

# INTERIOR ARCHITECTURAL ISSUES

**DESIGN  
THEORY  
PHILOSOPHY**

Editor  
**Kağan Günçe**



LIVRE DE LYON  
2023

Architectural  
Sciences

**INTERIOR**  
**ARCHITECTURAL ISSUES**  
**DESIGN, THEORY & PHILOSOPHY**

**Editor**  
**Kağan GÜNÇE**



**LIVRE DE LYON**

Lyon 2023



**INTERIOR**  
**ARCHITECTURAL ISSUES**  
**DESIGN, THEORY & PHILOSOPHY**

**Editor**  
**Kağan GÜNÇE**



**LIVRE DE LYON**

Lyon 2023

## **Interior Architectural Issues - Design, Theory & Philosophy**

**Editor** • Prof. Dr. Kağan Günçe • Orcid: 0000-0003-1557-2987

**Cover Design** • Kamiar Yazdani

**Book Layout** • Motion Graphics

**First Published** • May 2023, Lyon

**ISBN:** 978-2-38236-555-7

**copyriht © 2023 by Livre de Lyon**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the Publisher.



This book is the first in the Journal of Interior Design Academy - INda book project series.

**Publisher** • Livre de Lyon

**Address** • 37 rue marietton, 69009, Lyon France

**website** • <http://www.livredelyon.com>

**e-mail** • [livredelyon@gmail.com](mailto:livredelyon@gmail.com)



LIVRE DE LYON

# PREFACE

## **‘INTERIOR ARCHITECTURAL ISSUES – Design, Theory & Philosophy’**

Interior architecture is a multidimensional field that focuses on the interior design of the built environment, as well as the space that has the potential to be defined. This area aims to offer ‘design’ by producing the most appropriate solutions according to functional, structural and aesthetic criteria in a space, as well as the ‘anthropometric’, ‘sensory’ and ‘perceptual-mental’ aspects of the user. Understanding the space, which is one of the most basic requirements for existence, has always been a curiosity and an endless subject of research, questioning and interpretation for designers. The space, which can be described as a piece of space whose boundaries are determined by the senses, is at the center of the discipline of interior architecture. In this context, the subject of space and the act of designing the space is the artistic fiction of the contact that human and artificial nature will establish with each other.

Interior architecture issues began to be institutionalized in the United States in the early 1900s in the field of industry and education. This formation, which contains fine arts in its essence, has become a multidimensional profession accepted in a significant part of the world in a short time. Although interior architecture as a profession was initially structured as a special field that developed with the focus of architecture, it currently maintains its unique professional structuring in a dynamic phenomenon. Interior Architecture profession has become a ‘basic science field’ that continues its development with expansions to ‘design’, ‘theory’, ‘philosophy’, ‘environmental psychology’, ‘conservation - renewal’, ‘history’, ‘material’, ‘structure’, ‘physical environment control’ and ‘education’.

Naturally, there is a shortage of written documentation and resources in the field of Interior Architecture, which can be considered new. In order to support the development of the field of interior architecture, it is inevitable to deal with and examine all its dimensions and to put forward concrete documentation by making future projections. With this awareness and responsibility, this issue was brought to the agenda by me in the Journal of Interior Design and Academy (INda), of which I am a stakeholder, and was supported by the editorial board of the journal. The name ‘INTERIOR ARCHITECTURAL ISSUES’, which I suggested for this book that will contribute to the field of Interior Architecture, was found very meaningful and inclusive by the editorial board. This journey continued and was completed

with an enjoyable, exciting, long, productive, meaningful, productive and intense effort.

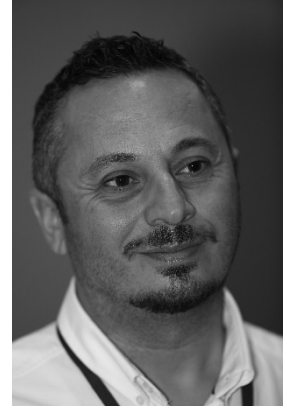
When the call was made with the aim of collecting the studies to be done on the above-mentioned subjects in a book, very positive and good reactions were received. These positive responses have once again clearly demonstrated that such a study has been needed for a very long time. In order to achieve the ‘first’ in this field in the best possible way, we have been very meticulous, selective and sensitive. In the call for the book titled ‘INTERIOR ARCHITECTURAL ISSUES’, 72 book chapter suggestions were received from very valuable academicians. As a result of the evaluations, 38 studies were selected and this journey started. Evaluation and classification of 38 studies, each more valuable than the other, were done meticulously. After this meticulous process, 18 valuable book chapters in the book named ‘INTERIOR ARCHITECTURAL ISSUES – Design, Theory & Philosophy’; 20 valuable book chapter studies were also found suitable to be included in the book named ‘INTERIOR ARCHITECTURAL ISSUES - Design, History & Education’. Both of these valuable books will be published in the same time period.

‘INTERIOR ARCHITECTURAL ISSUES – Design, Theory & Philosophy’, where the works of expert researchers in the relevant field, ‘Department of Interior Architecture’, ‘Department of Interior Architecture and Environmental Design’ and academicians who are academics in related departments are published. With this book named ‘INTERIOR ARCHITECTURAL ISSUES– Design, Theory & Philosophy’, it will create a new platform with new initiatives by shedding light on the field.

I would like to express my endless thanks not only to Livre de Lyon Publishing House, which opened its doors to us for its book project; to the editor and editorial board of the Journal of Interior Design and Academy (INda), who have supported this project from the very beginning; but to the doyen academics who have served in the field of Interior Architecture for many years, who have taken part in this book project as the author of the book chapter with their valuable work, and to the young academicians who have started to work enthusiastically on this path and give hope.

**Prof. Dr. Kağan GÜNÇE**  
**Editor**

Kağan Günçe is Professor of Architecture at Eastern Mediterranean University (EMU) in North Cyprus. He is a full-time professor in the Faculty of Architecture, EMU. He also serves as Vice-Chair of the Institute of Graduate Studies and Research at EMU. He has a Bachelor degree in Architectural Program, a Master (of Science) degree in Architecture Program and Ph.D. in Architectural Theory from EMU, Department of Architecture. He was the director of HERA-C (Housing Education, Research and Advisory Centre) and he was the head of the Interior Architecture Department at EMU. He was a long-time University senator and is currently the elected professor representative senator. His research interests include interior architecture - architectural design, theory, environmental psychology and conservation. He has articles, papers in many national and international journals & conferences, and international research projects in the mentioned fields. His academic work has received many citations in ‘web of science’ platform.



