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## The Effectiveness of Utilizing Future Perspectives of Artificial Intelligence in Digital Fine Arts: An Analytical Study of Some Robot Artworks

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### Abstract:

*Digital fine arts are considered one of the most important modern arts that rely on technology and information technology. With the tremendous advancement in the field of artificial intelligence, these arts require modern technology to develop and improve them. Several studies have discussed the possibility of using artificial intelligence in the field of digital fine arts to enhance artistic performance and increase productivity. The utilization of artificial intelligence in this field opens up new opportunities for interaction between artists and audiences, and it can lead to transformations in the artistic creative process.*

**Keywords:** digital art, new media art, transformation of art

### Introduction:

In particular, artistic appreciation in the history of art is one of the important sensory skills that enables individuals to understand and appreciate art and beauty. However, this requires continuous learning and training. Among the means that help to develop artistic appreciation is technology, especially artificial intelligence in the field of art. Individuals are able to access multiple sources and artworks through the internet, thereby enhancing their artistic experience and expanding their horizons. This is due to the many diverse achievements



that technology has offered to humanity as a result of the rapid and successive changes in advanced science. This has opened up new horizons for making tangible modern progress in all areas of life, including digital visual arts. This is because openness to scientific and technological progress has become an urgent and meaningful necessity that cannot be ignored in the face of all the new challenges that arise, so that art can progress along with human civilization in the history of art.

Modern technology has also significantly influenced the process of artistic creation by providing diverse and abundant resources. It liberated contemporary art from the aesthetic dimensions that had been firmly entrenched within traditional art concepts. The barriers that separated artistic genres have also been removed, allowing these movements not to delve deeply and settle their expressions within a specific circle, so as not to lose their updating quality that is engaged in experimenting with the consequences of the moment.

Undoubtedly, the fundamental transformations witnessed by the art of the twentieth century, as a result of the artists' engagement in the circle of modern concepts, have opened up the field of visual creativity to all possibilities. Today, what is happening in the data and international art forums raises more questions about the aesthetic and technical methods adopted, and about possible paths, especially considering the growing connection between art and technological means. The dominant technological culture in contemporary thought has contributed to shaping the feelings of artists, directing their perception, and increasing their use of technical media to the point where some artistic styles are closely linked to technological tools and cease to exist without them. Among these artistic movements, we can mention visual art, video art, and digital art in all its branches.

By presenting this research, we do not need to discuss the comparison between artistic schools and trends in visual arts. Change is the nature of life and one of its features. However, the aim of this research is to shed light on the schools, trends, and techniques that have passed and continue to pass over time and have influenced visual arts through the developments that have occurred in modern times.

Furthermore, the true aim is to elevate cultural and artistic awareness to a level that corresponds to our intellectual and skill needs of the era. The artistic techniques produced will assist those working in this field to obtain them and all the new experiences and results in order to raise levels and competencies and keep up with the spirit of the age. It is best for the artist to harness and channel these experiences, trends, and techniques into artistic, scientific, and educational frameworks.

### **Research problem:**

The researcher noticed a scarcity in Arabic studies and scientific research that elucidate the future prospects of employing artificial intelligence technology in the field of digital art and

the history of art, as well as producing digital art paintings. This prompted the researcher to undertake this study to explore:

How can artificial intelligence be employed in the field of digital art and art history?

How can digital art paintings be produced, through two main axes:

- **The first axis:** consists of conducting a survey study of the research phenomenon represented in the artistic paintings of robots, as robots are one of the future prospects for employing artificial intelligence in the field of visual arts and art history.
- **The second axis:** involves an analytical study of models of artistic paintings represented in the artistic paintings of the robot Haroun, as a future perspective for employing artificial intelligence in the visual arts and art history.

Hence arises the problem of the current research, which can be defined in the following questions:

- How does the robot reveal the future prospects of utilizing artificial intelligence in the field of digital art and art history?
- How can the field of art history benefit from employing artificial intelligence technology in digital art and art history?

#### **Research Objectives:**

1. To identify the future prospects of employing artificial intelligence in the field of digital art and art history through the presentation of some of the robot's works.
2. To analyze some of the robot's digital artworks and evaluate their practicality in the field of digital art and art history.
3. To determine the future prospects of employing artificial intelligence technology in the field of digital art.
4. To define the concept of artificial intelligence and its applications in the field of digital art.

