

Direct perception and algorithmic data processing: a comparative study of creative processes in an artistic project at the Kłodzko Fortress

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Abstract: This article presents a comparative analysis of the creative process and the final results of works produced by members of the Student Painting and Drawing Scientific Club at the Lublin University of Technology during an open-air workshop at Kłodzko Fortress. These are juxtaposed with images generated by artificial intelligence models based on photographic documentation of the site and the prompts provided. The traditional creative process is compared with the algorithmic process, taking into account differences in sources of inspiration, the creative process itself, and the nature of control over the composition. The findings suggest that human creativity relies on multisensory experience, emotional interpretation, and intentionality, whereas artificial intelligence creates images solely through the processing of input data, lacking the capacity for conscious interpretation. An analysis of the final outcomes reveals significant variations in the aesthetics, compositional coherence, and the level of emotional expression of the works. The discussion highlights the importance of creativity, the role of imperfection and expression in art, and indicates the limitations of artificial intelligence in replicating human creativity.

Keywords: artificial intelligence, abstract art, creative process

1. Introduction

The dynamic development of artificial intelligence in recent years significantly impacts the world of art. Machine learning models capable of generating images based on textual descriptions, photographs, or visual datasets, have opened up new possibilities for both professional artists and amateurs [1]. Increasingly, these tools are ceasing to serve merely a supporting function and are becoming autonomous systems capable of creating visual compositions. Their growing presence in the artistic environment prompts reflection on the nature of the creative process, the role of experience, and the limits of imitating human creativity [2].

In the field of visual arts, particularly in the marketing and promotion industries, generative systems are playing an increasingly important role [3]. These are predominantly models that construct an image by multi-stage reduction of random noise and gradual alignment of the resulting composition with the description contained in the prompt. Complementing this technology are transformative models, which analyse extensive visual datasets and learn dependencies regarding colour, light, and texture. Hybrid solutions are also becoming increasingly common, integrating photo processing with functions such as stylisation, aesthetic transformation, and the generation of numerous variants based on a single motif [4]. Despite their technical sophistication, all these systems function based on statistical data: they lack the capacity for environmental perception, the experience of space, or an emotional response to their surroundings [5]. Unlike humans, they do not rely on intuition or sensory sensitivity; their operation is based on the calculation and recombination of existing visual samples. Consequently, their creativity is purely algorithmic in nature and does not encompass the experiential dimension of the human creative process [6].

The aim of this article is not only to present two distinct methods of image creation but, primarily, to demonstrate how differences in information processing – experiential versus algorithmic – influence the nature of the resulting compositions. This framework allows the works produced to be treated not merely as illustrative examples, but as analytical material for investigating the nature of creative processes within the context of contemporary generative technologies.

2. Research methods

To compare the creative processes of humans and artificial intelligence, the *MIRĄŻ* project was utilised. This project was conducted by members of the Student Painting and Drawing Research Club at the Lublin University of Technology during an open-air workshop at Kłodzko Fortress. The participants created abstract paintings inspired by the specific character of the site. The creative process involved sketching, the analysis of visual material, and group critiques, during which new interpretations and compositional solutions emerged. Simultaneously, the collected photographic documentation served as the basis for generating analogous compositions using artificial intelligence models. These models operated solely on photographic imagery and project design descriptions, entirely detached from physical space and sensory conditions.

A comparison structured in this manner enabled an analysis of the differences between two distinct creative paths. Human artistic activity stems from direct, multisensory perception, an emotional interpretation of the environment, and a reflection on form that evolves over time. In contrast, the algorithmic process is devoid of experience, consciousness, and intention; it generates images based on statistical relationships that correlate with aesthetics but not with the physical cognition of space [7].

2.1. Description of the artists' creative process

The artists' creative process was primarily based on the direct experience of the Kłodzko Fortress space, which determined the direction of subsequent artistic activities. The first stage of the work involved the observation and analysis of the fortification layout. These considerations were not limited merely to recording the structure itself; of equal importance were the variability of light and shadow, the colour palette, and textures. Direct contact with the fortress environment enabled the capturing of its scale, the massing of the structure, its material diversity, and the specific atmosphere stemming from the historical character of the space.