**Prof. Dr. Kağan Günçe**  
**Editor**





# CONTENT

<b>PREFACE</b>	I
<b>CHAPTER I.</b> INTERDISCIPLINARY PHILOSOPHIES OF INTERIOR DESIGN AND FURNITURE: A LOOK AT EDGAR ALLAN POE'S WRITINGS <i>Deniz HASIRCI</i>	1
<b>CHAPTER II.</b> ON THE TIME AND REALITY OF FILM SPACES: THE STAR WARS EXAMPLE <i>Nur AYALP</i>	17
<b>CHAPTER III.</b> ART-INSPIRED SPACE STRUCTURING IN MOVIES <i>Ceren KOÇ SAĞLAM &amp; Vildan DÜNDAR TÜRKKAN</i>	33
<b>CHAPTER IV.</b> FUTURISTIC APPROACHES IN DESIGN AT THE INTERSECTION OF TECHNOLOGY AND SPACE <i>Güler KARABEKİR &amp; Emine Nur OZANÖZGÜ</i>	49
<b>CHAPTER V.</b> HEARTY PALACES OF PERCEPTION: THE SENSE OF SPACE IN IMMIGRANT HOUSES IN NICOSIA <i>Banu TEVFİKLER ÇAVUŞOĞLU</i>	71
<b>CHAPTER VI.</b> SYSTEMATIC PATTERNS OF DESIGN OF A CONCEPTUAL APPROACH TO INTERIOR ARCHITECTURE <i>Shirin IZADPANA</i>	93
<b>CHAPTER VII.</b> A CRITICAL REVIEW OF THEORETICAL APPROACHES IN INTERIOR DESIGN <i>Eliz ERDENİZCİ</i>	113
<b>CHAPTER VIII.</b> ENVIRONMENTAL PERCEPTION IN FLOATING INTERIORS <i>İnanç Işıl YILDIRIM</i>	137
<b>CHAPTER IX.</b> PERSONAL SPACE PROTECTION TACTICS AGAINST SPATIAL CONTROL STRATEGIES: TERRITORIALITY <i>Damla ALTUNCU</i>	153

<b>CHAPTER X.</b>	SPATIAL TRANSFORMATIONS OF OFFICE DESIGNS THROUGH THE CONCEPT OF GENERATION: HYBRID WORK AND MOBILITY	171
	<i>Refia Anıl AĞRILI &amp; Müge GÖKER PAKTAŞ</i>	
<b>CHAPTER XI.</b>	PSYCHOACOUSTICS AND MUSICAL DEVELOPMENT IN ENCLOSED SPACES	197
	<i>Derin Hilal BİLMEZ &amp; Ümit ARPACIOĞLU</i>	
<b>CHAPTER XII.</b>	THE TECHNOLOGICAL POTENTIAL OF NATURAL SYSTEMS: INTERIOR DESIGN SOLUTIONS	231
	<i>Aliye Rahşan KARABETÇA</i>	
<b>CHAPTER XIII.</b>	BIOPHILIC DESIGN CRITERIA IN INDOOR OF CHILDREN'S PLAYGROUNDS : A SYSTEMATIC REVIEW	249
	<i>Filiz TAVSAN &amp; Fatma Zisan YOLCU</i>	
<b>CHAPTER XIV.</b>	ECOCENTRIC APPROACH IN INTERIOR FURNITURE DESIGN	277
	<i>Zeynep YANILMAZ &amp; Hande EYÜBOĞLU</i>	
<b>CHAPTER XV.</b>	INTERDISCIPLINARY TRAJECTORIES: REGENERATING BARCELONA PAVILION WITH MIDJOURNEY	299
	<i>Orkunt TURGAY &amp; Merve KAPTAN &amp; Pınar ÖKTEM ERKARTAL &amp; Tahsin DEMİR &amp; Çılga DOĞUKANLI</i>	
<b>CHAPTER XVI.</b>	IMPORTANCE OF STORE ATMOSPHERE IN CREATION OF CORPORATE IDENTITY IN RETAIL CLOTHING STORES: LOUIS VUITTON STORE ANALYSIS	321
	<i>Funda Bahar KAYA</i>	
<b>CHAPTER XVII.</b>	FLEXIBILITY AS A DESIGN CRITERION IN RESIDENTIAL INTERIORS	341
	<i>Özge İSLAMOĞLU</i>	
<b>CHAPTER XVIII.</b>	A NEW SYMBIOTIC LIFE APPROACH FOR INDOORS: PET-FRIENDLY INTERIOR DESIGN	361
	<i>Neşe Başak YURTTAŞ &amp; Damla ALTUNCU</i>	

## CHAPTER XV

# INTERDISCIPLINARY TRAJECTORIES: REGENERATING BARCELONA PAVILION WITH MIDJOURNEY

**Orkunt TURGAY<sup>1</sup> & Merve KAPTAN<sup>2</sup> & Pınar ÖKTEM ERKARTAL<sup>3</sup>  
& Tahsin DEMİR<sup>4</sup> & Çılga DOĞUKANLI<sup>5</sup>**

*<sup>1</sup>Asst. Prof. Dr. - Istanbul Galata University  
e-mail: orkunt.turgay@galata.edu.tr  
ORCID: 0000-0001-7675-1992*

*<sup>2</sup>Asst. Prof. Dr. - Istanbul Galata University  
e-mail: merve.kaptan@galata.edu.tr  
ORCID: 0000-0002-3467-5001*

*<sup>3</sup>Assoc. Prof. Dr. - Istanbul Galata University  
e-mail: pinar.oktem@galata.edu.tr  
ORCID: 0000-0002-8564-8900*

*<sup>4</sup>Industrial Designer - Istanbul Galata University  
e-mail: tahsindemir@yandex.com  
ORCID: 0000-0002-5488-1048*

*<sup>5</sup>Research Assistant - Istanbul Galata University  
e-mail: cilga.dogukanli@galata.edu.tr  
ORCID: 0000-0001-7002-3804*

### 1. INTRODUCTION

Over the past decade, artificial intelligence has made significant advances in the development and use of neural networks that allow computers to understand, see and hear the world around them. As the nature of everyday life in the modern world rapidly changes, so too do the various design

disciplines. These advances in the use of AI in many different fields are also being adopted in computer-aided creativity. Deep learning and/or machine learning algorithms, which have created text-to-image AI programs such as Midjourney, DALL-E, Stable Diffusion and many others, transforming your descriptions into images in a very sophisticated way, creating skyscrapers in the style of Leonardo da Vinci or the dream house you have always wanted to visualize, are also being used in the fields of architecture and interior design.