#### **Research Assumptions:**

The current research assumes:

- That the use of intelligent technology in digital art and design can contribute to the development of this field and expand the creativity of artists and designers, and that there are challenges that need solutions and measures that can be taken to overcome them.
- That there is a positive relationship between the use of artificial intelligence technology and the improvement of the quality of digital art, as well as facilitating the process of producing and marketing it.
- That there is a positive impact of employing artificial intelligence technology in the innovation and development process in the field of digital art and art history.

### **Importance of the Research:**

- The importance of this research lies in enhancing our understanding of how the use of intelligent technology can contribute to expanding the field of digital fine arts and improving the quality of artistic production.
- Providing recommendations and guidance for artists and designers in employing intelligent technology in their work.
- Helping to identify the challenges and obstacles that may be faced in using artificial intelligence in the artistic field and determining the necessary measures to develop this field.
- It lies in the technological transformation witnessed by the field of digital fine arts, which relies heavily on the use of modern and advanced technologies, specifically artificial intelligence technology.
- This research can help identify the future prospects of the field of digital fine arts and determine the challenges that art history may face, and analyze the most important results that can contribute to the development of the field of digital fine arts and art history.
- The importance of the research also lies in how the tools of the visual artist have evolved with the introduction of programs that simulate human intelligence, as well as emphasizing the idea that artificial intelligence programs have entered the field of visual art in particular.

### **Search boundaries:**

The current research is limited to the study and analysis of some works of robot art to explore the future prospects of employing artificial intelligence in the field of digital fine arts and art history.

### **Research sample:**

The survey sample was chosen to study the research phenomenon on the works of the robot Haroun, where the robot Haroun represents one of the artificial intelligence techniques used in the field of fine arts and art history in terms of description, rooting, and dating.

### **Research methodology:**

In line with the researcher's theoretical specialization in art appreciation and art history, and given the nature of the subject and the study requirements, this study relied on the descriptive analytical method as one of the primary and main methods used in survey descriptive research. This is intended to obtain sufficient data and information that can be used in studying, rooting, and dating the research phenomenon, and evaluating it in terms of analyzing and critiquing its artistic output.

## Research Terminology:

Below are some terms related to the current research topic:

### 1. Artificial Intelligence:

Artificial Intelligence (A.I) is an abbreviation for the branch of computer science that deals with creating intelligent machines and devices. It has multiple definitions, and the researcher adopted the definition that considers A.I as a simulation of human brain functions such as learning, planning, problem-solving, logical and analytical thinking, and speech recognition.

### 2. Digital fine arts:

Digital art is a general term that refers to artworks that use digital technology as a fundamental part of the creative process. Digital art is defined as "the use of digital technology in the production, design, and processing of fine art."

## Associated Studies:

The researcher conducted a preliminary survey of research papers and scientific journals related to the topic of the study in the research location, which were found in the libraries of art, art education, and specialized universities in Egypt, as well as digital libraries and databases. The researcher found that there is a great interest among researchers in the field of art to study and utilize technology in artistic creativity, while there is still a deficiency in addressing the progress that has been made in the context of digital art schools.

In this context, a study by Ismail El Haddad<sup>1</sup> discussed the impact of artificial intelligence technology on digital art and the process of artistic design. The study concluded that artificial intelligence technology has an impact on digital art.

Additionally, there is a study by Susan Liautaud<sup>2</sup> which discusses the challenges of using artificial intelligence technology in creative fields and the importance of paying attention to the ethical consequences of its use. The study resulted in identifying challenges to using artificial intelligence technology in creative fields and emphasizing the importance of ethical consequences of its use.

There is a study by Popper (1993)<sup>3</sup> titled "The Art of the Electronic Age" which discusses the relationship between technology and visual art, and introduces a new concept called synaesthesia. The study concludes that there is a blending of art, human emotions, and technology.

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<sup>1</sup> Ismail El Haddad: "The Impact of Artificial Intelligence on the Creative Process in Contemporary Digital Art",

<sup>2</sup> S. Liautaud: "Art and AI: Reflections on Human-Centeredness and Ethics"

<sup>3</sup> F. Popper, "Art of the Electronic Age", New York: Harry N. Abrams, Inc, 1993.

