

Through VR glasses, viewers had the opportunity to change their place in architecture. From 2019 to 1906 it was possible to experience a different place and space than the one you are physically present in. In fact, this situation conveys a content-oriented exhibition experience, thus spatial elements in the exhibition space are not of primary importance, before the use of AI works in exhibition spaces. As a result, you can present the space and art experience you want to present to the audience without the need for any architectural space (exhibition area) through VR glasses.

CHAPTER 3: HISTORY AND DEVELOPMENT PERIOD OF ARTIFICIAL INTELLIGENCE

3.1. Development Process of Artificial Intelligence

In my thesis, the effect of AI and exhibition systems on architecture is discussed. As explained in the introduction section, it is discussed that exhibition systems have changed throughout the history. In this section, the development of AI, the effects of AI artwork, and the differences between digital art and AI in terms of exhibition and architectural space is discussed.

AI is a technological development arising from problem-solving and emerging in many fields of activity. One of these fields of activity is inevitably art. AI and art examples have been appearing intensely lately and in this case, they affect the exhibition spaces and architecture (Pirim, 2000). In this section, first, the development processes of digital art and AI in the literature will be shown as a timeline and examined between 1700's and 2000's.

Although the starting point of AI was not art and architecture, and it emerged in computer science, it started to be used due to a problem-solving and need. AI is actually divided into groups chronologically in the historical process (Pirim, 2000):

- *Dark Period (1965's)*: This period is the first period in which AI showed little development but emerged. In this period in the field of AI, only Computer experts worked to develop a thinking machine. It covers the period of the emergence of intelligent computers as a result of machines and data.
- *Renaissance Period (1970's)*: This is the period in which developments in the field of AI, as in other fields, are paved has been. The initiatives of scientists interested in AI have formed the foundations of today.
- *Partnership Period (1975's)*: AI researchers started to communicate not only in the field of informatics, but also with other branches of science affected by AI, such as psychology, sociology, linguistics.
- *Entrepreneurship Period (1980's)*: AI projects have now found their place on paper and outside the laboratory environment. It is the period in which the architectural and medical worlds need to be shaped according to the needs of that field. This period has not ended.

AI has been studied in this way in the literature. We can see the AI artworks, which are the subject of this thesis, and their reflections on architecture, in Figure 11, AI timeline.

Timeline covering the 1700s and 2000s (Pirim, 2000),

- It begins with the theory of mathematics and the use of AI by Thomas Bayes in 1763. Now the concept of AI enters the world of science.
- In 1921, the word "Robot" entered the literature in a play written by the writer Karel Capek.
- In 1949, a theory that machines can think was put forward by Berkeley, and the concept of AI data and machine entered the literature.
- 10 years later, in 1959, Arthur Samuel's Machine Learning article marked a stepping stone in the history of AI.
- The concept of AI, which was on paper and in thoughts in the 1960s, has now begun to be seen in the field of application. Shakey, the first mobile robot, was designed in 1969.
- The fields of application of AI continued with the chess tournament of the AI named Deep Blue, produced by IBM in 1997, with the world chess champion (Figure 9)

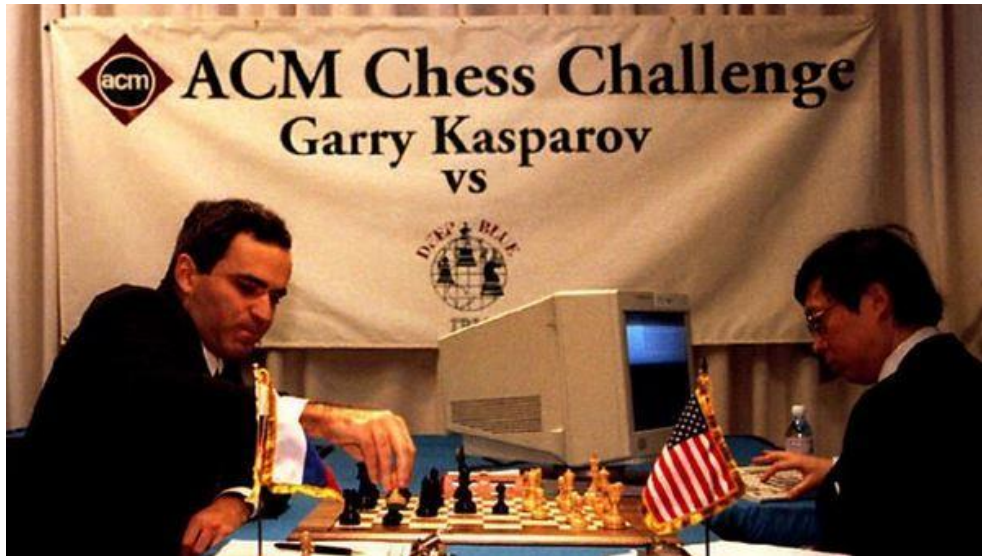


Figure 8. 1997 Garry Kasparov and Deep Blue chess match (Source: Uslu, 2015)

- In 2015, the usage areas of AI were no longer limited. Google created an AI group. In this way, we see that the first step of AI works of art has been taken. With the reinterpretation of sky photos by AI.



Figure 9. Google Deep Dream painting by Vincent van Gogh. (Source: Cascone, 2016)

- In 2018, we see the direct use of AI in art with Edmond Belamy's portrait reproduced by algorithms.

- In 2018, the first reflection of the AI work of art, which is the subject of this thesis, on the exhibition spaces was set out with the idea of “the imagination of machine” made by Artist Memo Akten, we see it with his Deep Meditations exhibition (Akten, 2018).