This type of artificial intelligence system, known as a text-to-image generator, converts text input, such as sentences or paragraphs, into an image that visually conveys the content of the text. To create images from text, a deep neural network is trained on a large dataset of coupled text and image samples. The network learns to recognise patterns in the data and produce visuals that accurately reflect the semantic meaning of the input text. Text-to-image generation can be done in a variety of ways, including the use of transformers, conditional generative adversarial networks (cGANs), and variational autoencoders (VAEs) (Tibebu et al., 2022). These models are capable of producing beautiful, photorealistic images that capture the meaning of the input text almost perfectly.

For us - the bemused witnesses of the artistic AI influx - the evolution of these creative processes raises fascinating questions that we have never had to ask before. As the current developments affect many different academic fields, we have come together as scholars from different disciplines to communicate and connect our similar concerns about this emerging trend called text-to-image generators. Our disciplinary specialities are architecture, interior architecture, visual communication design and communication studies. This article, as a final product of the interaction between four disciplines, offers an exploration of the creative and compositional capabilities of Midjourney.

Midjourney is basically based on existing resources, so its implementation must be preceded by the collection of data for analysis, their synthesis for categorisation and their evaluation as a final result. The data are mainly processed by interdisciplinary real users, who rely on their knowledge and experience to analyze them and carry out design actions such as architecture, interior design, industrial design and visual communication design. We took into account a number of things while selecting the text-to-image generator Midjourney.

The first is image quality. The images generated should accurately reflect the meaning of the text supplied and be of good quality. While some text-to-image generators can produce images that are photorealistic, others may produce more stylised or abstract images. In this respect, Midjourney's photorealistic

image quality meets our needs. The second reason for using Midjourney is its customisation options. It allows us to define certain details to include or exclude, or the ability to change the style or color of the images created. The third is its speed and scalability. Its response to volume and input is fast enough to meet our expectations. In addition, its interface is easy to use and gives clear instructions to the user. Another very special feature of the Midjourney is its ability to produce outputs via the Discord social messaging platform. This feature mobilizes the image production process and thus reinforces the production activity of the users. One of the vexing problems of the aforementioned design disciplines is that the client's imagination of the final product gets lost in translation between common language and design terminology. Therefore, the common use of Midjourney opens a new discussion on whether it can be used as a mediator between the expert and the client. Finally, its cost, is affordable and reasonable for the user.

Our sample prompt will be shaped around the famous Barcelona Pavilion by describing the building in our own terms specific to our disciplines. Then we are going to analyze the resulting five images following a methodology of formal analysis and try to assess if the end results confirm the disciplinary approaches in question. In the next step, we will compare these five images with each other in terms of their compositional, structural, and formal elements to see how successful Midjourney would be in understanding the perspective of an academic community.

Midjourney has the potential to be a helpful tool for research in architecture, design and communication sciences, assisting with the visualization and communication of design concepts, testing design alternatives, and producing visual aids for commercial, pedagogical and academic purposes.

## 2. METHODOLOGY

Midjourney is a text-to-image generator that turns verbal descriptions into photorealistic visuals using deep learning techniques. Midjourney does not share its computational model yet, however we believe that it has a similar one with DALL-E. Therefore it would not be wrong to assume that it has two key parts to generate images: a text encoder and an image generator. The input textual description is encoded into a high-dimensional vector representation by the text encoder. Using this vector representation as input, the picture generator creates an image that corresponds to the description. A sizable dataset of paired written descriptions and associated photos are employed to train the model.

DALL-E uses Generative Adversarial Network to produce outcomes. Generative models are using an unsupervised learning approach which means that the model is not trained with pre-matched items, but rather the network is fed with an input and then released to find interesting patterns. The two components of the network are the generator and the discriminator. Both components are fed with the same inputs. As the generator is obliged to produce new outputs, the determinator stands as a reality checker. Since the discriminator is also fed with the same inputs, it checks whether the generator's outputs are consistent with the raw inputs or in other words, whether they are real or fake. This operation continues until the discriminator is fooled (Brownlee, 2019).

The AI relies only on words to generate images (Panicker, 2022). At the same time, creation's limitation is words. Our language has limitations and a subliminal meaning underneath any language that cannot be explained (Brillhart, 2021). Therefore, using only prompts made up of words can hinder architectural creativity. Yet it could be helpful as an interface between the client and the designer.

The reason we think Midjourney is worth examining is that it is trained using an unsupervised learning approach. Lev Manovich (2018), an artist-thinker who coined the term 'cultural analytics', criticizes both data statisticians and cultural theorists for categorizing and regulating aesthetics as information interpreted from a single perspective. For Manevich, the old 'supervised learning approach', as we know it from Rutgers University's Art and Artificial Intelligence Laboratory's Creative Adversarial Networks (CAN) project, is just one extension of linear and regulatory categorisation, as in chronological angle, angle of likes, etc. The unsupervised learning approach is exciting because with this method, the machine is not yet liberated, but emancipated from human bias (Manovich, 2018). In its most succinct form, this critique is very similar to the Bauhaus critique of personal discourse. Like the Bauhausian perspective, Manovich is looking for a perspective that is divorced from history, individuals, classes, in short, the human categories we create. And the unsupervised learning approach allows machines to recognise patterns without human intervention. In this research, we will witness the journey of the knowledge bequeathed to us by the Bauhaus since the design fundamentals we are going to use in our prompts are established by this school.

