Visual Arts Section
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Can Real Artwork Be Created with Artificial Intelligence?

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Abstract: Artificial intelligence is one of the most popular topics today. Briefly called AI, the most advanced technology and a great revolution, has moved to very different dimensions with the internet age. We can see that AI reveals human potential. AI machines, robots and many tools that we use in our homes and workplaces in many parts of the world have become a part of our lives. Human beings can produce art, but can AI produce real art? Scientists who asked this question started to train AI. They developed computers that produced works of art by developing various methods. AI, which learns and analyzes many works of art with these methods, provides inspiration and creativity to artists. In this period when technology is rapidly becoming widespread, art also offers new meanings to the person and the individual's role in society. While the digital world defines new living conditions and art, people's economic relations have also changed. While companies invested heavily in this technology, AI started to produce its first works. The majority claim that AI produces real works of art and place a value on it. So, who are the real artists of these works? How natural are the works produced by artificial intelligence? Is it valuable enough to buy? Does it bring the viewer artistic satisfaction? Does it contribute to art and society in a cultural and economic context? Will artists take back their pens and brushes or will they use technology as a tool to produce original works?

Keywords: AI technology, Internet of Things, Machine learning.

Artificial intelligence

Artificial intelligence; it is an intelligence system which instantly makes plans and programs, evaluates all possibilities and makes the right decision, creates a strategy and weighs in the options. The skills of artificial intelligence include processing, analysis and problem solving, perception, learning and planning, and object orientation skills.

Fig. 1 Pao_studio/Shutterstock

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John McCarthy, a famous computer scientist, was born in the USA in 1927. He coined and introduced the term "artificial intelligence" at the Dartmouth Conference in 1956. This event marked the beginning of a new era in artificial intelligence research and development.

Fig. 2 McCarthy in Stanford University

McCarthy described artificial intelligence as the "science and engineering of intelligent machines making (Banafa, 2016)"[1].

Deep Learning and IoT

Machine learning gained popularity between 1980 and 2000. It is a method of data analysis that automates analytical model building and is a branch of artificial intelligence[2].

In AI, the "deep learning" subfield, which enmeshes data prediction, recognition and identification systems, operates akin to a network which uses image and sound recognition and editing. This system becomes more like our personal assistant through touch, face scan and gesture identification. Companies such as Apple, Google or Skype have contributed to the business world through this system. Face recognition, video analysis and under-vehicle

[1] Ahmed Banafa (2016). *How Artificial Intelligence Will Kickstart the Internet of Things?*, Semiwiki.com website (accessed November 18, 2018), retrieved from: https://www.semiwiki.com/forum/content/5383-how-artificial-intelligence-will-kickstart-internet-things.html

[2] Thomas H. Davenport (2018). *Machine Learning*, Sas Institute website from Analist The Wall Street Journal, accessed November 15, 2018, retrieved from: https://www.sas.com/en_us/insights/analytics/machine-learning.html

imaging methods used as security systems in various countries control the entrance to government buildings.

The idea of adding sensors and intelligence to objects, called the "Internet of Things" (IoT), began in the 1980s. Sensors and the internet of things began to be used for the business sector and production as their costs decreased.

While the internet provides us with data, artificial intelligence processes it. All industrial machines, robots, unmanned aerial vehicles and computers don't become functional without the internet. The internet network, which acts as a remote sensor, processes and evaluates information instantly.

Creativity and Computer Art

While we expect for the digital world, technology and machines to respond to humans and the world, the following question arises: can these machines be creative? Can artificial intelligence make art? How real is the art created by AI?

The concept of creativity is a complex structure in itself. It has abstract meanings such as "aesthetic", "inspiration", "foresight". Knowledge and experience are needed to produce creative works. This knowledge and experiences must be combined with insight to create original works. Therefore, the first AI products are new visual works integrated with old information, ideas and images.