Figure 10. Deep Meditations 2018 (Source: Akten, 2018)

Since 2018, various artists have been creating various works with AI or using algorithms. We see that these works are reflected in museums, which are exhibition venues, and that they bring their exhibition functions to a different form today.

When exhibiting AI works, it can cover the entire space or it can be displayed even on a single wall surface.



Figure 11. AI Development Process Timeline Between 1700-2000 (Source: aiaartist, 2021)

When we look at the historical development of AI timeline, it has been encountered since the 17th century. A machine developed by Leibniz could perform multiple mathematical operations. In the 17th century, this machine was seen as an AI achievement, along with its presentation to the royal family in London. However, the article called “Can Machines Think?”, published by Alan Turing, known in the literature as the founder of AI, started to be questioned all over the world in 1950. Alan Turing introduced a concept called the “Turing Test” for the first time, and for the first time in history, man and machine were communicating in the Turing test. Two people

were communicating on a screen without seeing or hearing. One of them was a machine and the other a human, both trying to convince them that they were human. The machine test was considered successful, as the human at the computer reached the point where it could not distinguish. Turing claimed that with this test, the machine's ability to think like humans can be learned (Eberl, 2019).

Before Turing published this test, in the 1930s and 40s, there were also studies on computers that would imitate all human activities. The first research in AI studies pioneered by Turing continued with tests comparing the intelligence of humans and machines. The first AI conference was held in 1956. In the conference called Dartmouth Workshop; The researchers, who are 12 people, aimed to give machines the ability to learn and they worked on it. (Tegmark, 2019). In this workshop, researchers focused on the concept of machines gaining the ability to think, expressed by Turing, and focused on these features of computers rather than simple calculation processes. After the theoretical studies on AI, it was the collaboration of Samuel and IBM that continued the concept of learning machines after the Turing test. According to Eberl, the collaboration of Samuel and IBM strengthened the concept of machine learning because Arthur Samuel, who had developed a machine that could play checkers, played against the machine himself and proceeded by checking his accounts to increase the machine learning process. At the end of the process, the machine became able to predict every move thanks to these calculations. This strengthened Eberl's concept of learning machines.

These developments, which emerged in the 1950s, remained on paper for a while and remained silent until 1996 due to the limited application areas. In 1996, the concepts of AI and learning machines created excitement again in the scientific world. IBM has developed a machine called Deep Blue. This computer played a chess tournament with World Chess Champion Garry Kasparov. Defeated in the first game in 1996, Deep Blue defeated the world champion in the second game played in 1997, and this has made history once again, proving the machine learning activity. After 1997, after 20 years of silence, developments in this field accelerated. In 2006, new concepts emerged in AI, and neural networks gained speed in robot technology with the way of learning. Software that affects activities in commercial areas has also emerged. Apple revealed the Siri software and for the first time, the concept of a personal assistant entered our lives with phones. Google continued to work in this area and developed an

AI called Deepmind (Tegmark, 2019). By developing games, DeepMind experts developed the learning ability of AI against undefeated players and defeated the players. AI develops learning skills in line with the software taught to it and cannot show human characteristics.

3.2. Digital Art and Artificial Intelligence

Since the 1960s, new media technologies and the use of the internet have offered artists new production areas; but the emergence of digital art in the middle of the 20th century, traditional art forms, the possibilities of digital technologies transformed into industrial and mechanical production forms.

“Artists, who experiment with digital forms, first focus on photography, cinema and television, video camera and computer in the 1980s, and the Internet, which became widespread in the 1990s used it as a creative medium” (Yücel, 2012, p. 30).

The concept of AI is changing many habits today. Art is one of them. In my study, which will deal with the spatial characteristics of AI artworks and exhibition forms, it is understood that the concept of AI rearranges most conditions as a thinking algorithm. To summarize, it describes the mental and tangible re-creation using advanced technological possibilities.

In this study, the point that digital art has reached today with the increasing digitalizing culture is discussed. In the study, the historical process of AI art is discussed, and especially the post-human concept is emphasized.

Working with AI and new media systems, artists brought together the virtual and the real through digital representation. In doing so, some tools were used; The tools they use, such as projection and video systems, have transformed the exhibition space or turned an architectural façade into a work of art. In this case, the physical reality of the space and the reality that the artist wanted to show created two different perceptions.

The forms of exhibition and the method used while creating the work of art determine the perception and distinction of physical space-virtual space. The viewer who comes

to see the work spends time in the space and interacts with the work being exhibited. This experience is usually realized through the sense of sight.

In classical exhibitions, visitors who come to the exhibition space have the opportunity to experience the works in the space chronologically, using only their sense of sight, with museum or art gallery markers. Artworks produced by AI were exhibited in this way at the first stage, then the works were shaped according to the space by including them in the architectural space.



CHAPTER 4: USE OF AI IN ART

4.1 Artificial Intelligence Artwork

This section consists of two titles. In the first part, works of art produced by AI and their formation processes. In the second part, the effect of AI art on the exhibition space is discussed.

- Art produced by AI was made through robots and machines. These examples had no effect on the space.
- With the emergence of digital art and new media systems, AI artworks were projected onto the exhibition space or a facade through a projection system. In chapter 4.2, the effects on the selected places are discussed.

Art products made using AI emerged in the 90s, primarily in the fields of music, cinema, painting, and literature.

While these works are being made, we see that it is a work that comes out by creating the composition of different works from the databases of AI.

In the field of painting, the works produced by AI have been met with great curiosity by people. At the same time, the works were offered for sale in art galleries and auctions and attracted great interest from the audience. It has also been a matter of debate whether the work produced by a system with software and hardware is a work of art.