The aim of this research is to assess what degree of similar outputs Midjourney can create compared to the defined space or object in the mind of the designer, or which type of prompts (containing terms used in basic design

principles) is more successful in terms of resemblance. Based on this basic problem, this study focuses on the process of re-creating the Barcelona Pavilion, which has a very important place in the architectural literature and whose image is known even by those who do not have architectural formation, with Midjourney program, and compares the images created by the definitions of the pavilion by researchers from different disciplines with the original building.

In his recently published article “*Text-to-image Generation AI in Architecture*” Yıldırım (2022) argues that this technology has the potential to revolutionize the way architects and designers approach their work. His main claim is that the text-to-image generators like Midjourney make their work more efficient, creative and faster. Yıldırım (2022:117) writes:

“...text-to-image is a powerful and versatile AI tool that has the potential to greatly improve the efficiency and effectiveness of the design process in architecture. Their user-friendly interface and ability to generate a wide range of images make it an exciting and valuable tool for architects and other creative professionals.”

Testing Yıldırım’s hypothesis, in our study, we dive deeper into the creative possibilities of Midjourney by experimenting with design terminology and everyday language. Synchronically built with the constant of our study, the Barcelona Pavilion, the world of art and design was undergoing a paradigm shift along with the rest of the world. Modernist ideas after the First World War were so influenced by the devastation of the war that modernist designers had a high opinion of the universal over the local. To operationalise this notion, of universal over local, they established design fundamentals to create a visual order capable of uniting the individual and the universal, the craftsman and the artist. The production mentality of the Bauhaus school, to which Van der Rohe, the architect of the Barcelona Pavilion, also belonged, was concerned with expression, not individual discourse (Moholy-Nagy, 2012). So the key idea to design was the methodology of design itself. And the design fundamentals were the constituents of this process.

In this study to experiment whether this universal language of design works the same way through the Midjourney system, we conducted a study targeting the results of Midjourney over the different usage of language. To achieve this, we conducted a two-stage prompt experiment with two different groups of experts and non-experts in architecture and design studies. In order to reproduce our constant, the Barcelona Pavilion, with Midjourney, the expert group has written a prompt consisting of basic design principles. (These principles are explained



in detail in the following chapter.) The content of this prompt is executed in the following order to make sure there will not be a bias as a consequence of syntax: Line/ color/ shape/ space/ texture (material) / scale/ balance (symmetry, asymmetry etc.) The second prompt is executed by non-experts through everyday language. A third prompt 'imagine/Barcelona pavilion' has been executed in order to understand whether the Midjourney database is containing our constant object.

In order to interpret the results The Vision Transformer model NLP and Normalised Cross Correlation (NCC) models are chosen to measure the image similarity between our constant and Midjourney outputs:

Among the computational models such as Mobilenet V3, Big Transfer (ICT) and Vision Transformer, which have natural language processing technology used in the field of computer vision, the Vision Transformer model (NLP) was selected and the similarity ratios obtained as a result of the image similarity calculation were used to interpret the connection between (virtual) images and (physical) reality produced within the Midjourney platform.

The numerical expression produced by the NLP model represents a complex algorithm model that is related to the field of computer vision, which groups and breaks down the pixels in the image in certain dimensions and tries to define the things that make up the content and tries to make sense of what they are. During the realization of this representation, for example, during the comparison of the Barcelona pavilion outputs we have, it performs a number of algorithmic operations in the background, such as the size of the green areas, the size of the areas with water, the volumetric proportioning of the areas contained in the colors, in the pixels, and the meaning of the objects or images that make up these areas by overlapping with each other.

The numerical expression of the similarity rate between two images using the NLP model cannot go beyond being statistical data alone. In other words, we need to visualize the reference points that we will infer while making comparisons between created images and existing images to support this statistical information. Therefore we also used the NCC model. Pixel-based methods such as NCC are more suitable for comparing images with similar patterns. This is why in our work, we used pixel-based image processing algorithms to compare and interpret the generated images. Heat maps are one of the data visualization approaches used in scientific and technical fields to visualize comprehensive data. Therefore, such an infographic was used to help identify and interpret

patterns and trends that may not be apparent from a simple set of text-based information such as the prompt we use in the programme dialogue panel.

The Normalised Cross Correlation (NCC) method, one of the widely used pixel-based methods, measures the similarity of two images by shifting one over the other and calculating the cross-correlation coefficient at each position. This is why in our work, we used pixel-based image processing algorithms to compare and interpret the generated images.

### *2.1. Design & Basic Principles*

When we try to identify the term “designing” first we have to focus on its definition. As a noun “design” is the notion of intention in thinking to planning or conceiving the form and structure of an object. As a verb “design” is to make a visible expression and/or declaration of our inner conception and imagination that transfer theoretically intelligible forms (ideas) into the material world. Thus, “design” can be defined as the intellectual activity of intentionally generating a systematic scheme for the future production of an object that is expected to fulfill a certain purpose.

Especially in design integration and optimization the basic design principles are common parameters both for all design disciplines such as architecture, interior architecture, industrial design, visual communication design, graphic design, urban design, etc.

The mentality of basic design and the way of its education is the extension of Bauhaus that was founded in Germany, 1919-1933, brought a new approach in education towards the concept of technique, technology, art, design. The main aim of this approach was to combine the mutual aspects of design. The most important innovation of this mentality is to constitute a new origin of method that is structured by some principles. Togetherness of different design disciplines, a method of working based on collaboration and integrity at the same point of view brings success.

Basic Design improves some skills of the designer in terms of enriching the content, scope, objectivity, planning and organizing the creative sensations systematically, functionally and visual awareness, visual thinking.

For analyzing and understanding the mentality of basic design, it is definitely necessary to underline 2-Dimensional, 3-Dimensional compositional organizations, basic design principles and basic design elements.