Following the observation stage, sketches and visual notes were produced, allowing for an exploration of the relationships between proportions, volumes, and spatial rhythms, as well as the identification of structures that could serve as the basis for subsequent paintings. These visual notes served both a documentary function – recording essential architectural features – and an interpretive one, as compositional transformations were already being initiated at this stage.

A key aspect of the process was emotional interpretation and the conscious transformation of observed forms. The artists did not reproduce the fortress space realistically, but instead gave it abstract forms through subjective associations, moods, memories, and emotions connected to the site. Observed structures underwent simplification: the geometric layouts of the bastions were transformed into synthetic compositions, the rhythms of the walls inspired the creation of dynamic lines, and the monumentality and rawness of the architecture were reflected in expressive contrasts. This stage represented a transition from an objective view to a subjective interpretation based on individual impressions.

The final stage involved the execution of the completed works, produced using techniques such as acrylic painting, watercolour, and collages incorporating dyed tissue paper. The creators made decisions regarding composition, colour relationships, contrasts, and the character of forms in a manner that conveyed both the formal elements of the fortress and the emotional perception of the site – its atmosphere and symbolic resonance.

2.2. Description of the creative process using artificial intelligence

First prompt:

Based on the photography below, create an abstract, geometric graphic inspired by the work of artist Mark Rothko



Second prompt:

Do not be inspired by Mark Rothko's work literally; keep the shapes of the fortifications in the photography



Final result:



Figure 1. The process of generating images based on photographs of Kłodzko Fortress. Source: Own study

The process of creating works using artificial intelligence began with the collection of input data, which served as the information base for subsequent generations. Firstly, photographic documentation of Kłodzko Fortress was compiled, covering a broad spectrum of spaces – from monumental bastions to architectural details, such as the texture of walls or brickwork patterns. The photographs depicted the fortress under various weather conditions and with diverse lighting dynamics, providing an extensive set of visual information regarding the structure and character of the site.

In selected cases, the dataset was expanded with additional materials: historical documentation, photogrammetric models, and point clouds. This information broadened the scope of the input data and enabled more complex generations, in which the artificial intelligence could reference geometry, chiaroscuro, or spatial relationships. In certain realisations, references to the works of selected artists were also utilised, allowing the model to draw inspiration from abstract painting styles. Collectively, the gathered materials constituted the visual and contextual foundation for the generated images.

The second stage of the process involved formulating prompts and precisely selecting the parameters controlling the operation of the artificial intelligence model. The prompts functioned as instructions – describing both the nature of the desired aesthetics and the scope of elements to be included in the composition. Users specified, among other things, the degree of abstraction, dominant fortress motifs (such as the arrangement of walls, spatial geometry, or textures), the intended atmosphere of the work (e.g., monumentality, rawness, layering), and stylistic elements related to colour schemes, line dynamics, or the level of formal simplification.

The final stage consisted of a multi-step process of generating variants and transforming them. As AI models typically do not produce a satisfactory result on the first attempt, it became necessary to repeatedly test different sets of prompts, parameters, and visual data. For each concept, a series of variants was generated, differing in their

interpretation of the input material – ranging from more realistic representations to extreme abstract transformations. The generated images were then subjected to selection: their composition, alignment with the initial objectives, level of abstraction, and interpretation of fortress motifs were analysed. Subsequently, the versions that best fulfilled the intended goals were chosen and subjected to secondary generation, with the prompts enriched by new, more precise instructions.

First prompt:

Based on the photo below, create a graphic in similar style, i.e. colourful splashes, abstraction, slightly blurred colourful splashes similar to those found in the works of Mark Rothko



Second prompt:

Based on the photo below, create a graphic in similar style, i.e. colourful splashes, abstraction, slightly blurred colourful splashes similar to those found in the works of Mark Rothko



Final result:



Figure 2. The process of generating images based on photographs of Kłodzko Fortress. *Source: Own study*

3. Divergences in the creative process: human versus algorithmic

3.1. Environmental influence

Differences between the artists' creative process and the generation of images by artificial intelligence are primarily observable in the manner of reacting to the environment. Creators working *en plein air* maintain a direct relationship with the site – they sense its atmosphere, scale, and the interconnections between individual spatial elements. Conditions such as temperature, precipitation, or the characteristics of light exert a direct influence on aesthetic choices. The artist, in contrast to artificial intelligence, makes decisions in response to external stimuli, personal experiences, and emotions, which modify their perception and the method of constructing the image. This distinction is fundamental, as AI algorithms do not possess personal experiences or emotions, which traditionally inform the creative process [8].