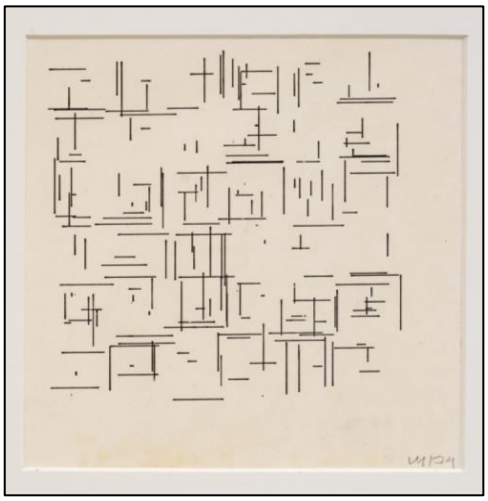

Fig. 3 Vera Molnár, "Untitled-an early example of computer art", 1972

Since the 1960s, artists have investigated how computers can independently produce art. The birth of digital art also dates back to the discovery of the computer. "Computer art", which emerged in the 1960s, also constitutes digital or algorithmic art.

When Frieder Nake opened a computer art exhibition in Stuttgart in 1965, he received criticism as to whether the works produced by the program which

produced geometric figures were real art. The same debate continues today. Nowadays, there are graphic design departments in art schools. Here, the works done with computer programs create an aesthetic appearance.

Some artists, such as Hungarian-born Vera Molnar, created the first code-based drawing programs (Image 3). She created non-representational paintings in the 1940-50s. In 1968, she began using computers to create her first algorithmic drawings.

Fig. 4 William Latham, Gazelli Art House

British computer artist William Latham produced 3D computer models of organic life forms using genetic algorithm-based techniques to transform basic forms into artistic creations (Image 4). Latham applied the principles that would "evolve" the forms of animated, organic sculpture in simulators, without human orientation in the simulators[3]. Computer science and AI system "deep learning" was evolving, but it was thought that computers could produce a real work of art.

In the world of music, another branch of art, generic music lists were created on the computer. Companies like Spotify have started making artificial art with "Peaceful Piano" and similar playlists. We also use ChatGPT in our daily life as an assistant author and academic researcher.

Artificial Intelligence and Art

The Art-net website, an important name in the art market, announced that a Parisian collector purchased a work created with artificial intelligence in 2018.

[3] J.J. Charlesworth (2018). *Can AI produce pictures but can he create art for himself?*, "CNN Style", September 10, retrieved from: https://edition.cnn.com/style/article/artificial-intelligence-ai-art/index.html

He reported that this work was made using a computer program by Obvious, a French creative collective.

Fig. 5 $\boldsymbol{G}\ \boldsymbol{max}\ \boldsymbol{D}\ \mathbb{E}\boldsymbol{x}\ [\boldsymbol{log}\ \boldsymbol{D}\ (\boldsymbol{x}))] + \mathbb{E}\boldsymbol{z}\ [\boldsymbol{log}\ (\boldsymbol{1}\ -\ \boldsymbol{D}\ (\boldsymbol{G}\ (\boldsymbol{z})))]$, "Edmond de Belamy Portrait", 2018

The first portrait work signed by AI has been auctioned for the first time in Paris. This portrait of the fictional Belamy family was created as an artificial art through a series of algorithms[4]. It was created by a computer without any human intervention, using an AI system called Generative Adversarial Networks (GAN). Belamy portraits here were created by imitating paintings from the 14th to the 18th centuries[5].

Professor Ahmed Elgammal from Rutgers University in New Jersey conducted a study similar to the Belamy family using data from 14th century paintings. Elgammal, who researches representations of moving objects, says the results of virtual intelligence are mostly abstract images.

The professor has trained its algorithm by feeding more than 80,000 digitized images of Western paintings from the 15th century to the 20th century. According to him, the machine has developed an aesthetic understanding. His algorithms produce art without human touch[6].

Elgammal implemented a Turing test to compare computer-generated images with human-generated images. The subjects were unable to distinguish the difference between works produced by artificial intelligence and those

[4] Eileen Kinsella (2018). *First AI manufacture portrait sold in auction is lowered expectations*, "Artnews", October 25, (accessed November 22, 2018), retrieved from: https://news.artnet.com/market/first-ever-artificial-intelligence-portrait-painting-sells-at-christies-1379902

[5] Naomi Rea (2018). *Why a collector has taken an artwork with artifi-cial intelligence and is open to buy more*, "Artnews", April 3 (accessed November 22, 2018), retrieved from: https://news.artnet.com/art-world/art-made-by-artificial-intelligence-1258745

[6] Rene Chun (2017). *Getting a Picture Difficult to Understand by Computer or Human*, "Artsy" website (accessed November 21, 2018), retrieved from: https://www.artsy.net/article/artsy-editorial-hard-painting-made-computer-human

produced by humans. They even found the art of AI more aesthetically appealing.