**Table 1.** 2- and 3-Dimensional Compositional Organizations

<b>2 DIMENSIONAL DESIGN (2D)</b>	<b>3 DIMENSIONAL DESIGN (3D)</b>
<ul style="list-style-type: none"> <li>• Form defining elements</li> <li>• Composition making</li> <li>• Repeat pattern design</li> <li>• Chromatic repeat pattern design</li> <li>• Bounded area design</li> <li>• Textural surface design</li> <li>• Relief design</li> </ul>	<ul style="list-style-type: none"> <li>• Solid Void</li> <li>• Assemblage - Subtraction</li> <li>• Cubic Assemblage of Volumes</li> </ul>

**Table 2.** Basic Design Principles and Concepts

<b>BASIC DESIGN PRINCIPLES</b>	<b>CONCEPTS</b>
<ul style="list-style-type: none"> <li>• Contrast</li> <li>• Harmony</li> <li>• Rhythm</li> <li>• Figure-ground</li> <li>• Balance</li> <li>• Symmetry/Asymmetry</li> <li>• Dominance</li> <li>• Linearity</li> <li>• Centrality</li> <li>• Continuity</li> <li>• Chaos</li> <li>• Hierarchy</li> <li>• Solid-void</li> </ul>	<ul style="list-style-type: none"> <li>• Transformation</li> <li>• Unity</li> <li>• Order/Disorder</li> <li>• Emphasis</li> <li>• Variety</li> <li>• Radiality</li> <li>• Transparency</li> <li>• Growth</li> <li>• Proximity</li> <li>• Additive/Subtractive</li> <li>• Flexibility</li> <li>• Repetition</li> </ul>

**Table 3.** Basic Design Elements

<b>BASIC DESIGN ELEMENTS</b>	
<ul style="list-style-type: none"> <li>○ Color</li> <li>○ Composition</li> <li>○ Form</li> <li>○ Space</li> <li>○ Material</li> <li>○ Structure</li> <li>○ Function</li> </ul>	<ul style="list-style-type: none"> <li>Volume</li> <li>Texture</li> <li>Light/Shadow</li> <li>Proportion</li> <li>Scale</li> <li>Line</li> <li>Plane</li> </ul>

**Table 4.** Visual Elements and Characteristics of Form

VISUAL ELEMENTS OF FORM	VISUAL CHARACTERISTICS OF FORM
<ul style="list-style-type: none"> <li>• Point</li> <li>• Line</li> <li>• Plane</li> <li>• Volume</li> </ul>	<ul style="list-style-type: none"> <li>• Size</li> <li>• Shape</li> <li>• Texture</li> <li>• Color</li> </ul>

## ***2.2. Barcelona Pavilion***

The Barcelona Pavilion is one of the iconic buildings that has a very important place in the history of Architecture (Figure 1). It was designed in 1929 by the famous architect Mies van Der Rohe, who was chosen to represent Germany at the Barcelona International Exhibition, organized to display the industrial traditions of the 19th century. Mies undertook an important mission to showcase the industrial productivity of Germany, which was defeated in World War I, and therefore focused on how it was represented spatially rather than what was shown in its design (Martínez de Guereñu, 2018).

The single-storey Barcelona Pavilion is basically defined by two horizontal planes. One of these planes is the raised terrace that forms the floor of the building, and the other is the flat roof supported by cross-section columns (Figure 2). Between these two planes are free-standing, non-load-bearing walls (Figure 3). These marble and glass walls, some of which extend beyond the roof plane, shape the flow of the space (Figure 4). Since the location of the pavilion is on the circulation route of the exhibition, Mies gave great importance to the fluidity of the space without disturbing the continuity of the route. He also made the transition between indoor and outdoor as easy as possible (Carter, 2007).

The pavilion is reached by a few steps running parallel to the front of the building and a large reflecting pool is encountered. To the left of the pool is the main space, which is arranged with eight chrome-plated carriers and wall planes placed at regular intervals. The wall shimmering in gold, covered with eight sheets of onyx doré marble placed with a book-matching technique, constitutes the main concept of the building (Shulze and Windhorst, 2012). Even the architectural dimensions of the original pavilion were determined through the dimensions of this block chosen as a module. The main space ends with a second reflecting pool that houses the sculpture “Dawn” by German sculptor Georg Kolbe (Figure 4). Mies chose green Tinian marble for the walls surrounding the

sculpture pool, and Roman travertine for the entire floor including the terrace and the enclosing walls. Outside the marble, on the wall between the sculptur pool and the hall, bottle green transparent glass is used, and on the screen behind the hall, gray transparent glass is used. (Russel, 1986). Another element identified with the Barcelona Pavilion is the famous Barcelona chair, which was specially designed for the opening and was named after the building. This furniture, designed with button-detailed kid-skin cushions on a steel carrier, has become one of the iconic pieces of furniture history.

In 1930, the original Barcelona Pavilion was dismantled just after the International Exhibition was over. It was reconstructed in 1986 by Ignasi de Solà-Morales, Cristian Cirici and Fernando Ramos from photographs and salvaged drawings. For this reason, the structure visited today is not exactly the same as the original. There are differences in material colors, construction technology and dimensions. Nevertheless, it allows visitors to have an idea about the concept of the building and Mies' design dynamics (Krohn, 2014).



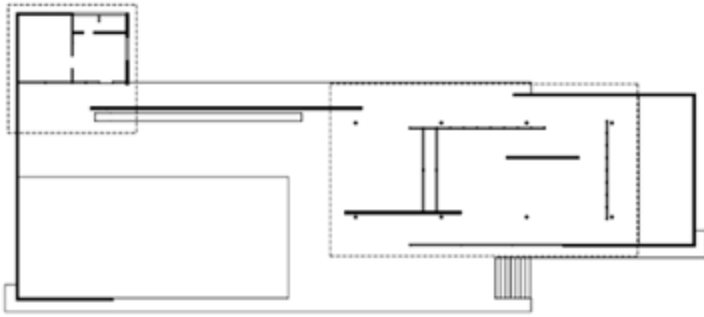
**Figure 1.** Barcelona Pavilion (Photo by Pınar Öktem Erkartal, 2014)



**Figure 2.** Main Space from the Raised Terrace (Photo by Pınar Öktem Erkartal, 2014)



**Figure 3:** Main Space of Barcelona Pavilion (Photo by Pinar Öktem Erkartal, 2014)



**Figure 4.** Plan of Barcelona Pavilion (Krohn, 2014: 76)



**Figure 5.** Second Reflecting Pool with the Sculpture (Photo by Pinar Öktem Erkartal, 2014)

### ***2.3. Different Disciplinary Approaches to Interpreting Images and Results***

The aim of this scope is to compare the common and “general descriptive” expressions and “specific descriptive” expressions used by different disciplines such as interior - exterior architecture, communication design and industrial design. The images created in the programme as a result of different professional disciplines in which they use their own professional terminology, which constitutes a “common and general” framework of descriptive expression, have been compared with the specific content that constitutes the “emphasis expression” framework. Thus results were discussed. The sample pairs are presented below along with the details and interpretation of the results generated by Demir T., Doğukanlı Ç., Kaptan M., Öktem Erkartal P. and Turgay O. The similarity ratio calculation method mentioned in the methodology and the information resulting from the visualization of the applied algorithms will be explained in the following order;

A: Similarity ratio of the studies created within the framework of Communication Design discipline and interpretation of the studies,

B: The similarity ratio of the works created within the framework of Architecture and Interior Architecture discipline and the interpretation of the works,

C: Within the framework of the Industrial Design discipline, the similarity ratio of the work created in the product scale and the interpretation of the studies.