Furthermore, the study by Harbach, B (2003)<sup>4</sup> highlights the importance of exploring creativity in the digital age with a focus on theories of creativity, examining the nature of artistic expression and the interaction between the artist and the audience. Harbach found that the web and software packages allow for a high degree of creativity, while also providing learners with experience in working with modern technologies.

Additionally, the study by Clark, Seth (2005)<sup>5</sup> titled "A Framework for Integrating Design Tools for Robotics" emphasizes the importance of integrating computer-based design as a mechanism for analyzing and designing robotics.

The study by Congcong Li (2009)<sup>6</sup> discusses the evaluation of aesthetic visual quality of digital art, and the particular challenges in evaluating the aesthetic quality of artworks that rely on digital visual content. The researcher found that digital artworks possess high aesthetic quality and creativity, and that digital art, much like human art, can be classified as high or low quality. Additionally, the study by Ben Dickinson<sup>7</sup> explores the impact of modern technologies on fine arts and the challenges that may arise in the future.

A study by Michael Slavitch<sup>8</sup> discusses the impact of artificial intelligence technology on the art industry and how it can be used to produce innovative artworks.

Another study by Sophia George<sup>9</sup> discusses the importance of AI technology in the art industry and creative design fields, and how it can be utilized to achieve creativity and innovation in the field of visual arts.

Regarding digital creativity, Taha Al-Lail (2012)<sup>10</sup> stated that "the artist always seeks to assert their existence, emotions, and feelings within the artwork, aiming to express an individuality that is not separate from collective individuality. It is not born in a moment but rather a combination of sensory and intellectual deposits, where the awareness and unconsciousness of the creator interact, and the moment of creativity becomes clear in the artistic work".

Artist "Markos" confirms that the artworks he produced using the computer made him see art in a new way. The immense possibilities and aesthetic potential of each element in the

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<sup>4</sup> Harbach, B. (2003). Exploring Creativity in the Digital Age . In D. Lassner & C. McNaught (Eds.), Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2003 (pp. 2390-2392).

<sup>5</sup> Clark, Seth. A Framework of Design Tools Integration for Robotic Mechanisms.- Master of Science, University of Akron, Mechanical Engineering, 2005

<sup>6</sup> Li, C., & Chen, T. (2009). Aesthetic Visual Quality Assessment of Paintings . IEEE Journal of Selected Topics in Signal Processing( Vol 3 Issue:2) April 2009.pp:236 – 252

<sup>7</sup> B. Dickinson: "Artificial Intelligence, Robotics and the Future of Art"

<sup>8</sup> M. Slavitch: "Machine Learning and the Future of Art"

<sup>9</sup> S. George: "The Role of Artificial Intelligence in the Creative Industries"

<sup>10</sup> Taha Al-Lail: (2012) Fine Arts and the Challenges of Artistic Creativity. Al-Fan Al-Tashkeely Magazine, available at: [http://www.altshkeely.com/2012/rainbow2012/pho\\_dig.htm](http://www.altshkeely.com/2012/rainbow2012/pho_dig.htm). Accessed on 17/12/2012.



artwork, as well as the infinite variety of the relationship between the elements, have made computer art an expression rather than just techniques performed by the machine.

There is a study by author Yasmine Hegazy (2016)<sup>11</sup> that discusses the importance of modern technology and artificial intelligence in the fine arts and how artists have developed their tools and used robots to create works of art that imitate those of other artists.

### **Types of digital art:**

Digital art that involves image processing can be classified into the following types:

**1- Static digital art:** In this type of art, the image is static, and it can be further classified into the following:

A- **Vector design and graphics:** These are graphics that deal with specific coordinates and have limited colors not exceeding 16, and they are known for their ability to expand while maintaining their shape and accuracy.

B- **Raster design or pixel art:** This type of art contains a very large number of colors and relies on the stability of pixels during the design process.

**2- Animated digital art:** In this type of art, the focus is on animating the image, and the animated design consists of repeated static images with varying positions and a consideration of time. One of the well-known software in this field is Adobe Flash, which animates images from start to end while considering the temporal element of movement. Mastery of static art is key to animated art, as it is the first step in preparing animated elements.