It has been a matter of debate whether AI, which humans have or AI, which does not have consciousness, will improve itself in terms of creativity, criticism, and originality. In this development, thanks to the software it has, it has enabled it to produce original works.

As Başarır mentioned in her article, the main question in areas where artificial intelligence is used is can AI learn better than humans? Is Art and Design being transferred to someone new? Intelligence and/or non-biological? So my artist/designer? (Başarır, 2020)

The answers to these questions are discussed as to whether my artificial intelligence has remained in the background in the creation process of the designer and artist in both architecture and art in recent centuries.

At the beginning of the AI works of art are the works produced by AICAN. AICAN is an AI program that can produce original works of art (Figure 12). AI artist named AICAN produced at Rutgers University Art and AI Lab. Thanks to the developed algorithms, it can create original works of art by separating the concept of aesthetics and styles.



Figure 12. An artwork by AICAN (Source: E.C.U, 2018)

He argues that while AICAN is designing algorithms, he rejects the usual styles, forms, and subjects in his works, and they intuitively learn that by doing new things, people's attention will be more attracted (E.C.U, 2018).

One of the painting robots developed with AI is the AI AARON, designed by Artist Harold Cohen. Special software that works with the software that allows the user to use real paint and brushes while it has a mechanism. Starting to paint with abstract works, AARON has learned three dimensions and positioning over the years. With the

development of its software, it can do coloring. It can paint with the support of algorithms without intervention (Figure 13).

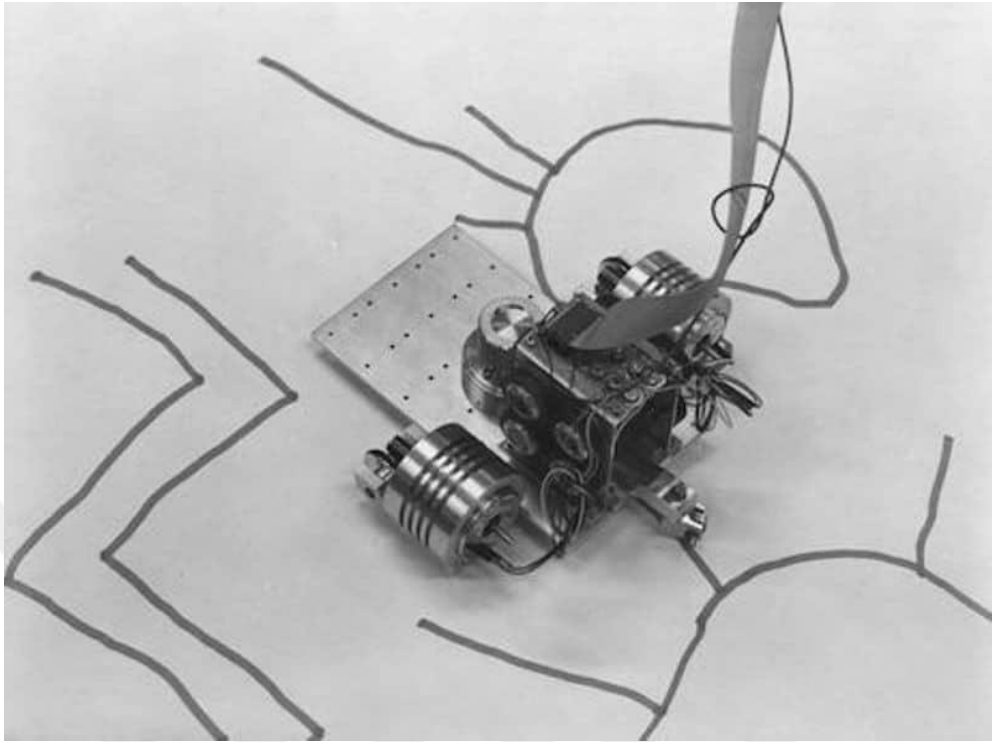


Figure 13: AARON AI program drawing device (Source: Evli, 2020)

AARON has been developed by Cohen in the 1970s. But it can only draw black and white lines. Human intervention is required for coloring. It was a joint work of art by AARON and Cohen at an exhibition in 1979. A 100-meter mural by Aaron was painted by Cohen. This is the first example of human and AI collaboration in art in the 1970s (Figure 14).



Figure 14. A work drawn by AARON by Harold Cohen is colored (Source: Evli, 2020)

Cohen said the following about AARON in an interview he gave in 1989;

“It took me 20 years to teach AARON to draw. How can I teach to paint before I die?”

Five years later, AARON, which not only draws exterior surfaces, but also paints, designed it. Cohen's newly designed AARON's paintings seemed indistinguishable from Cohen's colorings.



Figure 15. Harold Cohen and AARON, Computer Museum Boston, 1995 (Source: The New York Times, 2015)

Artworks made by AI are not limited to painting. There are also poems written by AI. Developed by the new media artist Bager Akbay, it is a blog site of AI named “Deniz Yilmaz”, and its poems arouse curiosity among its followers. In short, after a robot that paints, a robot that writes poetry in robotic systems has been developed (Figure 16).