## **3. FINDINGS**

### ***3.1. Communication Design Perspective***

The results given by the Vision Transfer Model stated below, when the image created by the researcher through entering the interface is compared with the image that is the actual physical representation of the subject.

Image similarity is a measure of how similar two images are. It can be calculated using various metrics such as mean square error, cosine similarity or Euclidean distance. In the context of deep learning models, image similarity rate can be used to evaluate how well the model is able to differentiate between different classes of images or how well it is able to cluster similar images together.

As a result of visualizing stated algorithms, the following graphs have been created. So it was seen that, one of the image's similarity rate result of % 47 (Figure 6) and the other one's (Figure 8) is around % 31. How this similarity rate

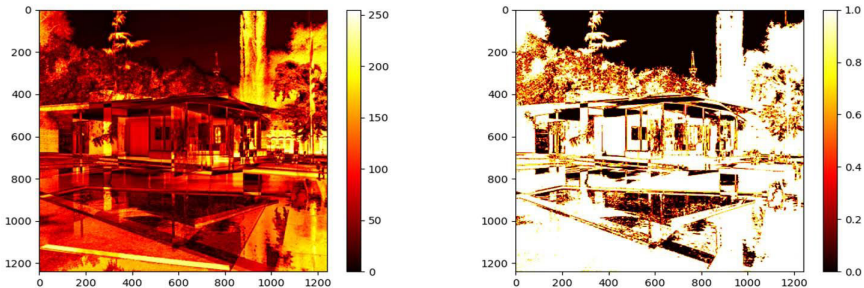


should be interpreted is grounded in the researcher’s professional background. In this process, researchers can apply manual techniques which are helpful for drawing a conclusion by juxtaposing these two images and searching for visual cues for interpretation. In this contextualized the heat map and similarity graph are helpful in supporting the intuitive - visual inference process.



**Figure 6.** Left: the Generated Image, Right: Physical - Real Representation of the Described Subject

When we compare the left image, which is created by prompts via midjourney to the real photograph of the same subject, surprisingly in the results it is seen that, instead of establishing analogy between the subjects, it establishes more similarities with the environmental conditions. We are able to easily make this reading through the inferential difference graph, which is given below. The following assumptions can be made around the overlapping of images and the removal of differentiated areas on the basis of the visuals which is given below.



**Figure 7.** Overlapping and Inferencing Graphic for Figure 6



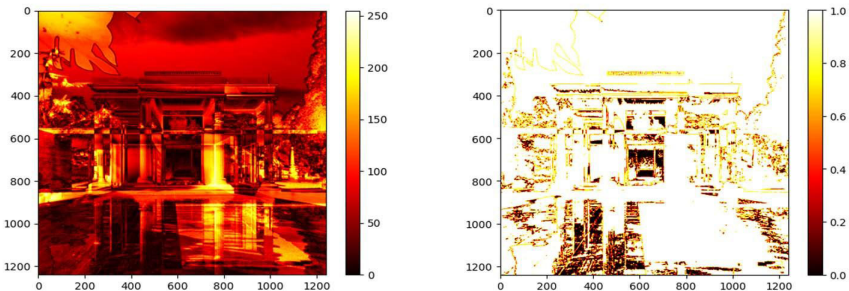
When we look at the graph above, similarity increases in areas where the comparison coefficient approaches 0. To answer the question of what these areas are, we need to take reference from the original images. When we make this matching, it is predicted that the result of non-structural descriptors that describe environmental conditions. For example, for these image pairs, the similarity of the sky increases the similarity rate.

In addition to this, as secondarily, the places that help to evaluate these images in a semantic bond are the pool area, the vertical-horizontal surfaces of the building, and the characteristic structure of the roof. When considering these areas, it is also obviously seen that the comparison coefficient approaches 0. When an evaluation is made in this direction, it is concluded that this image pair resembles each other but the analogy is established by the observer.



**Figure 8.** Left: The Generated Image, Right: Physical - Real Representation

Another evaluation was made on the second example (Figure 8), created by the researchers positioned within the discipline of Communication Design field also.



**Figure 9.** Overlapping and Inferencing Graphic for Figure 8

The algorithm run for the sample pairs shown above allows us to conclude that statement. The part that is correlated between the two samples is the image of the building reflected from the pool, i.e. the reflection alone. This is again due to the effect of unstructured descriptive expressions alone. This sample group gives the conclusion that convergence or dissimilarity to the described content may be affected by environmental factors.

### 3.2. Architecture and Interior Design Perspective

In the example (Figure 10), the similarity rate of the image pairs created by the researcher with architectural discipline was calculated as 40%. In the interpretation phase of these image pairs, it was tried to explain the effects or variables that create this value.