### **Artificial intelligence in digital art processing:**

Artificial intelligence has developed and is being used in various fields, including digital art, such as image analysis, pattern recognition, and deep learning. AI has contributed to opening up new possibilities and opportunities in the fields of art, entertainment, and education, as well as enabling interactive experiences and artistic expression. The GoApe project, which was a result of collaboration between the University of Zurich and an AI lab, is a clear example of AI applications in the field of art. It aimed to provide artists and programmers with easy means to create 3D graphical simulations and body movement support there are no sources in the current document<sup>12</sup>.

It is worth mentioning that there has been a significant breakthrough in artificial intelligence research towards expert systems and their various applications. Expert systems are considered one of the most powerful branches of artificial intelligence, which in turn is one of the strongest branches of computer science. They are programs that simulate the performance

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<sup>11</sup> Yasmine Hegazy: "Abstract Expressionism and its Impact on the Visual Dimension in Haroun Robot Paintings", 12th International Conference on Art and Economy, April 2016.

<sup>12</sup> Rolf Pfeifer. artificial intelligence and art.-access from: [www.artistsinlabs.ch](http://www.artistsinlabs.ch).-access date:jan,2004.

of a human expert in a specific field of expertise by collecting and using information and expertise from one or more experts in a particular field.

In short, these systems were created to extract the expertise of experts - especially in rare specialties - and incorporate it into an expert system that replaces humans and helps transfer this expertise to others, in addition to its ability to solve problems faster than a human expert.

### **Common Applications of Robots:**

Nowadays, robots are used in many economic, military, industrial, technological, and medical fields, with medical applications being the most widespread in the Arab world. In some fields, robots have become a reality that achieves great profits and achievements in the artistic field and its elements, such as shape recognition, such as faces, handwriting recognition, and non-linear control, such as controlling the grip of a feather, pen, and artistic materials, by utilizing artificial intelligence. Artificial intelligence has contributed greatly to various fields<sup>13</sup>.

### **The potential use of artificial intelligence technology in digital art:**

Digital art is one of the most important modern art forms that rely on technology and information technology. Regarding the possibility of using artificial intelligence in the field of digital art, it can enhance artistic performance and increase artistic production. Employing AI in this field opens up new opportunities for interaction between artists and the audience and can lead to transformations in the creative process. Many art critics and historians find it difficult to write about modern art from a purely visual perspective without addressing content and meaning. They discuss materials and technical processes in the creative process, neglecting the influence of inspiration, imagination, and expression.

This trend is clearly evident in most of the names given to artistic movements, such as "Expressionism", which is a refined form of "Barbarism" that is closer to caricature, and "Cubism", which looks at the elements of nature from several angles at once. Historically, exhibitions have been associated with artistic schools, where artists present their works to the public in the form of art exhibitions. The freedom to hold exhibitions has led to many gatherings of artists, each group seeking to achieve a new style. This constant pursuit of innovation and avoidance of tradition has led to multiple exhibitions with different styles, each known by a specific name, such as "Impressionism" or "Expressionism". The Impressionist school, for example, resulted from an exhibition in which twenty-nine artists participated, including Cezanne, Guillaumin, Monet, Manet, and Pissaro.

Therefore, the visual artist must be creative in developing their tools and utilizing artificial intelligence technology based on the characteristics of their community and according to their culture, otherwise they will not be innovative. Finally, it can be said that artificial intelligence

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<sup>13</sup> Zain Abdel Hadi: "Artificial Intelligence and Expert Systems in Libraries: An Experimental Introduction to Expert Systems in the Field of References", Academic Library, 2000, p. 44.



technology contributes to providing those material means to assist the artist in digital artistic creativity.

### **Contemporary Technology and Fine Arts:**

It is natural for art to be influenced by scientific and technological progress in the field of information. A new artistic trend emerged based on digital systems, known as Digital Art, which is the name given to the visual art movement that uses the computer as a technical intermediary in producing new works of art<sup>14</sup>. By using various specialized software programs and advanced effects fed into the computer, the resulting work is a mix of the artist's vision and the digital output of those programs, producing a new work referred to as the digital dimension<sup>15</sup>. Between 1968 and 1970, major exhibitions were held in the United States and Europe that attracted attention to the art and technology movement in general and to the computer's potential as an innovative tool in particular. These exhibitions included computer-generated poetry, drawings, sculpture, robots, choreography, films, and architecture in Cybernetic Serendipity, demonstrating how the use of new technology had become important in fine arts.