In turn, artificial intelligence functions entirely outside the context of the site. Generative models operate solely on static data; photographs do not provide them with information regarding air temperature, light intensity, or the emotional mood of the space. As Notaro A. observes, AI does not experience the environment in a sensory manner, nor does it react to the rhythm of the day, the presence of others, or the creator's focus and intuition. Its operation is detached from real-world conditions, limited exclusively to the provided input data. This process relies on deep learning models that synthesise vast datasets of historical and contemporary works, yet it remains a mathematical analysis of "data points" rather than a sensory engagement with the physical world [9].

In the *MIRAZ* project, the environment directly shaped the operational parameters of the work. Physical presence within the Kłodzko Fortress necessitated a response to shifting conditions, such as low temperatures, humidity, and the specific interior lighting, which influenced the dynamics of the gesture and the method of constructing form. This stands in stark contrast to generative processes. In this case, artificial intelligence relied solely on input data in the form of photographs, treating them as two-dimensional pixel arrays and geometric shapes. The algorithm did not interpret the fortress as a concrete, physical space with a specific scale or atmosphere; instead, it operated on statistical visual dependencies contained within the provided files.

3.2. Sources of inspiration

The second fundamental area of difference lies in the source of inspiration. In humans, inspiration grows from experience – seeing, touching, sensing the space, and entering into a relationship with the surroundings. Artists react to the texture of the walls, the proportions and rhythm of the bastions, as well as the atmosphere of a site, which can evoke various emotions: monumentality, mystery, or the sense of the weight of time. Inspiration is, therefore, a synthesis of the senses, emotions, and reflection [9].

In the case of artificial intelligence, inspiration is of a completely different nature. It does not arise from perception, but from the manipulation of data. AI models process provided photographs, verbal descriptions, and visual structures present in training sets. The interpretation of a site, therefore, boils down to an analysis of statistical dependencies. AI neither records nor senses the atmosphere of a place, but instead identifies recurring pixel patterns or stylistic features. Algorithmic inspiration is the processing of data and the mapping of learned visual schemas [6].

In the *MIRAZ* project, inspiration for the algorithm was condensed into prompts, through which the authors imposed specific aesthetics, graphic techniques, or references to renowned artists to interpret the photographs of the fortress. In this context, the machine's "inspiration" was merely a technical hybrid of visual data and linguistic directives. This process followed a completely different path for the authors – here, the idea emerged from direct emotions, knowledge of the site's history, and acquired expertise in painting, while their individual craftsmanship and skills naturally shaped the final artistic vision.

3.3. The evolution of the creative process

The evolution of the creative process also unfolds differently for artists compared to AI models. Human creative work proceeds in a dynamic, unpredictable manner, remains constantly susceptible to change, and is open to experimentation. Initial assumptions may undergo a complete transformation under the influence of new observations, emotions, group critiques, or reflections on completed sketches. A creator may alter the fundamental premises of the work following a sudden surge of inspiration, suggestions from others, an intuitive decision, or a chance occurrence that reveals new formal possibilities. The creative process, understood in this way, encompasses self-reflection, the evaluation of actions taken, corrections, and multiple reinterpretations of the original concept. As noted by Mazzone and Elgammal [10], this is driven by "artistic intent" and a "capacity for growth and change over time".

In the case of artificial intelligence, the evolution of the process is iterative but lacks its own consciousness. Subsequent variants of images generated by the model result from modifications to prompts, parameters, or input data [11]. The algorithm does not develop a concept, does not revisit previous decisions due to an emotional response, and is unable to evaluate the correctness of a composition. Thus, evolution in AI work is a series of calculations rather than a process of the creative maturation of an idea. Many variants are produced, but their development is mechanical rather than reflective [9].