Figure 10. Left: the Generated Image, Right: Physical Representation

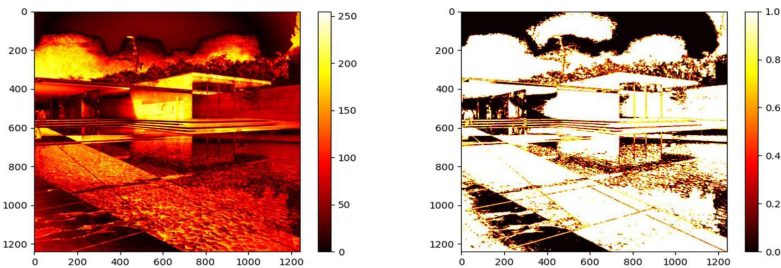


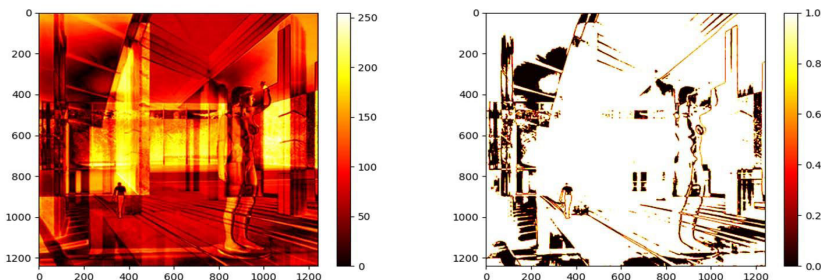
Figure 11. Overlapping and Inferencing Graphic fo Figure 10

The excess of the volumetric ratio of the areas that are similar to each other which is seen in the example above. These two examples are quite similar in these areas. When the factors that make up this area are listed in order of effect; the toning of the sky from the edges inwards (when looking at the two photographs, the toned transition of the sky areas from the outside to the inside is seen), the large planar surfaces around the pool area and the two-step staircase that provides a break from the ground. When analysed these samples, which create the perception of being quite similar to each other, we come across 2D graphical effects, as the factor affecting the result in a surprising way.



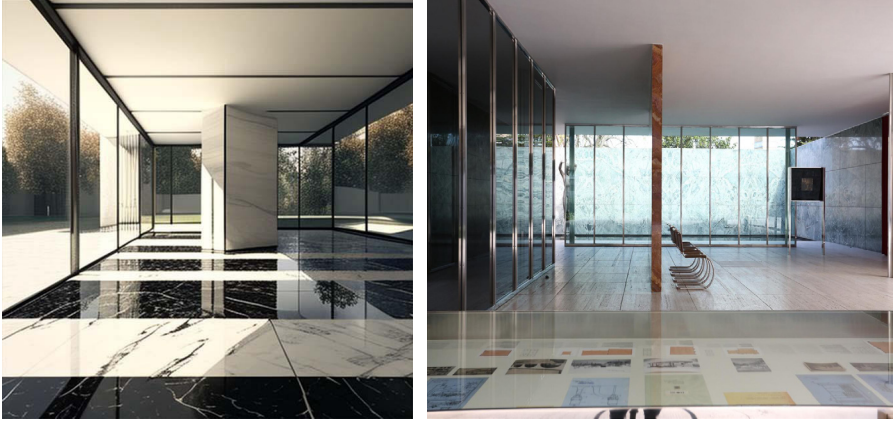
**Figure 12.** Left: the Generated Image, Right: Physical - Real Representation of the Described Subject

The Factors affecting the similarity ratio in negative way to go down % 26 (Figure 12) are categorized in that example as “none realistic things”, which does not reflect the reality such as material reflections, linearity, cartoon style etc. 2D graphical effects as factors that semantically detach the content from its own physical context. If we exemplify these effects more; charcoal, water-colour, linear forms, draft and artistic graphic style effects can be listed.



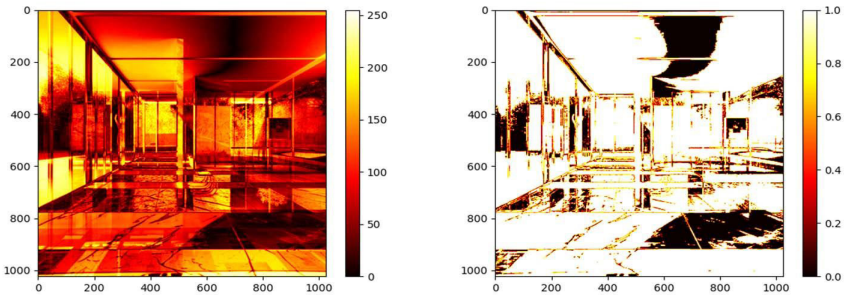
**Figure 13.** Overlapping and Inferencing Graphic for Figure 12

Similarly, in the comparison of the images created within the framework of the interior architecture discipline, the similarity rate of the sample pairs (Figure 14) compared by the researcher could reach around 55%.



**Figure 14.** Left: the Generated Image, Right: Physical - Real Representation of the Described Subject

As the reason for this; avoiding 2d effects, material and texture definitions for hyper realistic results, defining the lighting effect and feeling, trying to define simplicity and naturalness are the views that are effective on this rate.



**Figure 15.** Overlapping and Inferencing Graphic for Figure 14

The effects and places which create this similarity can be listed as follows according to the prompts; The ratio of spatial shadow-light values, the similarity of the soft-toned shadow transitions on the ceiling (compared into original ) the light reflected from the ground and the wide facades which is creating volumetric openness. In addition to this, other important topics that contribute to the formation of the similarity effect can be listed as follows; the



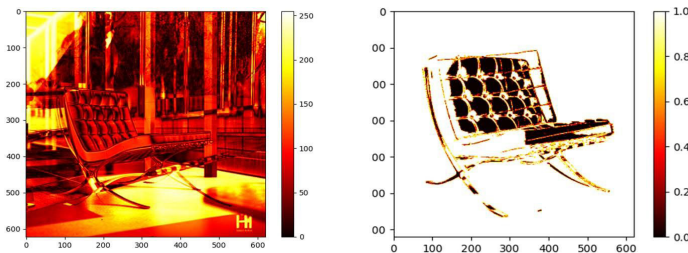
elements that perceive the material and spatial volume, the description of the building elements and the definition of the perceived space created by different dimensional planes.

### 3.3. Industrial Design Perspective

In the evaluation phase of the product scale, the prompts used to create a benchmark were quite simple. During the creation of the product, only the name of the architect and the name of the product tag were used as input to the command line than image created. When we compared this one into the photograph that constitutes the physical representation of the product are given in Figure 16. The similarity rate between these two visually similar products created using a single line prompt ( Figure 16) is 47%. The “designer name” and “product name” used as input tags increase the similarity rate. When we try to describe and create the same product with professional words used in the field of industrial design such as describing the material pattern, manufacturing terms and desing elements which is referring the geometrical identity etc. This affects the result very much, it makes a data visualisation outside the visually defined object.