He founded the first art exhibition produced with artificial intelligence algorithm under the name AICAN. Using psychology-based and deep learning techniques, AICAN creates artistic images. Its algorithm seeks answers to the following question: "What if we can teach a machine how to recognize art and art style and then program it to create new images that don't follow the created styles?"[7]

American technology writer David Pogue (1963) asked Elgammal: "Well, who is the artist of one of these paintings? Are these programmers? Is the software?" Professor Elgammal replied: "I think I'm both. I see myself as an artist when I create the frame. If artificial intelligence is produced by un-manned machines, it is a fact."[8]

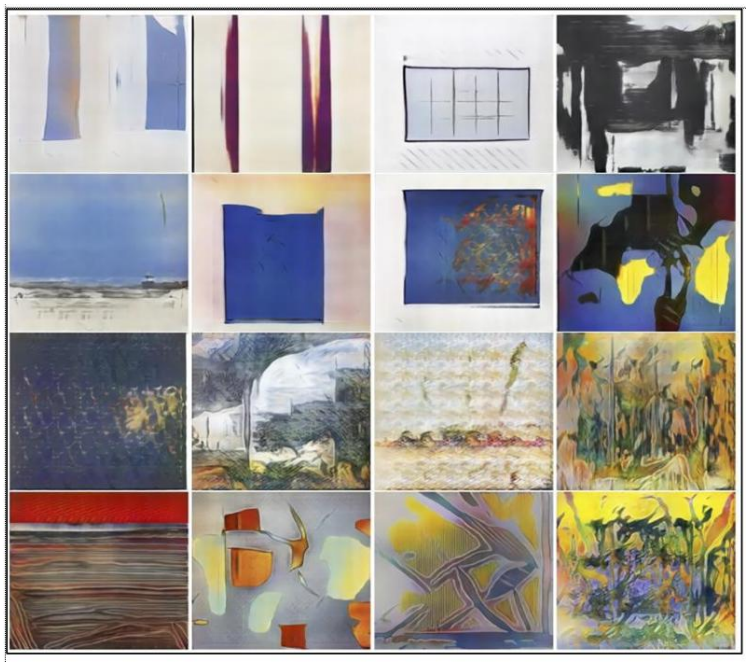

Fig. 6 AICAN Collection, Creative Adversarial Networks: Generating art by Learning about Art and Deviating from Style Norms, 2017

Mario Klingemann, a pioneer of AI working with GAN, says this model can create images that define the emerging and new type of AI, and that it is

[7] Rutgers University website (accessed November 21, 2018 & September 2024), https://sites.google.com/site/digihumanlab/research

[8] Unknown, *Art created by artificial intelligence*, CBS News, "Art and Artificial Intelligence Laboratory-Rutgers University website" (accessed November 21, 2018), retrieved from: https://www.cbsnews.com/pictures/art-created-by-artificialintelligence/7/

really just a tool. Klingemann: “Even if you don't have a deeper knowledge of how they work and how they can control, they create an instant gratification.”[9]

The Greek digital painter Theo Triantafyllidis says, “Even the most advanced AI today is somewhere between a really clumsy child and a really intelligent animal.”[10]

Essentially, artificial intelligence is a structure that creates new possibilities inspired by human creativity. When independent creativity is fully realized, the artificial intelligence artist will be separated from the human. As the artist Teo said, the art of AI, which is still crawling, aims to run fast. Looks like this will take some time.

Fig. 7 Theo Triantafyllidis, “Seamless”, 2017

Art of Robots

The first modern robots were created in the early 1950s. The revolutionary robot of the twentieth century was invented as an industrial product.