In the *MIRAZ* project, this clear distinction between the two processes was particularly evident. While the development of AI-generated works relied on the successive introduction of changes to text prompts and observing the resulting mechanical transformations of the image, the authorial process unfolded non-linearly. Decisions to shift the artistic direction stemmed from sudden insights or emotional responses to the history of the Kłodzko Fortress, manifesting an artistic intent that the machine lacks. In the human process, every sketch was subject to self-reflection and critiques, allowing for the evolution of the idea itself, rather than just the visual form. It was lived experience that enabled a conscious deviation from initial premises, while the algorithm remained limited to the statistical processing of input data.

3.4. Extent of control

Significant differences also arise regarding the degree of control over the creative process. The artist exercises full, direct control over every stage of the work: choosing the format, medium, and tools, and deciding on the composition, intensity, colour palette, or type of texture. Throughout the process, the artist makes conscious decisions and bears full responsibility for the final outcome [10]. However, this control also encompasses the acceptance of randomness; should the paint behave unpredictably or a line appear too abrupt, the artist can utilise this as a creative impulse.

In the case of artificial intelligence, user control is indirect and limited. The creator influences the image primarily through the formulation of prompts, the selection of technical parameters, and changes to input datasets. However, the final form of the image remains largely unpredictable, as it results from the internal structures of the model, over which the user has no direct influence [9]. It is often necessary to modify prompts multiple times to achieve an effect that meets expectations [11]. Control is therefore not so much a creative gesture as an attempt to indirectly correct the algorithm's output.

In the *MIRAZ* project, the authorial process stemmed directly from the creator's vision, with the only unknown factors relating to the physical behavior of the chosen medium. Due to the process-oriented nature of the work, it was possible to react to these phenomena in real-time, allowing for full control over the final outcome. Any unpredictable reaction of the material could be immediately corrected or consciously utilized, ensuring the work remained consistent with the original concept. In the case of artificial intelligence, control was limited to defining input parameters. The lack of influence over the image generation process itself made the final result unpredictable. Unlike manual work, the user could not intervene while the image was being created. This necessitated multiple prompt modifications and selecting the best effects from the finished variants.

4. Differences in the final result

4.1. Form and aesthetics

The analysis of the final works reveals significant differences in form and aesthetics between images created in a traditional creative process and compositions generated by artificial intelligence. In the case of artists' works, the individual character of the pieces stems from their personal style, visual narrative, and conscious artistic decisions. Each image is a trace of specific actions, ideas, and a physical process, in which irregularities, brushstrokes, and textures appear [9]. These elements, often perceived as imperfections, constitute an essential part of the works' expressiveness and originality, lending them a unique character that is impossible to replicate. This aesthetic also stems from the emotional engagement of the artist, who consciously employs means of expression to convey the atmosphere of a place and personal feelings.

Images generated by artificial intelligence are the result of analyzing visual patterns present in training datasets – AI does not create aesthetics, it processes them [6]. They are characterized by stylistic homogeneity and digital precision resulting from an algorithmic pursuit of statistical similarities. The repeatability of forms, colour schemes, and visual rhythms constitutes a natural limitation of a system that operates on combinations of already known solutions. As a result, AI works often appear visually attractive, yet they lack individual tension and emotional depth [2].

4.2. Composition

In terms of composition, the differences between authorial works and images generated by artificial intelligence are particularly distinct. AI models create compositional layouts consistent with the most frequently encountered visual patterns, which stems from their statistical mode of operation [2]. Consequently, AI-generated compositions tend to be repetitive and predictable; they avoid experimental or original solutions, and their rhythm and layout rarely introduce an element of surprise. As a result, the generated images lack the individual expression and creative tension present in human works.

In the works of the *plein-air* participants, however, composition is the result of multi-stage, conscious experimentation. Already at the sketching stage, the artists analyzed the proportions of the fortress space and the relationships between its volumes. This process was not merely about replicating reality, but about its creative interpretation. The creators intentionally moved away from full compositional harmony, introducing non-obvious accents and asymmetries that served as key tools of expression.