**Figure 16.** Left: the Generated Image, Right: Physical - Real Representation of the Described Subject



**Figure 17.** Overlapping and Inferencing Graphic for Figure 16

The following assumptions can be made around the overlapping of images and the removal of differentiated areas on the basis of the visuals (Figure 16) with the over inferences which is given Figure 17. The places corresponding to the correlation coefficient value of 0, which allows us to establish a similarity relationship between the two images, are shown above. The places where the relationship between these areas and the reality can be established are; carrier structural structure, horizontal and vertical planes (sitting and leaning) textures on the material. When a similarity relationship is sought with a definition other than “architecture and designer”, the algorithm yields a value around %20. The subject was differentiated with the prompt inputs defined in line with the findings mentioned above.



**Figure 18.** Generated Differentiated Subject

Since a pixel-based non-semantic match is made here, the end user must make sense of that relationship. In this respect, the second result differs from the geometric form and material of the object to be identified and does not resemble its essence, which is shown in Figure 18. In order to obtain the closest values to the real one, a semantic study with high sensitivity should be carried out that establishes a relationship with reality.

#### 4. CONCLUSION

As a result of developing technology and machine learning studies, artificial intelligence has become more and more visible in every field. Among the design disciplines, programs such as Midjourney, Dall-E, DiffusionBee, Motionleap have potentials that can provide convenience for designers, especially in the concept and presentation stages, by providing the visualization of the desired text. These potentials have been revealed in various publications (Yıldırım,

2022) and are being put forward. However, it is an area that needs to be studied. The main findings obtained in this process are as follows: It has been observed that the prompts chosen by different researchers who have taken the formation of architecture and interior architecture to define the space are similar. The prompts chosen by the researchers who did not receive this formation differ from the others as it is discussed in the findings part of this article.

The images created in the trials, where the name, architect or architectural style of the Barcelona Pavilion were never mentioned and only the basic design elements and principles were used as prompts, remained quite far from the original. It has been determined that in the images created by artificial intelligence, color and material are more dominant than other prompts, vertical elements are more prominent than horizontal elements, and some elements (such as lighting and furniture) that are not specified by the designer are added to the image.

The images created by using prompts in which the name and architect of the building are clearly written, the architectural style is specified, and no other spatial elements are defined showed higher similarity with the original of the building. This shows that Midjourney perceives clearer and popular keywords better than more complex patterns such as the character of spatial elements or how they are articulated to each other.

The fact that artificial intelligence did not create the original structure exactly, even with multi-defined prompts, showed that it does not have enough linguistic data in the field of architecture and that it needs to be “trained” more, especially within the framework of spatial definitions.

In addition, the program failed to create the Barcelona Chair with the prompts chosen by the researcher, who took industrial design formation, to define furniture features such as material, color and form. But it visualized the chair very closely to the original with prompts where the phrase “Barcelona Chair” is used exactly. This reveals that the program is more trained and equipped with more data at the object scale than at the spatial scale.

Based on all of these, it is possible to say that it is not as easy as it seems for designers to create an image of their dreamed space or design object similar to their original idea, using the Midjourney artificial intelligence program, during the concept or visualization phase. In order to create a design similar to the desired one, it is necessary to make additional definitions such as style, inspired architect/designer, period in addition to spatial definitions. Even in this way, the image created is only a guide and it is highly possible that it is not enough to

reflect the designer's idea exactly. So Manevich's foresight of the unsupervised learning methods is not valid at least for the Midjourney platform.

As a result, with the increasing popularity of artificial intelligence programs, whether they will replace visualization programs in the spatial design process is one of the questions that led to the emergence of this article. Since Midjourney's image generating process is based on translating prompts into algorithms, we believe that it does now show full competence in creating the images that the user wants to obtain in the first place. The absence of a feature such as selecting a certain area of an image by using the interface and interfering only with that specific area are limiting factors for the user. The future development levels of the programs would directly affect and transform the answer to this question. Yet, at the moment Midjourney is just a tool that is designed to boost the creativity of designers by giving them these tool options. However, the relationship between artificial intelligence and the human creative mind is still so complex and unclear. It is possible to say that the Midjourney program is promising but rather limited in spatial visualization at the moment.

## REFERENCES

Martnez de Guereu, L. (2018), *Mies Barcelona and the Bauhaus*, in *Mies van der Rohe: Barcelona-1929* (pp.45-77), Barcelona: Editorial Tenov and Fundaci Mies van der Rohe.

Carter, P. (2007), *Mies van der Rohe At Work*, London: Phaidon.

Krohn, C. (2014), *Mies Van der Rohe the Built Work*, Basel: Birkhäuser.

Russel, F. (1986), *Architectural Monographs: Mies van der Rohe*, London: Academy Editions.

Shulze F. and Windhorst, E. (2012), *Mies van der Rohe: A Critical Biography*, London: The University of Chicago Press.

Brownlee, J. (2019, July 19). A gentle introduction to generative adversarial networks (Gans). Retrieved

Manovich, L. (2018), *AI Aesthetics*, Moscow: Strelka Press.

Yıldırım, E. (2022), Text-to-Image Generation A.I. in Architecture, in H. Kozlu, *Art and Architecture: Theory, Practice and Experience* (pp.97–120), Lyon: Livre de Lyon.

Panicker, S. (2022), AI-Inflected Art/Architecture: Who(or rather, what) is the artist/architect? *Blueprint September 2022*, 3(2), 15–36.

Brillhart, J. (2021), Reality x Design: Constructing Reality (Panel 3) [Lecture]. <https://vimeo.com/518264551>



Tibebu, H., Malik, A., De Silva, V. (2022) Text to Image Synthesis Using Stacked Conditional Variational Autoencoders and Conditional Generative Adversarial Networks, in *Intelligent Computing: Proceedings of the 2022 Computing Conference, Volume 1*. Cham: Springer International Publishing, 2022, p.560-580

Moholy-Nagy, L. (2012), *Fundamentals of Bauhaus Design, Painting, Sculpture, and Architecture*, New York: Dover Publications Inc. Mineola.