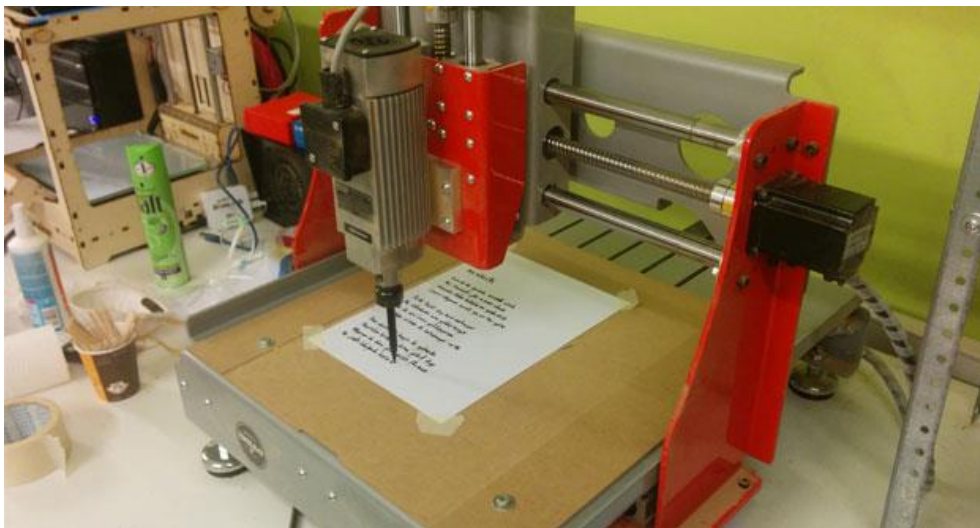


Figure 16. Deniz Yilmaz - Robot poet (Source: Akbay, 2015)

The use of AI in art can also be mixed. In other words, the artist can work both with the AI machine feature and manually. An AI artist named Soug Chung creates hybrid

artworks, both machine and hand, to discover that there is communication between humans and machines.

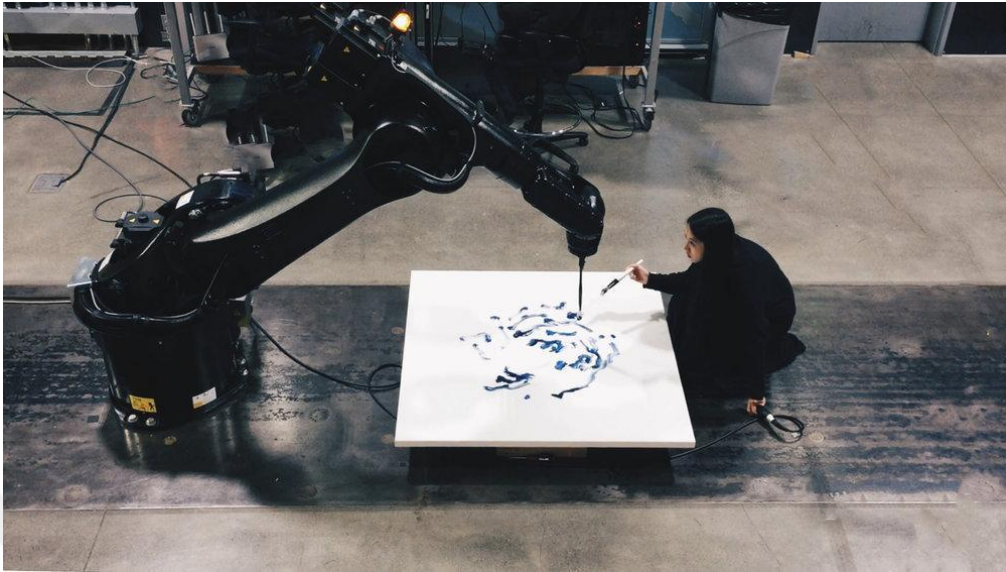


Figure 17. Soug Chung Düet (Source: aiartist, 2021)

By painting with a machine in the Drawing Operations (Duet) performance exhibition, she presented both machine memory and the cooperation of human talent as a performance art among the audience.



Figure 18. Soug Chung Drawing Operations (Duet) performance. (Source: aiartist, 2021)

“Being able to engage in brand building collaboratively with a robot means not always knowing what I'm doing, and it's really enlightening,” the artist says in an interview.

It is not known whether the artist or the AI robot is in control of the artwork during the production process. Already in this obscurity, it makes the audience wonder about the result of the work.

4.2. Relation of AI Artwork and Exhibition

With the use of AI in works of art and increasing digital technologies, the concept of Digital Installation has emerged. This form of exhibition, which allows the active use of the space in a virtual way, is also the main subject of this thesis. The basis of digital exhibits is the use of AI and AI artworks.

This section constitutes the method part of the thesis. Whether the selected AI artworks are on the space and on a single wall surface and its effects will be discussed. Selected artists and AI artworks are as follows:

- Refik Anadol; Machine Hallucination, 2019.
- Memo Akten; Body Paint, 2009.
- Memo Akten; Deep Meditations, 2020.
- Refik Anadol; WDCH Dream, 2019.
- Refik Anadol; Casa Battlo, 2021.

Although there are too many artists in AI art samples, the reason for going through two artists (Refik Anadol and Memo Akten) is; It is to explain that an artist makes different forms of an exhibition by using an AI artwork. Choosing the AI works of the artists;

- Displayed directly within the exhibition space
- Projected on the facade surface or wall surface

two types were studied.

Refik Anadol is one of the leading artists who ensure the use of AI in art and its interpretation of architecture. New media artist Anadol realized an installation in 2017 using architecture with his work called Archive Dream. In the project carried out jointly with the SALT Research Center, 1 million 700 documents were classified with machine memory and visualized with algorithms (Anadol, 2019).



Figure 19. Archive Dream Exhibition (Source: Anadol, 2019)

In the Machine Hallucination exhibition held by the artist in New York in 2019, the most compelling result he has produced to date, both algorithmically and big data, has em



Figure 20. Machine Hallucination, (Source: Anadol, 2019)

In this project, the story of 113 million photos of New York being downloaded and turned into dreams by AI is followed. With 18-channel video and 32-channel sound, the audience experiences the cinema of the future within the story. Anadol's purpose here is to experience the cinema of the future (Anadol, 2019).