Figure (1) shows the artist Harold Cohen standing next to his artworks through the robot Haroun

The opportunity to explore the art and technology of the age came, and Maurice Tuchman, the patron of modern art at the Los Angeles County Museum of Art, took the initiative. He developed an art and technology program, A&T.

Tuchman's plan began in 1966, but it was not completed and implemented until 1968. It was concerned with "blending new technological sources with industry with the imagination and artistic talent of the greatest artists of the age." In order to achieve this goal, he wanted to put about 20 talented artists in one place for twelve weeks at a major technology and industry

<sup>14</sup> Sayda Mahmoud Ahmed Khalil, 2006, pp. 60-61.

<sup>15</sup> Islam El-Sayed Gharib, 2006 AD.

company in California. His presentation was motivated by the belief that giving selected artists the ability to deal with modern technology would increase their artistic abilities and improve industry productivity. Additionally, mastering digital art and practicing it is one of the ways to achieve new aesthetics, where different types of knowledge from philosophy, science, art, and engineering come together.

Therefore, taking advantage of new technological innovations contributes to the design process by supporting human cognitive abilities. This can be achieved by utilizing computer-aided design (CAD) technologies, which can handle vast amounts of information and provide a wide range of design alternatives to create a supportive decision-making system. Additionally, CAD technologies facilitate modifications, re-formulation of artwork, and surface processing to achieve the final vision without wasting any materials<sup>16</sup>. The researcher believes that understanding the formal aspects through practical application of digital art is essential, as virtual shapes are related to their constituent materials, which carry specific meanings that artists can benefit from.

#### **The Artist and the Robot in Fine Arts:**

The digital revolution has created many areas of conflict between art and technology, and the challenges facing fine arts in the information age can be seen as manifestations of this conflict. Observers of the reality of fine arts can identify many challenges in the information age because there is an antagonistic relationship between art and technology and between artists and technicians. If the dialogue is still in the arena of conflict, then artists are required to take a serious stance against computer specialists.

These challenges manifest in the ability of computer specialists to produce programs that allow for the creation of paintings using graphics tools. Computers are now used to create the backgrounds for films, aided by the ease of use that allows designers to choose the perfect color, regardless of their imagination. This has led to the emergence of what is known as "freedom of colors," as well as the ability to choose the appropriate font style (thuluth, riqaa, naskh, Andalusian, etc.) and size, in just a matter of seconds. Furthermore, massive collections of Islamic decorations can now be found on dedicated websites and placed in appropriate locations. Perhaps the most significant revolution in the field of computer graphics for the fine arts is the ability to produce animation, as well as the ability to design three-dimensional shapes,

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<sup>16</sup> Iman Ali Mohammed Al-Sharqawi, 2006.

allowing designers to see their work from multiple angles and adjust it as needed. In fact, home and road designs, as well as home decor, are now created using computers<sup>17</sup>.

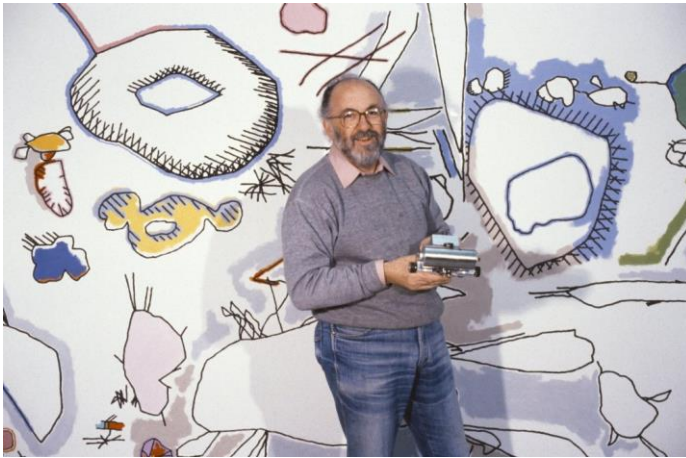


Figure (2) illustrates the digital artist Harold Cohen, one of the pioneers of digital art, using a robot standing next to his works through the robot Haroun

Harold Cohen is a British artist born in 1928. He obtained a diploma in Fine Arts in 1951 from the Slade School in London. He lived in California since 1968 and moved to San Diego as a visiting professor at the University of California in the field of Fine Arts. He was interested in the field of artificial intelligence and its applications in the fine arts. In the 1970s, he was able to develop a computer-controlled drawing machine, and he also developed the language "Aaron" over the course of twenty-three years. He contributed to the development of robot art<sup>18</sup>, and his paintings designed<sup>19</sup>.