Works generated by AI

Author: Aleksandra Typek

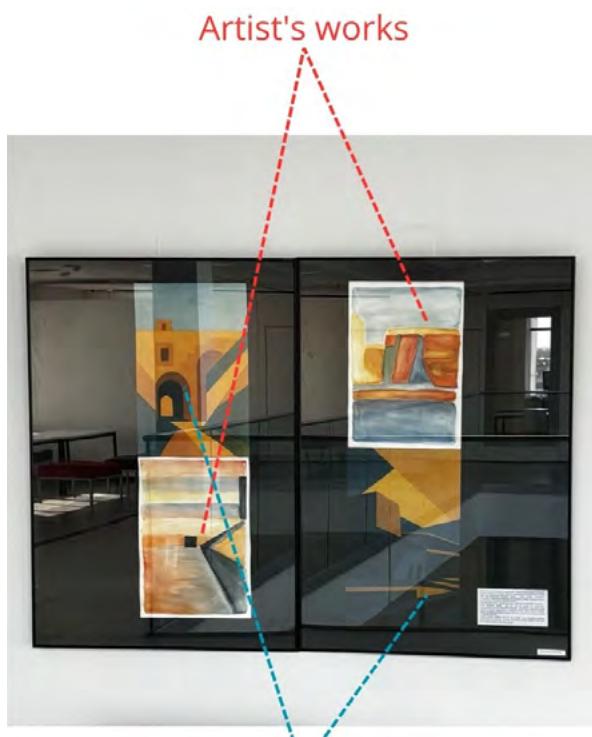
Figure 3. Comparison of the final results of images created by artist Aleksandra Typek and artificial intelligence. Source: Own collection



Works generated by AI

Author: Oliwia Wiech

Figure 4. Comparison of the final results of images created by artist Oliwia Wiech and artificial intelligence. Source: Own collection



Works generated by AI

Author: Dominika Lisiewska

Figure 5. Comparison of the final results of images created by artist Dominika Lisiewska and artificial intelligence. Source: Own collection



Works generated by AI

Author: Paula Piękoś

Figure 6. Comparison of the final results of images created by artist Paula Piękoś and artificial intelligence. Source: Own collection

4.3. Interpretation of the site

Differences are also evident in the interpretation of the site, which proceeds in entirely different ways for human creators and artificial intelligence. In the artists' works, architectural motifs, spatial layouts, light, colour palettes, and the textures of the Kłodzko Fortress serve as a starting point for transformations resulting from the direct experience of space. Artists working *en plein air* could observe the site's variability depending on the time of day, weather, or their own mood, allowing them to build multi-dimensional interpretations embedded not only in form but also in emotion and narrative.

In their works, they focused primarily on the abstract representation of individual experiences and impressions related to being within the fortress space. Artists often concentrated on a single selected element or motif, which became a vehicle for their own unique way of seeing. This process was deepened through sketching, detail analysis, experimental composition, and group critiques where participants shared their observations. Consequently, the resulting images retained only symbolic references to the actual structure of the fortress; their primary subject became the atmosphere of the place, personal impressions, and an emotional dialogue with the space.

In contrast, AI models reconstructed the site by analyzing available images and identifying characteristic features, which were then combined with stylistic patterns from training datasets in the form of photographs and descriptions. This processing method led to interpretations of a reproductive nature; the algorithm mimicked visible elements, often adhering to them too literally and rarely proposing solutions that deviated from the provided material. As a result, the images generated by artificial intelligence retained the formal features of the fortress but lacked the personal perspective and multi-layered analysis present in the works created by the artists.

Table 1. Key differences between human and algorithmic creativity. *Own elaboration*

Area	Human	Artificial intelligence
1. Relationship with the environment	Direct experience of space	Lack of perception and contact with the environment
2. Processing method	Multi-sensory interpretation	Computational data analysis
3. Reaction to stimuli	Emotional and intuitive	Algorithmic data processing
4. Source of variability	Reflection, experimentation, spontaneity	Prompt parameters and algorithmic rules
5. Decision features	Conscious and intentional	Indirect, limited by model architecture
6. Creative potential	Individuality and uniqueness	Recombination of learned patterns
7. Recognition of forms and image structure	Differentiated perception of forms	Composition read as a continuous pixel matrix
8. Final reception	Complex, experiential expression	Aesthetically correct, lacking individual expression

5. Summary and conclusions

The comparison of works created by artists within the space of the Kłodzko Fortress with images generated by artificial intelligence reveals distinct and multi-dimensional differences resulting from divergent ways of responding to the environment and processing information. In the case of human creativity, the influence of the site proves to be crucial. Direct contact with the architecture, atmospheric conditions, the scale of the space, and the unique atmosphere of the fortress introduces an element of sensory presence into the creative process. Artists responded to their surroundings emotionally, and their paintings are not merely an interpretation of form, but also a record of the experience of being present within a specific space.