In this work, Anadol got rid of the boundaries of space and used all the space and all the architectural elements in the exhibition area as his canvas. Thinking of the space as a white cube, the artist presents the building elements by redefining the functionality of architectural formations with his art in the exhibition space.

The artist also questions how people would feel in the reality they would be in, if there were no angular spaces limited to any wall, without the boundaries of architecture. His work called Infinity Room, it is aimed to create a feeling of infinity by covering the floor and ceiling of the space with mirror material so that the audience can experience a complete void from the moment they enter the room in the exhibition area. He questions that after the video images made by AI are projected in the space, the viewer does not have a perception of boundaries in the space and that the perception that limits the space may vary between people (Figure 21).



Figure 21. Figure: Infinity Room (Source: Özmetin, 2020)

In addition to the works of Refik Anadol, in which he treats the space as a cube, we see in his works that he uses as the canvas on architectural facades. His work for the exteriors of the Walt Disney Concert Hall is one such example (Figure 22). In this work that he realized using Google AI, he reflected visuals he created from orchestral compositions with screens placed on all facades of the concert hall designed by Frank Gehry (Özmetin, 2020).



Figure 22. WDCH Dreams (Source: Özmetin, 2020)

With the increasing technological developments in daily life, the usage areas of AI have increased. Robotic systems are the biggest example of these.

AI artworks are defined and exhibited in this part of the study; his relationship with the exhibition space and the new approaches he added to the exhibition area will be evaluated. These approaches are as follows:

1. Exhibition Space Physical Facilities

1.1. Type of Exhibition

1.2. Type of Venue

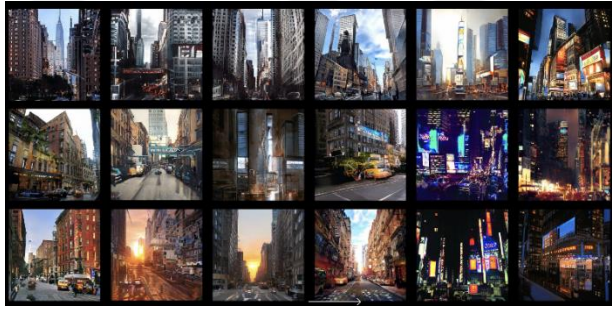

2. AI Artwork Display Format

2.1. Wall Surface

2.2. Total Space

2.3. Façade

Table 3. Spatial features of selected artworks / Machine Hallucination (Source: Anadol, 2019).

	CRITERIA		Machine Hallucination, ARTE House, NYC, 2019. (Refik Anadol)
EXHIBITION SPACE PHYSICAL FACILITIES	Dimension (M ²)		
	Type of Venue	AI Artwork	
AI ARTWORK DISPLAY FORMAT	Wall Surface	X	
	Total Space	X	
	Facade		

Evaluation and Conclusion: “Machine Hallucination”, an AI work of art produced by Refik Anadol in 2019, was reinterpreted by machine algorithms from the photograph

taken from certain points of the city with a Machine intelligence, and the work of art emerged. In the work created by using sound and image together, the viewer experiences the perception of a 3-dimensional work of art. This ensures that all architectural elements except the ceiling are included in the exhibition system and the audience perceives the entire space as an exhibition element (Table 3).

The machine hallucinations exhibition is an important example of AI works of art that transforms architecture in terms of exhibition areas and in this sense incorporates the exhibition space into the work of art.

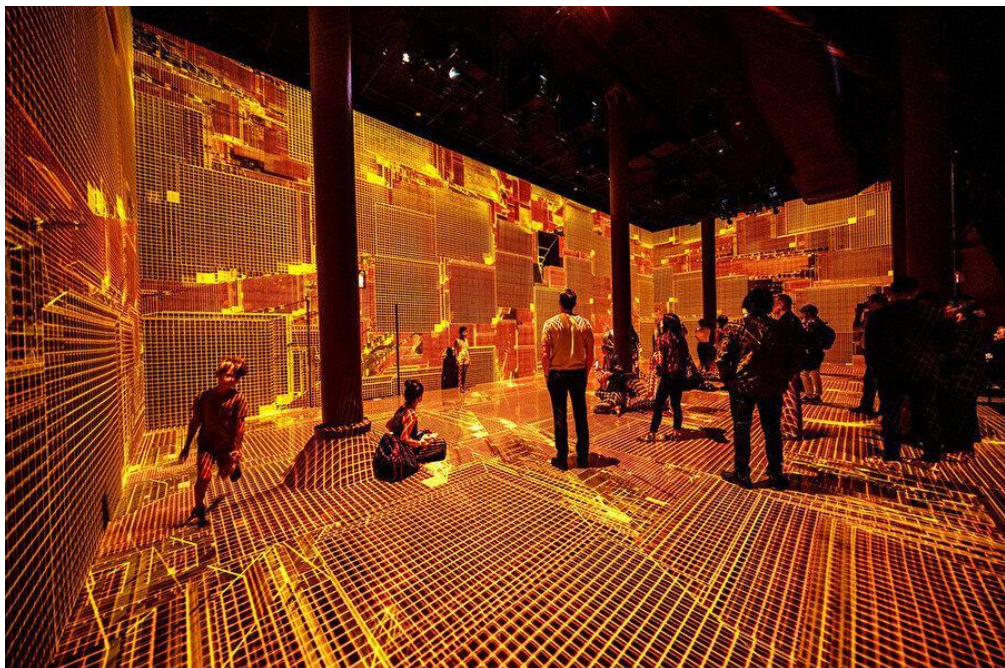




Figure 23. Machine Hallucinations (Source: Anadol, 2019)

As can be seen from the interior visuals of the exhibition, the AI artwork covers the entire area as marked in the table (Figure 23). In this case, the space boundary elements such as the floor, column and wall are perceptually destroyed by the viewer. In order to perceive the AI work of art, the audience perceives the whole of the space as a work and does not think of it as building elements such as floors, columns, walls, etc. In this work, AI is an important example in which the work of art transforms the exhibition space and changes the exhibition systems.