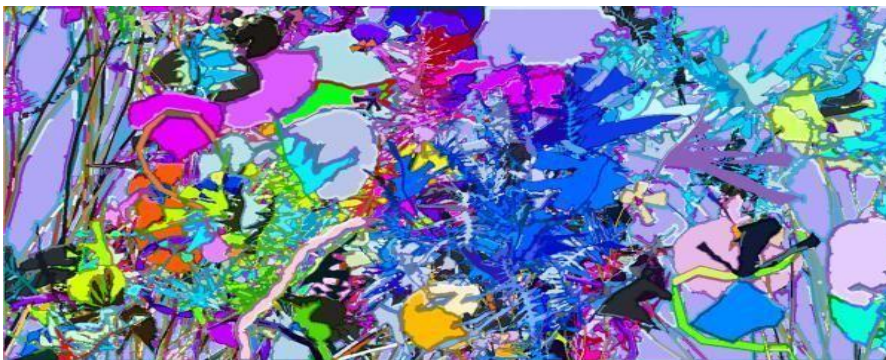


Figure (3) is an illustration of one of the artworks created by artist Cohen using the robot

<sup>17</sup> Safa Shahin, 2006.

<sup>18</sup> <http://dada.compart-bremen.de/node/750#>

<sup>19</sup> url: <http://www.scinetphotos.com/auction.html>

Harold Cohen used computer technology in the field of restoring old paintings, by compensating for missing, faded or damaged areas, and providing the visual artist with the original shape of these paintings and suggesting other forms that can be viewed before coloring and moving them from all directions using a three-dimensional system.

### **The robot Haron: between aesthetic and sculptural value:**

Digital art is considered an extension of visual art, thanks to the development of technology, where traditional tools are replaced by modern technological tools and unlimited options. The robot is considered a "moving drawing" for the digital artist, relying on specialized and professional software that blends technology with creativity.

Therefore, the visual artist must be creative in using these programs, producing them and employing them based on the characteristics of their society and culture, otherwise they will not be creative. It can be said that if technology has contributed to providing those material means to help the intellectual in producing their literary or artistic work, it has also reduced its role through a process of marginalizing culture and turning the arts into a traditional function.

In the context of artistic creativity of the Haroun robot, it is important to note that the robot is a machine that is controlled through a computer. The term "tele-robot" refers to a robot that receives remote instructions, generally from a trained human operator. The robot then performs tasks in a direct, synchronous manner through sensors. This robot has two arms, each with four fingers, and each finger has a force sensor at the top, while the smallest finger has 20 tactile sensors.