In the case of generative models, this type of contact does not occur. Algorithms function exclusively within the realm of input data, which they subject to mathematical analysis [9]. They lack the ability to perceive space and do not react to the context of the site. In an algorithmic perspective, the space of the Kłodzko Fortress is presented merely as a set of digital data, devoid of the depth of experience that comes from direct contact with space.

A comparison of both methods of creation prompts reflection on the very concept of creativity. Human creativity is based on a multi-level process: from observation and analysis to conscious decisions and interpretations. The creator is capable of transforming data and constructing their own metaphors. In the case of artificial intelligence, creativity is limited to the recombination of existing patterns and statistical dependencies stored within the model. The algorithm can generate images that are new in a formal sense, but it does not create ideas, as it lacks the capacity for reflection on the subject. This type of creation is not the result of lived experience or conscious intention, but rather stems from the mathematical processing of data [2].

In the human creative process, an important role is played by chance, spontaneous decisions, and the nature of the medium used. These elements can lead to new ideas, unexpected effects, and creative experiments. Imperfection and chance often become a source of expression, introducing an element of unpredictability and the author's individuality into the work [12]. Images created with artificial intelligence, on the other hand, are mathematically controlled and lack creative freedom; any modifications result solely from changes in prompts and source materials, rather than from intentional decisions or expression [13]. As a result, AI-generated works lack a unique character derived from experience, experimentation, and the creator's personal involvement.

A review of the final outputs reveals the limited ability of artificial intelligence to imitate both the artistic process and expression. While generative models are capable of replicating style, colour schemes, or composition, they fail to capture the atmosphere of a site, its symbolism, or the nuances that arise from direct contact with space [13]. In works created by humans, the final result reflects the emotions, ideas, and conscious choices of the author. Each image focuses on selected motifs, introducing subjective expression through composition, colour, and the chosen medium. Consequently, the artists' works possess a unique character and emotional depth that artificial intelligence is unable to achieve [2].

In summary, the conducted analysis of two distinct creative processes confirms the key differences between human and algorithmic methods of image construction. Creativity emerging from open-air practice (*en plein air*) is based on direct observation, interpretation, and the conscious selection of motifs. In contrast, generative artificial intelligence models process visual data statistically, without contact with physical space and without the possibility of endowing it with individual meaning. The analysis demonstrates that while AI tools may expand the scope of formal exploration, they do not replace a creative process rooted in the direct experience of space, conscious choices, and individual interpretation.

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Bezpośrednia percepceja a algorytmiczne przetwarzanie danych: studium porównawcze procesów twórczych w projekcie artystycznym w Twierdzy Kłodzko

Streszczenie: Artykuł stanowi analizę porównawczą procesu twórczego oraz efektów końcowych prac wykonanych przez członków Studenckiego Koła Naukowego Malarstwa i Rysunku Politechniki Lubelskiej podczas pleneru na terenie Twierdzy Kłodzko oraz obrazów generowanych przez modele sztucznej inteligencji na podstawie dokumentacji fotograficznej miejsca oraz zastosowanych promptów. Tradycyjny proces twórczy został zestawiony z algorytmicznym, uwzględniając różnice w źródłach inspiracji, procesie twórczym oraz charakterze kontroli nad kompozycją. Wyniki wskazują, że twórczość ludzka opiera się na wielozmysłowym doświadczeniu, emocjonalnej interpretacji i intencjonalności, podczas gdy sztuczna inteligencja tworzy obrazy jedynie poprzez przetwarzanie danych wejściowych, bez zdolności świadomej interpretacji. Analiza efektów końcowych ukazuje zróżnicowanie w estetyce, spójności kompozycyjnej oraz poziomie ekspresji emocjonalnej prac. Dyskusja podkreśla znaczenie kreatywności, roli błędu i ekspresji w sztuce oraz wskazuje granice możliwości naśladowania twórczości ludzkiej przez sztuczną inteligencję.

Słowa kluczowe: sztuczna inteligencja, sztuka abstrakcyjna, proces twórczy