In Table 3, the type of AI artwork and the way it is displayed in the space are indicated. Covering the entire space has completely changed the way the space is perceived, both as a wall surface and as a whole space, with an AI artwork.

In this case, it is possible to say that in this work, the artificial intelligence artwork completely transforms the exhibition space and changes the way the space is perceived.

Table 4. Spatial features of selected artworks / Body Painting – Memo Akten (Source: Akten, 2009)

	CRITERIA		Body Paint -Memo Akten(Mehmet Selim Akten) 2009.
EXHIBITION SPACE PHYSICAL FACILITIES	Type of Exhibition	Interactive installation	 <p>"Body Paint" at Trapholt of Museum Art, Kolding, Denmark (2019)</p>
	Type of Venue	AI Audio Visual and Interactive Performance	
AI ARTWORK DISPLAY FORMAT	Wall Surface	X	 <p>"Body Paint" at Wonderspaces, San Diego, CA, USA (2019)</p>
	Total Space		
	Facade		

Evaluation and Conclusion: Body Painting by Memo Akten, first exhibited at Bayham Hall, UK (2009), is an interactive AI exhibition. The exhibition, which was carried out using a single wall surface in the exhibition area, was made to define the nonverbal way of expressing itself. The artist's aim is to ensure that the body paint, which is normally made with paint, is on the screen with the movements of the viewer.

The work, which is not just a painting application, captures the movement and energy of the viewer's body and creates changes in the image and color according to the movements.



Figure 24. “Body Paint” at Sonar Istanbul, Turkey (2019) (Source: Akten, 2019)

The Body Painting exhibition is the display system of an AI artwork that becomes active with the interactive audience. This exhibition has been presented in various countries around the world. It is an interactive system by means of projection on a single wall in the space. It has not transformed the exhibition area, only a black coating is used on the wall in some exhibitions so that the work can be fully perceived (Figure 24).

Table 5: Spatial features of selected artworks/ Deep Meditations-Memo Akten (Source: Akten, 2020)

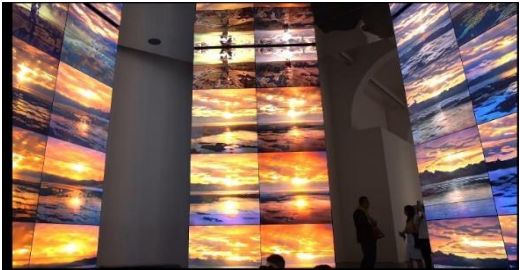

	CRITERIA		Deep Meditation
EXHIBITION SPACE PHYSICAL FACILITIES	Type of Exhibition	Public Art	
	Type of Venue	AI Audio Visual and Interactive Performance	

Table 5. (continued)

AI ARTWO RK DISPLA Y FORMA T	<i>Wall Surface</i>	<i>X</i>	
	<i>Total Space</i>	<i>X</i>	
	<i>Facade</i>		

Evaluation and Conclusion: I chose the AI artwork titled “Deep Meditations”, exhibited in various countries by Memo Akten, at the UCCA Center for Contemporary Art exhibition area in China, where it was last exhibited. The exhibition area is a space with white walls and modern art. In Deep Meditation, the artist wants to include the viewer in the work and limits the part of the exhibition space reserved for him with led screens from floor to ceiling. It aims to make the audience question nature, life and changes in the universe with sound.



Figure 25. Ucca Center of Contemporary Art (Source: Ucca Museum)

As seen in Figure 25, the exhibition area is a modern exhibition space planned with a “white cube” layout. Artists from different fields use the exhibition area in accordance with their concepts.

In the AI exhibition Memo Akten “Deep Meditations”, in order to bring the memory of the machine to the audience, it creates a limited area with led screens from floor to ceiling in the exhibition area, and promises meditation to the audience with the sound of machine memory in the middle area.

This situation allowed for creation of a different area inside the exhibition space. By including the audience in the exhibition with limited space, the AI artwork actually created its own space within the exhibition space.