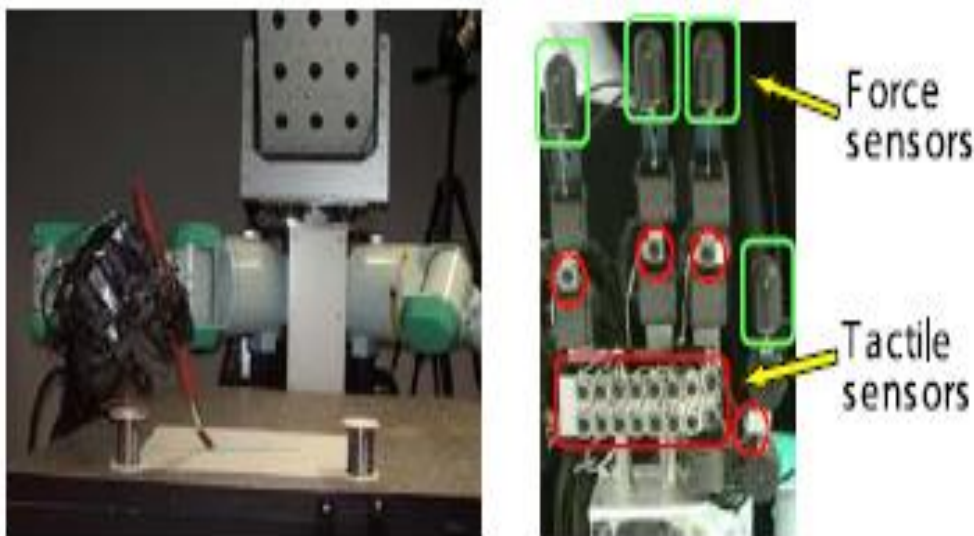


Figure (4) illustrates the drawing robot as it draws.



Figure (5) illustrates the painting robot holding a brush to draw with

The robot Haroun was able to distinguish between more than one brush if the color was different, and to choose the required brush.



Figure (6) illustrates the Haroun robot distinguishing between paintbrushes.

Advancements in technology and artificial intelligence have also helped to develop the artistic capabilities of the robot artist, including the ability to handle painting brushes in several ways, such as:

1. Brush tilt angle.
2. Amount of pressure on the brush.
3. Amount of brush pull upward.

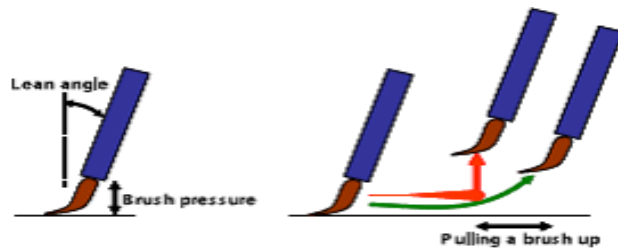


Figure (7) illustrates the angle of the brush tilt



Illustration (8) shows how to increase the brush stroke size

**Ability to execute design elements:**

Thanks to artificial intelligence software and expert systems, the robot Haroun has been able to possess the ability to design design elements that range from simple designs to complex ones. The following figure shows the result of the drawing done by the robot, where it drew an apple and a human mannequin.



Illustration (9) highlights the creativity of the robot Haroun

One of the artists who excelled in using the robot Haroun is the artist Cohen, who used the artistic elements of visual values through expressive abstraction in his paintings, using soft lines and how to clarify and mix them with colors. As for his style, his paintings designed using the robot Haroun are characterized by relying on lines and mixing colors. The robot Haroun

was able to draw abstract art in black and white, which was then added color by Harold Cohen<sup>20</sup>.



Illustration (10) shows an artwork created by Harold Cohen's (with the robot Haroun)

Especially, the artist Cohen was able to execute a distinguished set of artworks through the robot Haroun, with its abstraction and expressive values that are evident in digital art creations using robots. The researcher intentionally selected a research sample of the artist Cohen's paintings executed by the painting robot Haroun and analyzed them to confirm the role of digital art in its various uses in these works, including the use of the painting robot Haroun. The most important artworks executed by the artist Cohen using the robot Haroun are "Mother and Daughter," "Meeting on the Beach," "Two Friends," and "Two Women with a Decorated Background," in order to reveal some of the research results that the study aims to achieve through the isolation and analysis of artistic processing.

• **Aesthetic analysis of the artworks executed by the Haroun robot:**

The researcher describes and analyzes the morphological features of a sample of artworks produced by the Haroun robot, which are characterized by expressive abstraction. She noticed that they are works of high value in terms of composition, formal formulation of the painting, aesthetic relationships between the elements of the artwork, and the emotional and expressive artistic values charged with feelings and emotions.

**The first artwork: The mother and daughter painting by artist Harold Cohen**

Executed by the Haroun robot in 2003 (Form 4)

• **General composition:**

In this painting, the Haroun robot drew a beautifully composed artwork where the mother and daughter stand next to each other, separated by a large vase of flowers. The painting shows that the mother and daughter are standing in a room that could be a photography studio, as they were photographed in a classic pose.

• **Structural foundations:**

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<sup>20</sup> Shunsuke kudoh .painter robot: manipulation of paintbrush by force & visual feedback.-(IROS 2007 Workshop art & robots).2007.pp:65-66

In this work, the Haroun robot divided the painting vertically into two halves in a ratio of 1:1, where the lady's figure occupied the right half of the painting and the girl and vase occupied the left half of the same work, emphasizing the importance of the lady.