Fig. 8 Courtesy Design Museum, England, 2021

[9] Tim Schneider and Naomi Rea (2018). *Has artificial intelligence given us the next great art movement? Experts say slow down, the field is in its infancy*, “Artnet News”, September 25 (accessed November 21, 2018), retrieved from: https://news.artnet.com/art-world/aiart-comes-to-market-is-it-worth-the-hype-1352011

[10] Naomi Rea (2018). *Why a collector has taken an artwork with artifi-cial intelligence and is open to buy more*, “Artnews”, April 3 (accessed November 22, 2018), retrieved from: https://news.artnet.com/art-world/art-made-by-artificial-intelligence-1258745

Artificial intelligence is used extensively in finance, healthcare, production, education and service sectors. In fact, in China, AI is taught as compulsory subjects in primary and secondary schools.

Today, we can see that AI reveals human potential. Human is an emotional being and art contains emotion. Can artificial intelligence robots have emotions? Scientists who ask this question are training it more and more day by day and improving it to respond to emotions.

AI-Da, the first painter robot whose construction was completed in 2019, opened an exhibition in England in 2021 with portrait paintings she drew. The painter robot, produced through an agreement between gallerist Aidan Meller and Cornish, a robotics company, was developed at Oxford University. AI-Da paints portraits using graphics algorithms for drawing and painting, and can also draw with her hand what she sees with her artificial eyes.

Conclusion

Throughout history, artists have been in search of new things. Thus, they developed various techniques and styles. They created practical ways with new tools. New approaches emerged with many art movements from the Renaissance to contemporary art. In the past, only God was called a "creative" artist. Church painters were inspired by him. With humanism, man has moved to a creative position. In fact, according to quantum physics, the definition of God, the creator, has changed. Artificial intelligence machines are also inspired by humans. It produces works of art using the images taught to it and defined in the database.

In art education, we first start with imitation and make reproductions. Then, with knowledge and experience, we develop new techniques and create original works. Scientists and artists trained artificial intelligence and made it imitate humans. Although it is currently in its infancy, it has started to create partially original works. It is the artists and coders who drive it. Just as there is a trend from the realistic movement to contemporary art, artificial intelligence robots are also a contemporary creation. AI, the technology of our age, has brought a new perspective to art. AI machines offer new creative opportunities to artists and enhance imagination. We know that many traditional artists started to use computer to create new art forms and styles. Serigraphy, photography, computer software (Adobe, etc.), 3D printers, 3D modelling programmes (Blender etc.) are used to create sculpture, painting and digital arts.

Computer- and AI-generated art also contributes to abstract art. It is aimed to create striking works of art by adding more complex codes to artificial intelligence algorithms. Galleries also benefit from this technology, creating a new economic model for exhibiting original works and reaching more audiences. Artworks are exhibited in NLP galleries today and the artists use crypto signature to product their works and getting money.

AI can be a "tool" to produce art as part of the artistic process. Successful results were obtained in aesthetic experiments using this tool. Computer software is both a tool and a creative collaborator.

When the camera first appeared, it was not seen as an art tool. Photography was not an art form. Later, artists used it for their own purposes and began to produce art. Famous Turkish photographer Ara Güler says: „If the best camera took the best photographs, the person with the best typewriter would write the best novel." In other words, the artist who gives soul to the work of art is the human being himself. Machines perform a mechanical action. Artificial intelligence is more practical than humans, learns quickly and produces results.

These machines are getting more advanced every day and are getting ready to inspire people with "super intelligence and talent". Algorithmic images have gone beyond the stereotypes and become aesthetic. There are several kinds of intelligence. Art requires visual, mathematical, auditory and linguistic intelligence. AI has all of these, then it produces real works of art.

We can ask another question: "is it natural?" AI and machines imitate humans. So it is not natural but human to also imitate nature. Artists watch the nature, hear birdsongs, develop analytical processes in the face of the mathematics of nature and the music from nature. For instance, a landscape artist paints inspired by nature. They create art by interpreting it with various colours and forms, by creating new possibilities. But the reality itself is "nature". We are imitators too. How natural is this? How much natural art do we make? We create artificial worlds and imitate nature. So, AI makes real art and the metaverse will become our reality.

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