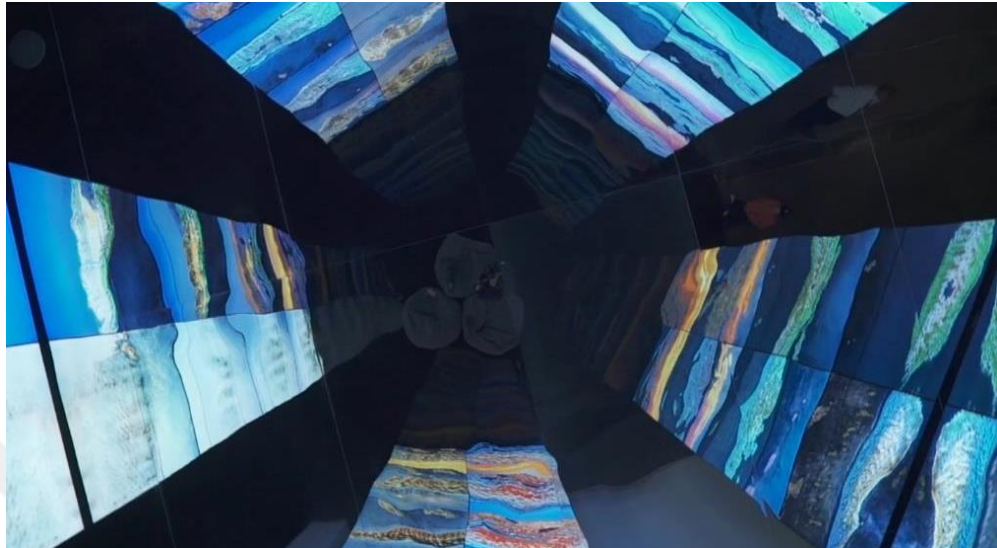


Figure 26. Panel's top view (Source: Akten, 2018)

The panels used in the exhibition are performing multiple video displays. Although related to each other, they represent different journeys in machine memory. Therefore, videos are displayed slowly in some panels and faster in others. This offers the audience a journey of discovery towards the end of the videos. It can be more curious and exploratory in short videos, and more target-oriented in long videos (Akten, 2018).

Table 6. Spatial features of selected artworks/ WDCH Dreams-Refik Anadol (Source: Anadol, 2021)


		CRITERIA	WDCH Dreams, Walt Disney Concert Hall, Los Angeles, 2019. (Refik Anadol)
EXHIBITION SPACE PHYSICAL FACILITIES	Type of Exhibition	Public Art	
	Type of Venue	AI Audio/ Visual Performance	

Table 6. (continued)

	CRITERIA		WDCH Dreams, Walt Disney Concert Hall, Los Angeles, 2019. (Refik Anadol)
AI ART WORK K DISPL AY FORM AT	Wall Surface		
	Total Space		
	Facade	X	

Evaluation and Conclusion: The façade of WDCH, one of Frank Gehry's most important works; has a distinctive architecture with its metallic, enthusiastic, curved surfaces. It is one of the concert halls with the best acoustics in the world. It is home to the Los Angeles Philharmonic Orchestra. On the facade of the Walt Disney Concert Hall, metal-clad surfaces with curved lines join each other with glass-covered surfaces in an unruly manner. Representing Frank Gehry's style, the building is like a work of art in itself.





Figure 27. Bird's eye view of the Walt Disney Concert Hall by the main entrance (Source: Uğur, 2020)

AI artwork designed by Refik Anadol designed the entire outer shell of the WDCH building for curved metallic surfaces. Since this work was designed for the building, the architecture did not create any physical changes.

WDCH Dreams, a public art exhibition, by Anadol and his team, using machine learning algorithms, developed LA Phil digital archives with a machine intelligence approach, reflecting the past of the orchestra on the metal surfaces of the architectural facade. This situation has been an example of AI artwork transforming the architectural façade and giving it a vision of a form of consciousness.

Table 7. Spatial features of selected artworks/Casa Batllo –Refik Anadol (Source: Anadol, 2021)

	CRITERIA		Casa Batllo –Refik Anadol, 2021
EXHIBITION SPACE PHYSICAL FACILITIES	Type of Exhibition	Interactive Installation/Living Architecture	
	Type of Venue	AI Audio Visual	
AI ARTWORK DISPLAY FORMAT	Wall Surface		
	Total Space		
	Facade	X	

Evaluation and Conclusion: Casa Batllo, designed by Antoni Gaudi, an important representative of the Art Nouveau movement, in 1903, is one of the landmarks of the city of Barcelona. The mosaic decorations, bone-looking balconies, and carriers of the building, whose façade already resembles a work of art, distinguish it from other buildings (Figure 28).

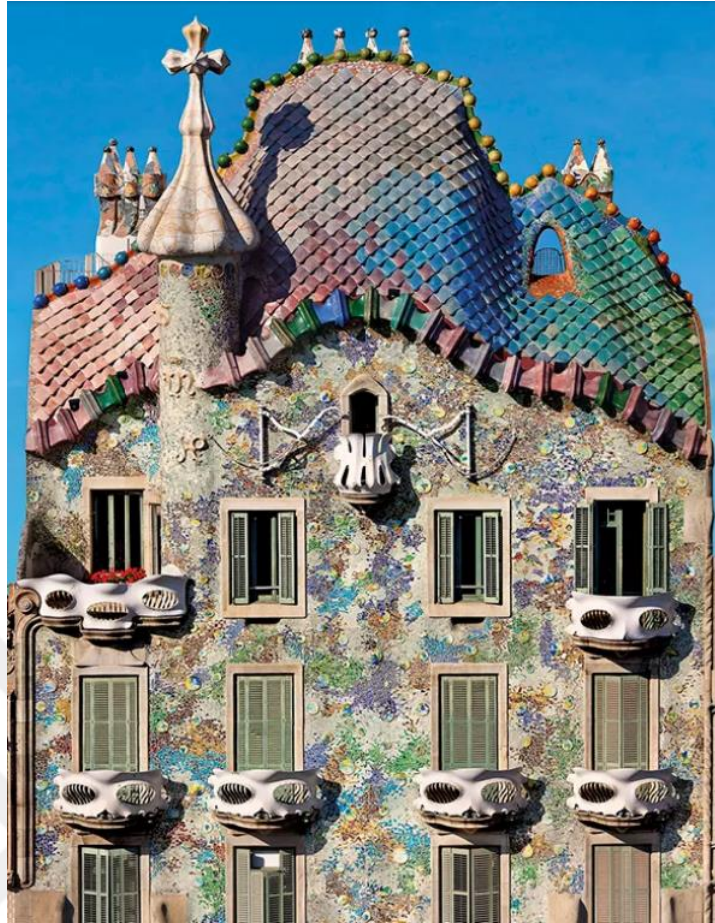


Figure 28. The facade of the Casa Batlló building (Source: Casa Batlló Museum)

The meeting of Casa Battlo and Refik Anadol has brought the concept of “Living Architecture” to the literature and appears as a different exhibition technique (Anadol,2020). If we evaluate the Living Architecture in the context of this work, as a result of the AI light show on the front of Casa Batlló, we can see a prototype of the city of Barcelona in America, which also keeps the climate data alive, as it is one of the landmarks of the city in which it is located (Figure 28).