#### **Aesthetic and Visual Values of the Haroun Robot:**

From analyzing the body lines, we find elegance and smoothness in both the drawing of the lady, girl, and vase. Additionally, the Haroun robot was able to combine cool and warm colors in the painting and distribute them in a way that gives a sense of balance. In this work, the robot also paid attention to architectural perspective, as evidenced by the lines where they intersect with the walls and floor of the room. Moreover, from analyzing the shapes, we find that the Haroun robot was able to link the elements of the artwork through the block of the vase that connected the lady to the girl, and through the block of the plant, the robot was able to connect the entire background in a stunning and impressive artistic performance that demonstrates a sophisticated artistic sense.



Figure (4): "Mother and Daughter" painting by the Haroun robot in 2003

#### **Search Findings:**

Through the study, the researcher has reached some conclusions:

1. It can be said that employing artificial intelligence in the field of digital visual arts will contribute to significant transformations in the future, as it will lead to improving the quality of artistic works, enhancing productivity and creativity, as well as providing new and exciting interactive experiences for the audience and improving user experience, and enhancing interaction between artists and the audience, and developing new concepts for art.



2. Artificial intelligence can be used in the field of digital visual arts to improve imaging and digital design techniques, enhance color accuracy, and recognize shapes and artistic designs.
3. There are many currently available artificial intelligence technologies that can be used in the field of digital visual arts, such as deep learning, artificial neural networks, and artificial intelligence.
4. Machine learning and artificial intelligence can be used to analyze interactions between the audience and artistic works and guide artistic design based on these analyses, as well as to improve user experience and provide new and exciting interactive experiences.
5. Modern techniques can be used to develop digital art in many fields such as animation, digital films, video games, engineering design, interior design, and industrial design.
6. Artificial intelligence can be used to analyze data, predict future artistic trends, and guide artistic production based on these analyses. It can also be used to improve user experience and add more interactivity to artistic works.
7. Digital art is closely linked to modern human civilization, scientific and technological developments, and techniques used in other forms of art.
8. With the help of artificial intelligence software and experience systems, robots are capable of designing design elements that range from simple designs to complex ones, and they have achieved abstract expressionism in their paintings.
9. The use of modern technologies, such as artistic robots, and their widespread adoption, helps to promote general artistic economic growth.

#### **Research Recommendations:**

Based on the results obtained, the researcher proposes the following recommendations:

1. Modern technologies can be used to provide diverse artistic experiences to the public, enhance interaction between artists and audiences, and improve user experience. Modern technologies can also help to expand the scope of art and provide new opportunities for artists and creatives to express their ideas and creativity.
2. The use of modern technologies in digital fine arts should be balanced and proportionate. These technologies should be used in harmony and proportion with the artwork, its meanings, and goals. The artistic and philosophical aspects of the artwork should not be neglected in favor of solely relying on modern technologies.
3. Artists should retain the ability to freely express themselves and direct their own subjects without relying entirely on modern technologies. In addition, the use of modern technologies in digital fine arts requires ethical and social responsibility, where

these technologies should be used in a way that respects privacy and intellectual property rights, and avoids harm and discrimination.

4. It is also important to provide appropriate training and education for artists and creatives on the use of modern technologies in digital fine arts. The necessary opportunities and support should be provided for them to acquire the necessary skills and keep up with the latest developments in this field.
5. Ultimately, the use of modern technologies in digital fine arts represents an important transformation in the global art scene.
6. It can contribute to improving the quality, aesthetics, and interactivity of artworks, as well as expanding the scope of art and providing new opportunities for artists and creatives. However, these technologies should be used with caution and balance, while maintaining the creative values and meanings of the artwork.
7. The use of modern technology in the field of digital fine arts can be considered a positive step towards the future, but attention must be paid to the artistic, creative, ethical, and social aspects of this use. This requires providing the necessary resources, training, and education for artists and creators, as well as protecting intellectual property rights and privacy and avoiding abuse and discrimination.
8. Curriculums include teaching new trends in digital arts produced by emerging media such as robots, so that students can understand their important role in postmodern arts as a catalyst and expression of various human and social issues.

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