Figure 29. Casa Battlo Building Dijital art Sculpture (Source: Gözükara, 2022)

As a digital art sculpture, it can be visited publicly in front of the Manhattan Rockefeller Plaza. It is also the first UNESCO world heritage building to be auctioned off this iconic digital art sculpture, interpreted in NFT format (Gözükara, 2022). An example of an NFT work that is sold after being exhibited as an AI work of art can be given as an example (Figure 29).



Figure 30. Casa Battlo NFT format (Source: Anadol, 2021)

CHAPTER 5: CONCLUSION

This thesis examined the reflections of AI artworks on architectural space. Exhibition areas and examples of AI artworks were discussed. The concept of AI artwork was defined. Afterward, AI works of art and works that affect the exhibition space were selected and their impact on architecture was emphasized.

The first research question is “What is an Artwork” and “How is it different than AI artwork”. To answer this, Chapter 3 examines the relationship between them and the differences between the AI artwork and the concept of artwork in relation to exhibition space.

The processes of the exhibition areas until today Chapter 2 focuses on how AI works of art are shaped before they are exhibited, their effects on architecture, and how art changes the way it is exhibited.

Chapter 2 also attempts to address the third and fourth research questions of the thesis:

“What are the design criteria of exhibition spaces for AI artworks?” and "What are the architectural spaces required for AI artists? Can it be done anywhere?"

This chapter attempts to answer research questions by presenting a history of the exhibition. In the section, starting from the traditional exhibition methods, the effects on architecture and the works exhibited without transforming the architecture are mentioned. For example, such as exhibiting the works collected by the nobles from various countries without being bound by any concept or chronological order. Afterward, innovative exhibition concepts are discussed and examples of 2d and 3d exhibition systems, which we can define as active and passive participation in museums, are given before the use of AI. It is discussed that these systems gradually started to transform architecture.

In the thesis, which describes the reflection of AI works of art in the exhibition areas, in the 4th chapter, innovative exhibition approaches that emerged for the exhibition forms of AI works of art are mentioned. This chapter also gives examples of AI works of art that are the research topic of the thesis. It is the chapter where some selected

works are examined according to certain criteria. The effects of selected artworks on the exhibition space were examined according to the following criteria:

1. Exhibition Space Physical Facilities

- 1.1. Type of Exhibition

- 1.2. Type of Venue

2. AI Artwork Display Format

- 2.1. Wall Surface

- 2.2. Total Space

- 2.3. Facade

In the AI artworks examined through the tables, the Physical characteristics of the Exhibition Area and the type of the exhibition were marked in the 1st part of the Table. In AI works of art, some features of the space affect the way the work is exhibited. Or vice versa, the work is planned according to the dimensions of the area to be exhibited. Examples of these two cases are found in Chapter 4. In the second part of the table, the way of exhibiting the AI artwork is mentioned. The work can completely cover a wall surface, it can be exhibited in the entire exhibition space and create an independent new area, or a single-surface exhibition system is made on architectural facades.

This thesis has provided a theoretical framework for the effects of AI on architecture through the display forms of artworks. A different methodology has been followed by classifying the reflection forms of AI works of art through the fields of AI, architecture and exhibition. The number of studies on AI works of art and its effects on exhibition areas is few or limited. For this reason, it has made an important contribution to discussing the effects of AI works of art, which are gradually developing in architecture, facade systems, and space, through examples.

This thesis is expected to will make spatial analyzes in AI display areas by including the audience in the research questions.

5.1. Limitations of The Study:

The following points can be considered as the limitations of the study. First, there are too many artists in the AI-working world, and they display their work in art galleries and exhibition spaces. In this study, the works of artists who are considered to be pioneers in the field of AI due to time constraints and their contributions to architecture have been selected.

The second limitation is that the exhibition spaces and architectural structures examined in this study cannot be physically identified by sight. Generally, the primary source is used and is indicated in the relevant tables. In this case, the audience cannot be reached in the exhibition spaces. The perception the exhibition space by the audience is not evaluated through a one-to-one survey or interview. In the related tables in the thesis, the situation of the exhibition space and the way it affects the architecture are discussed.

5.2. Future Research Suggestion:

According to my research process and understanding of the limitations of my study, the following recommendations are listed as future research guidelines:

First, AI works of art can be separated and their types can be determined. According to these determined types, the way they affect architecture and exhibition spaces can be analyzed according to a determined scale system.

In addition to examples from the world, a survey can be used to conduct a field survey in art galleries or architectural spaces where selected AI works of art in Turkey are exhibited, and a measurement system can be used on the audience's perceptions of the space and works of art. Exhibition diaries and audience experiences can also be included in the work. This will enable the study to be based on more realistic criteria.

In this case, AI can contribute to the literature by discussing the classification of artworks and how it affects architecture/exhibition spaces

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